



ASME 2015 PROGRAM

AUGUST 2-5, 2015 | BOSTON, MASSACHUSETTS

IDETC/CIE 2015

INTERNATIONAL DESIGN ENGINEERING TECHNICAL CONFERENCES & COMPUTERS AND INFORMATION IN ENGINEERING CONFERENCE

17th International Conference on Advanced Vehicle Technologies (AVT)

8th Frontiers in Biomedical Devices (BIOMED)

35th Computers and Information in Engineering Conference (CIE)

41st Design Automation Conference (DAC)

12th International Conference on Design Education (DEC)

20th Design for Manufacturing and the Life Cycle Conference (DFMLC)

27th International Conference on Design Theory and Methodology (DTM)

2015 ASME/IEEE International Conference on Mechatronic and Embedded Systems and Applications (MESA)

39th Mechanisms and Robotics Conference (MR)

9th International Conference on Micro- and Nanosystems (MNS)

11th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC)

ASME 2015 Power Transmission and Gearing Conference (PTG)

23rd Reliability, Stress Analysis, and Failure Prevention Conference (RASFP)

27th Conference on Mechanical Vibration and Noise (VIB)

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We are pleased to welcome everyone to the 2015 ASME International Design Engineering Technical Conferences and Computers and Information in Engineering (IDETC/CIE) Conference in Boston, MA, USA, August 2-5, 2015. This flagship international meeting, for the ASME Design Engineering Division and the Computers and Information in Engineering Division, consists of the following fourteen conferences:

- 17th International Conference on Advanced Vehicle Technologies (AVT)
- 8th Frontiers in Biomedical Devices (BIOMED)
- 35th Computers and Information in Engineering Conference (CIE)
- 41st Design Automation Conference (DAC)
- 12th International Conference on Design Education (DEC)
- 20th Design for Manufacturing and the Life Cycle Conference (DFMLC)
- 27th International Conference on Design Theory and Methodology (DTM)
- 2015 ASME/IEEE International Conference on Mechatronic and Embedded Systems and Applications (MESA)
- 39th Mechanisms and Robotics Conference (MR)
- 9th International Conference on Micro- and Nanosystems (MNS)
- 11th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC)
- ASME 2015 Power Transmission and Gearing Conference (PTG)
- 23rd Reliability, Stress Analysis, and Failure Prevention Conference (RASFP)
- 27th Conference on Mechanical Vibration and Noise (VIB)

This year, IDETC/CIE 2015 will co-locate with the new 2015 ASME Additive Manufacturing + 3D Printing (AM3D) Conference to highlight emergent technologies that impact the critical engineering issues of product design and development, manufacturing, and the management and integration of information systems throughout the product life-cycle.

Presentations of papers across a very wide range of sessions are complemented by inspiring plenary and keynote lectures, lively panel discussions, and informational tutorials and workshops encompassing a rich spectrum of cutting-edge topics related to engineering design and manufacturing, theoretical and experimental paradigms for nano- to macro-scale applications, as well as the use of computers in engineering. IDETC/CIE 2015 and AM3D will hopefully serve not only as a unique forum for the sharing of recent research results and industrial findings, but also as a superb forum for networking within and between academia, government, funding bodies and industry.

Of the 1,336 draft papers originally submitted to the conference, 1,091 have been included in the final technical program.

A successful technical program depends on several dedicated conference chairs, program chairs, technical committee chairs, and members of advisory

and international committees, symposium organizers, authors, and reviewers. We would like to warmly thank all of these members of our community for making IDETC/CIE 2015 and AM3D a landmark in terms of submitted papers and technical program. We would also like to express our appreciation for the efforts of the ASME staff, whose hard work behind the scenes is incredibly valuable.

We are proud to welcome you to a rich social program which features as the key event a reception at the John F. Kennedy Presidential Library & Museum with self-guided tours of the Main Exhibit Galleries and the Special Exhibit Gallery and a technical tour of the Massachusetts Institute of Technology.

We hope you will enjoy the IDETC/CIE 2015 and AM3D conferences and feel at home in the vibrant atmosphere of Boston.



Walter Lacarbonara

Conference co-Chair
Sapienza University of Rome



Jeffrey F. Rhoads

Conference co-Chair
Purdue University



Tamas Kalmar-Nagy

Program Chair
Budapest University of Technology and Economics

ACKNOWLEDGEMENT

ASME was founded in 1880 as the American Society of Mechanical Engineers. Today's ASME is a 120,000-member professional organization focused on the technical educational and research issues of the engineering and technology community. ASME manages one of the world's largest technical publishing operations, holds numerous technical conferences worldwide, and offers hundreds of professional development courses each year. ASME sets internationally-recognized industrial and manufacturing codes and standards that enhance public welfare and safety. The work of the society is performed by its member-elected Board of Governors and through its various Sectors, Boards and hundreds of Committees in Districts throughout the world. There are over 400 sections and student sections serving ASME's worldwide membership.

In its inaugural year, the Additive Manufacturing + 3D Printing conference examines the engineering behind additive manufacturing. Over the course of the program, the economics, technologies and processes driving product design, production, testing and finally validation aims to provide attendees with the knowledge to utilize this powerful and rapidly evolving technology. Speakers for the program have been selected by the program executive advisory committee to discuss the most recent developments from applied research and industry.

The Computers and Information in Engineering (CIE) Conference covers a broad spectrum of resources relating directly to the use of computers, computing methods, software and information management in engineering by providing a forum for understanding the application of emerging technologies that impact the critical engineering issues of representation, product design and product development, exchange, management and integration of information throughout the entire engineering product and process life-cycle.

The Design Engineering Division (DED) was founded in 1945, as the "Machine Design Division", part of the General Engineering Department of ASME. The objectives and function of this division, and its associated conferences, are to promote the art and science of mechanical engineering design in the conception, evolution, and design of machinery and products, as well as the mechanical design aspects of other phases of engineering. The division encourages and provides a forum for the interchange of ideas relative to design engineering through publications, presentations, discussion of technical papers, technical conferences and awards for outstanding achievement by individuals in the field of design engineering.

HAVE QUESTIONS ABOUT THE MEETING?

If you have any questions or need assistance, an ASME representative will be located at the registration area.

REGISTRANTS WITH DISABILITIES

Whenever possible, we are pleased to make arrangements for registrants with disabilities. Advance notice may be required for certain requests. For on-site assistance, please visit the registration area and ask to speak with a conference representative.

BOSTON

The Greater Boston Convention and Visitors Bureau, along with the Boston Hospitality Partners, is thrilled to welcome the American Society of Mechanical Engineers to Boston. A lot has changed here recently, so be prepared to be introduced to a "new" Boston. The Waterfront is booming with restaurants and harbor walks, museums have expanded and hotels have renovated. The mix of colonial charm and urban sophistication still shines through making Boston a dynamic site for meetings of all kind.

Cambridge is often referred to as "Boston's Left Bank" with an atmosphere and attitude all its own. It's the spirited, slightly mischievous side of Boston, just a bridge away on the other side of the Charles River. Packed with youthful vitality and international flair, it is a city where Old World meets New Age in a mesmerizing blend of history and technology.

Even though Boston is one of the largest cities in the country, its accessibility is unparalleled. And while it's easy to see the sights on foot, Boston also has an excellent public transportation system. In addition to everything within the city limits, some of Massachusetts' most scenic and historic towns are just a short distance from the city center and its proximity to other must-see sites all around New England, make it one of the country's most diverse and exciting locations. For more information visit <http://www.bostonusa.com/>.

HOTEL / HYNES CONVENTION CENTER

All conference activities for this year's AM3D and IDETC/CIE will be held in the Hynes Convention Center located at 900 Boylston St., Boston, MA 02115. ASME has secured a block of sleeping rooms at the adjacent - Sheraton Boston Hotel located at 39 Dalton Street, Boston, MA, 02199, (617) 236-2000. Attendees staying at the Sheraton, can access the convention center through the Shops at Prudential Center, which are adjacent to the 2nd level of the hotel.

REGISTRATION

Registration will be located on Level 2 of the Hynes Convention Center. The hours of operation are:

Sunday, August 2, 2015	7:00am – 6:00pm
Monday, August 3, 2015	7:00am – 6:00pm
Tuesday, August 4, 2015	8:00am – 6:00pm
Wednesday, August 5, 2015	8:00am – 3:00pm

NAME BADGES

Please wear your name badge at all times. Admission to all conference functions will be approved by your badge or a ticket. Your badge also provides a helpful introduction to other attendees.

TICKETED FUNCTIONS/ITEMS

Access to ALL conference functions such as the reception, workshops, and the conference luncheons is confirmed by your registration badge. If you wish to bring a guest to the reception, you must purchase a ticket in advance. For questions regarding any possible ticketed items, you can ask a conference representative located in the registration area.

CONFERENCE PRESENTATIONS

Registered attendees* will receive an email from ASME Publications prior to the start of the conference. This email includes a link to obtain online access to all of the technical publications associated with IDETC/CIE. The official 2015 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference proceedings will be produced at the conclusion of the conference. Any papers not presented on-site in Boston will not be published.

*Note: Online access to the technical publications is not offered to Exhibit-Only registrants. Presentations for AM3D Sessions may be available post-conference on the website.

AUTHORS PRACTICE ROOM

Room 205, located on Level 2, will serve as the author practice room from 7:00am – 5:00pm on Monday and Tuesday and from 7:00am – 3:00pm on Wednesday. An LCD projector and screen will be available for authors to practice their presentations.

BREAKFASTS

Start this year's conference off right! Please join your 2015 conference organizers on Monday in the conference foyer on Level 2. Coffee, and baked goods will be available for ALL registered attendees from 7:00am – 8:00am. Additionally on both Tuesday and Wednesday from 8:00am – 9:30am all registered attendees are invited to a Conference-wide Plenary Session. Breakfast will be served. Those without a conference badge will not be admitted. *Note, additional information about presentations taking place during the Tuesday and Wednesday breakfasts is included within the Keynote Section.

COFFEE BREAKS

Most coffee breaks will be scheduled in Exhibit Hall C on Level 2. The Monday morning and Wednesday afternoon breaks will be in the conference foyer on Level 2. The afternoon coffee breaks on Monday and Tuesday will feature ice-cream treats sponsored by the ASME Journal of Mechanisms and Robotics.

AWARDS LUNCHEONS

Design Engineering Division (DED) Awards Luncheon

Tuesday, August 4, 2015

12:40pm – 2:00pm

Location: Hynes Convention Center, Auditorium, Level 2

This luncheon is included in the registration fee for Full and Tuesday Registration attendees. Guests tickets are \$50.

Computers & Information in Engineering (CIE) Awards Luncheon

Tuesday, August 4, 2015

12:40pm – 2:00pm

Location: Hynes Convention Center, Room 312, Level 3

This luncheon is included in the registration fee for Full and Tuesday Registration attendees. Guests tickets are \$50.

Note: the DED and CIE Awards Luncheons this year will be held at the same day and time. One luncheon is included in the registration fee. Please attend the lunch that you selected during the registration process.

RECEPTIONS

Conference Reception

Monday, August 3, 2015

6:30pm – 9:30pm

Location: John F. Kennedy Presidential Library and Museum (off-site)

This reception is included in the registration fee for Full registration attendees only. One Day Attendees and guests may purchase a ticket to this function for \$75.

Chartered buses will transport attendees to and from the JFK Presidential Library and Museum. Buses will begin departing the Hynes Convention Center at 6:00pm. Return transportation to the Sheraton Boston Hotel will begin at approximately 9:00pm.

Sponsors & Exhibitors Reception

Tuesday, August 4, 2015

5:30pm – 8:00pm

Location: Exhibit Hall C, Level 2

This reception is complimentary for registered attendees. Guests tickets are \$50

This reception will allow you the opportunity to network with this year's exhibitors and sponsors. Attendees who have visited every exhibit booth (and have their exhibit passport stamped) will be entered into a raffle for a 3D Printer!

TECHNICAL TOUR

Massachusetts Institute of Technology Technical Tour

Wednesday, August 5, 2015

3:00pm – 5:00pm

Location: Massachusetts Institute of Technology

This tour is a ticketed function. The cost is \$35.

This tour of MIT will highlight a series of labs performing research related to additive manufacturing and digital fabrication within the MIT Department of Mechanical Engineering, Media Laboratory, and MIT-SUTD International Design Center. The tour will conclude with a visit to the MIT Museum. Space is expected to fill. Act quickly! Transportation will be provided from the Hynes Convention Center. The bus will depart the Hynes Convention Center at 2:30pm sharp. Attendees are encouraged to meet at the Boylston Street entrance on Level 1 at 2:15pm.

NETWORKING ACTIVITIES

FutureME MINI-TALKS

Sunday, August 2, 2015

5:30pm – 7:30pm

Location: Room 200, Level 2

Presented by the ASME Board on Career Development



Program Moderator: Bryony DuPont,

Assistant Professor, School of Mechanical, Industrial, and Manufacturing Engineering, Oregon State University



Overcoming the Challenges of Effective Communication in the Realm of Interdisciplinary Pursuits

Paul Egan, Engineering Design and Computing Laboratory, ETH Zurich

R&D that blurs disciplinary boundaries often yields revolutionary discoveries and products, yet there is little established advice for early career engineers pursuing these highly ambitious interdisciplinary projects. Even less advice exists for effectively overcoming the inevitable challenges—especially for how to effectively communicate across disciplinary borders. Although each interdisciplinary endeavor is unique, there are common communication pitfalls that exist regardless of the disciplines involved, which emerge due to differing knowledge, skills, and values. This talk aims to deliver guidelines for effectively communicating across disciplines while pursuing interdisciplinary endeavors—the advice that all interdisciplinary engineers wish they had, but never heard.



Collaboration: Building Connections

Meghann Noonan, Associate Project Engineer, Hasbro, Inc.

Meghann Noonan will discuss her journey in learning that communication comes in many forms and is interpreted differently by everyone. Not only is how you communicate with others important, but the perception of how you communicate is equally as important. Noonan's research experiences, as well as group projects throughout college, gave her a good base understanding of her communication style, or so she thought. During her tenure at Hasbro Inc. Noonan has been working with

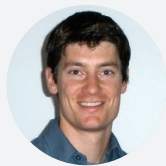
many different people on a daily basis, each with their own way of interpreting and sharing information.



Building an Online Brand that Works for Your Career

Douglas L. Van Bossuyt, Assistant Professor, Department of Mechanical Engineering, Colorado School of Mines

An online presence is now viewed as a critical element for many researchers and early career professionals to set themselves apart from other engineers. Branding your online presence and management may seem daunting at first, however, it can help you to evaluate and showcase your engineering work and experience. Based on the presenter's professional online history, this talk will discuss appropriate professional online presence building and maintenance, and how to avoid some common mistakes that engineers often make.



Pitching Technical Ideas to Non-Technical Audiences

Steven Hoffenson, AAAS Congressional Science and Engineering Fellow

Steven will draw on his experiences as an academic-turned-congressional staffer discussing how to effectively share technical ideas with non-technical audiences.



Communicating Your Passion

Tara Murphy, VP and General Manager for Keurig Green Mountain Cold Systems

...Passion is something we all have in spades. So how do we go about using that fire to ignite our ideas in the professional world, communicating that to the right people and getting them to jump on board? Tara shares her journey from Cornell Mechanical Engineering student to the forefront of the refreshment revolution. At this session you will learn key skills on how to identify and communicate your passion and how to lead others in achieving their goals. At the end of the session Tara will be raffling off a Keurig 2.0 brewer.



Please use this QR code to obtain up-to-date information on the FutureME MiniTalks, to learn more about our presenters and find other surprises

AM3D Poster Session

Monday, August 3, 2015

10:50am - 12:30pm

Location: Exhibit Hall C, Level 2

Presenters will showcase leading-edge Digital Manufacturing applications and technologies which are transforming manufacturing. The poster session will be part of the Monday morning break and provide the opportunity for interaction with poster presenters for detailed discussions. Vote for your favorite poster!

ASME/NSF Student Design Essay Competition 2015

Challenges in the Design of Complex Systems

Monday, August 3, 2015

8:00am - 6:30pm

Location: Exhibit Hall C, Level 2

Students are invited to write essays on their vision for the future of design and manufacturing. The essays are judged by a panel of faculty from across the United States. This contest has been going on since 1998 and at least eight previous winners have gone on to become faculty members. Essay winners receive funding to attend IDETC and present their work in the form of a poster. These posters will be presented on Monday, August 3, 2015, 11:15am - 2:00pm in the Exhibit Hall C. This year we are indebted to the reviewers: Benjamin Caldwell, Bryony DuPont, Scott Ferguson, Kemper Lewis, Greg Mocko, and Beshoy Morkos.

We gratefully acknowledge support from the National Science Foundation, Grant Number CMMI-1440457.

Design Essay Competition Organizers: Janet K. Allen and Farrokh Mistree

Winners:

Elizabeth May North Carolina State University
"The Evolution of Business and Manufacturing"

Chris Arbogast Oregon State University
"Production in 2030: Design and Manufacturing in a Digital Age"

Zhenjun Ming The University of Oklahoma
"Stay Competitive in the Trend on Industrial Internet"

Tyler Johnson LeTourneau University
"Hyper-customization Through Local Integrated Additive Manufacturing (LIAM) and Design Sharing"

Pedram Nojedehi and Maryam Sabeghi The University of Oklahoma
"Characteristics and Research Challenges of a Leading High-tech Global Design and Manufacturing Company in 2030"

Zachary Ball University of Buffalo
"Capitalizing Communication Possibilities in the Age of Information"

Phyo Htet Hein Florida Institute of Technology
"Next Generation Product Design Development Tool Utilizing Social Media Data"

Kristopher M.Nerczuk Clemson University
"The Shifting Paradigm to Low Resource Manufacturing"

Chris Miller North Carolina State University
"Becoming a Leader in 2030: Advice for Successful Design and Manufacturing Firms of Tomorrow"

Julia O'Rourke University of Texas at Austin
"Design for Extremely Low Greenhouse Gas Emissions as a Foundation for Global Design and Manufacturing in 2030"

Vivek Rao University of California - Berkeley
"Smarter Water: Agile Design and Manufacturing's Future for the Water Sector"

Jointed Structures and Nonlinear Systems Poster Session

Session MSNDC/VIB-6-3

Tuesday, August 4, 2015

6:30pm - 7:30pm

Location: Exhibit Hall C, Level 2

This poster session details the work conducted at the Sandia Nonlinear Mechanics and Dynamics Summer Research Institute, co-hosted by the University of New Mexico, and organized by researchers from Sandia National Laboratories, the University of New Mexico, Imperial College London, the University of Stuttgart, the University of Wisconsin Madison, the University of Tennessee Knoxville, Arizona State University, the Technical University of Hamburg, and Michigan State University. The Institute is co-sponsored by Simulia, Altair, LMS, and Audi.

CIE Graduate Poster Session

Tuesday, August 4, 2015

5:30pm - 7:00pm

Location: Exhibit Hall C, Level 2

Mechanisms and Robotics Poster Sessions

Monday, August 3, 2015

Session: MR-6-1, MR-6-2

8:00am - 11:40am

Location: Room 210, Level 2

Compliant Mechanisms and Micro/Nano Mechanisms (A. Midha Symposium)

Monday, August 3, 2015

Session: MR-12-1, MR-12-2

Time: 2:00pm - 5:50pm

Location: Room 210, Level 2

Student Mechanism and Robot Design Competition

Wednesday, August 5, 2015

Session: MR-6-3, MR-6-4, MR-6-5

9:30am - 3:00pm

Location: Room 210, Level 2

Compliant Mechanisms and Micro/Nano Mechanisms (A. Midha Symposium)

ASME Innovative Design Simulation (IDSC) Challenge

Sunday, August 2, 2015

8:00am – 5:00pm

Location: Room 210, Level 2

The ASME Innovative Design Simulation (IDSC) Challenge is a unique forum that provides mechanical engineering and multi-disciplinary undergraduate students around the world an opportunity to demonstrate their creativity, organization, analysis, synthesis, and software skills, and to demonstrate the engineering process from the perspective of modeling and simulation for product or process design. Students will showcase their knowledge and creativity to address a broad spectrum of academic, industrial, manufacturing, and humanitarian challenges.

The top 12 entries (as chosen by a panel of judges) are invited to present their simulations and/or simulation environments and compete for 6 awards of \$2,000 in three software-based design simulation categories to a panel of judges at the ASME 2015 International Design Engineering Technical Conference and Computers and Information in Engineering Conference (IDETC/CIE) and Additive Manufacturing + 3D Printing Conference and Expo (AM3D) in Boston, MA, USA. The faculty advisors of the winner students are also announced and recognized through \$1,000 and 5 years of complimentary ASME membership.

The ASME Innovative Additive Manufacturing 3D (IAM3D) Challenge

Sunday, August 2, 2015

8:00am – 5:00pm

Location: Room 207, Level 2

All are invited to attend the finals of the ASME'S Innovative Additive Manufacturing 3D (IAM3D) Challenge. Meet the 15 undergraduate engineering/technology student finalist teams vying for five (5) \$2,000 awards each in the Best Overall Design, Best Innovation, and Best Re-engineered/Multidisciplinary Collaboratively Designed Product; Best Freshman Design and Best Verbal Presentation. The faculty advisor of the five (5) winning student/teams also win a \$1,000 award and 5 years of complimentary ASME membership.

The IAM3D Challenge is designed to give mechanical and multi-disciplinary undergraduate students around the world an opportunity to re-engineer existing products or create new designs that minimize energy consumption and/or improve energy efficiency. Students will showcase their creativity by demonstrating the value added through their ingenuity, by the application of sound engineering design principles, and by leveraging Additive Manufacturing technology to address a broad spectrum of industrial, manufacturing, and humanitarian challenges. The IAM3D Challenge also emphasizes the value of an ability to deliver a clear, concise and effective oral presentation.

DEC Student Competition: Designing for the Future

Monday, August 3, 2015

Session: DEC-4-1

4:10pm – 5:50pm

Location: Room 105, Level 1

Designing for the Future is an undergraduate design competition organized by the Design Education Technical Committee (DEC) of the ASME Design Engineering Division (DED). It is to recognize that our undergraduates are the future of the engineering profession, and highlights the importance of working together in our diverse world community and the importance of appropriate stewardship of our resources as technology continues to move forward. The DEC believes that encouraging the undergraduates in design activities is critical to our mission of improving education in the art and the science of mechanical engineering design, thus providing the students an incentive to continue in design and become the researchers, educators, and professional design practitioners of the future.

MSNDC Student Paper Competition

Tuesday, August 4, 2015

Session: MSNDC-20-1

11:40am – 12:40pm

Location: Room 300, Level 3

The Technical Committee on Multibody Systems and Nonlinear Dynamics and Sound (MSND) is sponsoring a Student Paper Competition, as part of the 11th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC).

Student Networking Event and Team Design Competition

Tuesday, August 4, 2015

5:30pm – 7:00pm

Location: Innovation Alley, Exhibit Hall C, Level 2

After a busy day of attending technical presentations we invite you to join us for a student networking event and design competition. Meet old and new friends and engage in a 30-minute competitive design experience that will give you a chance to exercise your creativity and work as a team. Snacks will be provided and gift cards will be given to the winners!

VIB Student Paper Competition

Dates, Times, and Locations Vary. See technical sessions for more information.

The Technical Committee on Vibration and Sound (VIB) is sponsoring a Student Paper Competition, as part of the 27th Conference on Mechanical Vibration and Noise (VIB). Awards will be presented to the top 3 student papers.



AM ADDITIVE
MANUFACTURING
3D + 3D
PRINTING
Conference & Expo

Hello and welcome to the 2015 ASME Additive Manufacturing + 3D Printing (AM3D) Conference, the inaugural event in a new series of conferences focusing on digital manufacturing and design innovation!

Given all of the hype surrounding 3D printing, we decided to focus this inaugural conference on “the engineering behind additive manufacturing” and create an industry-focused event that explores how additive manufacturing is reshaping how we design, make, and qualify parts.

We secured an impressive list of thought leaders and practitioners from both industry and academia to discuss their views on the real challenges and opportunities of additive manufacturing (AM).

The conference begins by discussing the economics behind AM and use cases for AM and then moves into candidate part selection and design tools for AM. Participants will witness live demos of the latest software tools and technologies for AM design and topology optimization and for AM process modeling and simulation, which is becoming more and more critical for successful AM fabrication. Materials and processing challenges will be highlighted by those working in a range of industries, and we wrap up with industry leaders discussing techniques for part qualification and non-destructive inspection.

We have also arranged to have several thought-provoking panels during the conference, including discussions on standards for AM, materials development for AM, and future directions of AM and 3D printing as envisioned by several pioneers in the field.

The opening keynotes by Bruce Bradshaw (Stratasys), Jason Lopes (Legacy Effects), and Hod Lipson (Columbia University) are sure to capture your attention and imagination, and we encourage you to visit more than 30 exhibitors highlighting the latest equipment, software, and technology during the event.

This great event would not have been possible without the help of a dedicated Executive Advisory Board, and I am indebted to them for all of their support and assistance. Specifically, I would like to thank:

Kevin Creehan, America Makes

John Hart, MIT

Agnes Kulcha, United Technologies

Brandon Lane, NIST

Frank Liou, Missouri University

Ivan Madera, MORF3D

Ed Morris, America Makes

David Rosen, Georgia Institute of Technology

Brian Rosenberger, Lockheed Martin

John David Rowatt, Schlumberger

Tim Shinbara, AMT

Zack Simkin, Senvol

Krishnan Suresh, University of Wisconsin-Madison

Darrell Wallace, Youngstown State University

Xiaoping Yang, Cummins

Finally, I would also like to thank ASME for the excellent staff support for this event, particularly Israr Kabir who kept us on track, on time, and on task this past year. I am also grateful to all the logistical and administrative help we received from Raj Manchanda, Erin Dolan, and Mary Jakubowski at ASME, and from Jeff Rhoads and his team of organizers for accommodating AM3D into the 2015 ASME IDETC/CIE conferences.

We hope you enjoy the AM3D conference and learn all you need know about the engineering behind AM!



Timothy W. Simpson

Chair, AM3D Executive Advisory Committee
Pennsylvania State University



The Organizers of IDETC/CIE 2015 and AM3D, as well as the entire Design Engineering Division, would like to formally congratulate the ASME Vehicle Design Committee on their 30th Anniversary. Their leadership in promoting innovative analytical, computational, and experimental investigations related to the control, dynamics, and design of full vehicle systems and their sub-assemblies, through events such as the 17th International Conference on Advanced Vehicle Technologies (AVT), is of great technical benefit to the Division and, more importantly, critical to the safety and efficiency of the greater public. We look forward to celebrating additional anniversaries in the years to come.

17th International Conference on Advanced Vehicle Technologies (AVT)

On this 30th Anniversary of the founding of the Vehicle Design Committee (VDC) of the ASME we are pleased to welcome you to the 17th International Conference on Advanced Vehicle Technologies (AVT), part of the 2015 ASME IDETC. The Vehicle Design Committee (VDC) promotes innovative analytical, computational, and experimental investigations in control, dynamics, and design of full vehicle systems, their subassemblies and components. With the ever increasing demands on driver and passenger safety, human-vehicle interface and human behavior modeling/simulation are also embedded into the technical spectrum addressed by the VDC. Our members perform fundamental research, applied research, and technology implementations for light and heavy vehicle design, modeling, and validation.

This year's AVT includes seven symposia for a total of thirteen sessions in the areas of: vehicle systems dynamics and control; vehicle tire design and mechanics; vehicle safety and ergonomics; vehicle systems design; vehicle electrification and powertrain design; light vehicle design; and military and commercial ground vehicle design.

The VDC is specially honored to host Prof. J. Karl Hedrick of the Department of Mechanical Engineering at the University of California at Berkeley for the Milliken Lecture, entitled "Recent Advances in Automotive Active Safety Systems". We are also pleased to have Mr. Steve Franz, Senior Director of Advanced Programs for General Dynamics Land Systems as the keynote speaker, for a talk entitled "Balanced Combat Vehicle Design Using Non-Linear Optimization and Multi-Attribute Utility Analysis (MAUA)".

Two awards are given at this year's conference: one for the AVT conference Best Paper and one for the AVT Student Best Paper.

The winner of the AVT Best Paper Award is DETC2015-46607, "Motorcycle tire modelling," by F. Ballo, M. Gobbi, G. Mastinu, G. Previati, R. Zerboni, and the Student Best Paper Award winner is the paper DETC2015-46103, "Map-Based Navigation of Autonomous Car using Grid-based Scan-to-Map Matching", by T. Furukawa, K. Takami, X. Tong, D. Watman, A. Hamed, R. Ranasinghe, G. Dissanayake.

On behalf of the Vehicle Design Committee, we also thank our symposium organizers for your time and dedication. We could not accomplish what we do without your support and leadership. We ask you to stay engaged, keep proactive and together help shape the future of Advanced Vehicle Technologies. We hope you will enjoy the AVT conference and feel at home here.



Xubin Song

Conference Chair
Eaton Corporation



Lei Zuo

Conference co-Chair
Virginia Tech



Beshah Ayalew

Program Chair
Clemson University

8th Frontiers in Biomedical Devices (BIOMED)

On behalf of the ASME Design Engineering Division, we are pleased to welcome you to the 8th Frontiers in Medical Devices (BIOMED) Conference. The BIOMED conference is intended to provide a cutting-edge forum for design and manufacturing engineers to discuss new medical device technologies and strategies for their development and evaluation. In addition to discussing research and technology development topics of interest to the bioengineering research community, we also seek to address interests in clinical research and regulatory issues in this exciting and rapidly evolving landscape.

We have an exciting program, with 20 technical presentations organized into 5 sessions. We also look forward to an enlightening keynote talk about Innovation in Medical Devices by Andrew J. Carter, Chief Technology Officer at TheraCell, Inc.

We extend our thanks to all the authors, session chairs, and reviewers who have contributed to the overall success of the conference. Special thanks are due to the symposium chairs – Chad Smith, Linxia Gu, Jason Moore, Loretta McHugh, and Xiaoli Zhang – whose strong support was a great help in producing a quality conference program.

We hope that you enjoy the conference and look forward to continued interactions in the future.



Carl Nelson

Conference Chair
University of Nebraska-Lincoln



Brian Jensen

Program Chair
Brigham Young University

35th Computers and Information in Engineering Conference (CIE)

The Computers and Information in Engineering Division of ASME welcomes all IDETC/CIE Conference participants to the 35th Annual Computers and Information in Engineering Conference (CIE). This conference is a premier venue for the international exchange of technical, scientific, and application knowledge related to the theory and practice of computing to support engineering activities. As such, this broad conference is organized around the four Technical Committees of the CIE Division:

Advanced Modeling and Simulation (AMS)

Mahesh Mani, Chair
Seung Ki Moon, Vice Chair

Computer Aided Product and Process Design (CAPPD)

Caterina Rizzi, Chair
Rahul Rai, Vice Chair

Systems Engineering and Information Knowledge Management (SEIKM)

Farhad Ameri, Chair
Christopher Hoyle, Vice Chair

Virtual Environments and Systems (VES)

Rafael Radkowski Chair
Francesco Ferrise, Vice Chair

This conference provides a forum for researchers, practitioners, educators, and students from industry, academe, and government research labs to share their latest findings and challenges with the broader research community. Seek to exchange ideas, share results, foster collaborations, and build a sustainable research community.

The conference organizing team is pleased to report that there are 130 accepted papers from the 234 submitted abstracts and 167 submitted full papers. The papers have been organized into several topical sessions:

- Advanced Modeling and Simulation (3 sessions)
- Computer-Aided Product and Process Development (4 sessions)
- Virtual Environments and Systems (5 sessions)
- Systems Engineering, Information and Knowledge Management
- Inverse Problems in Science and Engineering
- High Performance Computing
- Computational Multiphysics
- Uncertainty Quantification
- Additive Manufacturing (2 sessions)
- Multimodal Interfaces for Engineering Design
- Digital Human Modeling for Engineering Applications (2 sessions)
- Emotional Engineering (2 sessions)
- Modeling Tools and Metrics for Sustainable Manufacturing
- Design Informatics
- Product Lifecycle Management
- Knowledge Capture, Reuse, and Management
- Systems Engineering
- Simulation in Manufacturing

- Modeling and Simulation of Humans in Engineering

Additionally, we have organized six panels of leading experts in their respective fields to provide discussions and forums for current topics of relevance:

- VES Panel: I, Me, Mine Interfaces & VES
- AMS Panel: Digital Manufacturing and Design Innovation
- CAPPD Panel: Divergent Engineering
- SEIKM Panel: Research Trends and Gaps in Systems Engineering and Knowledge Management
- CIE Panel: Internet of Things
- CIE Panel: Engineering and Design of Complex Systems

We would like to thank all the authors for submitting papers to share their work. We would like to thank the reviewers for providing valuable feedback to help improve the reporting and the quality of the conference and the session chairs and co-chairs that worked on coordinating all of the paper reviews. It is impressive to note that well over 400 reviews were submitted this year.

On Tuesday afternoon, we will hold our annual awards luncheon at which we will present the conference best paper awards and the Division research, leadership, service, lifetime achievement, and best dissertation awards. The graduate student posters will also be on display throughout the conference, so please feel free to stop by and talk with our future colleagues.

As always, all participants are encouraged to join the technical committee and the Division meetings. Our community will continue to grow and flourish with your active participation as we work to define our future vision this coming year.

We welcome you to the 35th Computers and Information in Engineering Conference.



Krishnan Suresh

Conference Chair
University of Wisconsin, Madison



Monica Bordegoni

Program Chair
Politecnico di Milano, Italy

41st Design Automation Conference (DAC)

Welcome to the 41st ASME Design Automation Conference (DAC)! In addition to our technical sessions, we will be hosting a keynote symposium under the theme “Engineering for Global Development.” Co-sponsored by DAC, EGD, and DEC, the symposium will feature internationally recognized keynote speakers and a series of lightning talks focusing on the engineering design challenges associated with global development. We will also be presenting the Design Automation Award and the Ford Best Paper Award at the symposium. Also, please join us for our 41st DAC committee meeting on Tuesday evening.

The technical program spans the breadth and depth of design automation research. After a rigorous peer review process, 116 papers in 18 active research areas were accepted to the conference. From the 116 accepted papers, ten were identified as “Papers of Distinction” and nominated for the “Best Paper Award,” sponsored by the Ford Motor Company. The 10 papers of distinction are listed below (ordered by paper number and including the assigned session):

- DETC2015-46255, Mikkel Abrahamsen, “Spiral Toolpaths for High-Speed Machining of 2D Pockets with or without Islands” (DAC 11)
- DETC2015-46547, GwangKi Min, Eun Suk Suh, and Katja Hölttä-Otto, “Impact of Technology Infusion on System Complexity and Modularity” (DAC 3-2)
- DETC2015-46760, David Rosen, “A Set-Based Design Method for Material-Geometry Structures by Design Space Mapping” (DAC 9-1)
- DETC2015-46806, Nordica MacCarty and Kenneth “Mark” Bryden, “Modeling Technology and Policy Strategies for Energy Services in Rural Developing Communities” (DAC 7-1)
- DETC2015-46836, Yi “Max” Ren, Alparslan Bayrak, and Panos Papalambros, “EcoRacer: Game-based Optimal Electric Vehicle Design and Driver Control Using Human Players” (DAC 10)
- DETC2015-46909, Simon Miller, Timothy Simpson, and Michael Yukish, “Design as a Sequential Decision Process: A Method for Reducing Design Set Space Using Models to Bound Objectives” (DAC 3-1)
- DETC2015-46935, Zhimin Xi, Rong Jing, and Cheol Lee, “Diagnostics, Prognostics, and Uncertainty Management of Lithium-ion Batteries” (DAC 6-1)
- DETC2015-47302, Zhen Jiang, Shishi Chen, D. Apley, and Wei Chen, “Resource Allocation for Reduction of Epistemic Uncertainty in Simulation-Based Multidisciplinary Design” (DAC 13-2)
- DETC2015-47532, Ahmed Sadek, Mohamed Aly, Karim Hamza, Mouhab Meshreki, Ashraf Nassef, and Helmi Attia, “Optimization

of Cutting Conditions in Vibration Assisted Drilling Operations via Multi-Objective Efficient Global Optimization” (DAC 1)

- DETC2015-47541, Hyunmin Cheong, Wei Li, Adrian Cheung, Andy Nogueira, and Francesco Iorio, “Automatic Extraction of Function Knowledge from Text” (DAC 10)

Authors from our community will present these and many other excellent papers throughout the conference. We encourage you to support your colleagues by attending the presentations and joining in the discourse. Organizing the conference requires the assistance of a number of individuals. We are particularly grateful to the session organizers and paper review coordinators:

James Allison, Mohamed Aly, Amy Bilton, Mark Bryden, Matt Campbell, Wei Chen, Hae-jin Choi, Seung-Kyum Choi, Souma Chowdhury, Charlotte de Vries, Guang Dong, Xiaoping Du, Bryony DuPont, Ehsan Esfahani, Georges Fadel, Scott Ferguson, James Guest, Karim Hamza, Chris Hoyle, Horea Ilies, Roger Jiao, Nathan Johnson, Ritesh Khire, Harrison Kim, Ikjin Lee, Kemper Lewis, Mian Li, Po Ting Lin, Christopher Mattson, Seung Ki Moon, Beshoy Morkos, Zissimos Mourelatos, Ashraf Nassef, Saigopal Nelaturi, Julian Norato, Andrew Olewnik, Jitesh Panchal, Matt Parkinson, Yi Ren, David Romero, Jurg Schiffmann, Carolyn Seepersad, Mohammed Shalaby, Tim Simpson, Andres Tovar, Conrad Tucker, Gary Wang, Pingfeng Wang, Zhichao Wang, Zhimin Xi, and Jie Zhang.

On behalf of the entire DAC community, we welcome you to Boston and another enjoyable and thought-provoking Design Automation Conference.

Thank you,



Carolyn Conner Seepersad

Conference Chair

The University of Texas at Austin



Michael Kokkolaras

Program Chair

McGill University

12th International Conference on Design Education (DEC)

On behalf of the ASME Design Education Committee, we would like to welcome you to the 12th annual International Conference on Design Education. The focus of the conference is on design education among educators, practitioners, and researchers. The conference covers design education topics of relevance to these stakeholders and encourages stimulating discussion of all topics.

We have four exciting special events in this conference. The DEC is a proud co-sponsor of the DAC Keynote Session on Design for the Developing World. The DAC partnered with Engineering for Global Development (EGD) to prepare this session. DEC is also co-sponsoring a special Panel Session with DAC and DTM titled, "Advances in Systems Realization: Research and Education." Continuing a new tradition, the DEC program includes student presentations from the 2nd Designing for the Future Competition, an undergraduate capstone design event. The competition is organized by Jitesh Panchal and Zahed Siddique. All attendees are invited to support and enjoy the student presentations scheduled for Monday afternoon at 4:10 PM. For our fourth special event, Daniel Frey has organized a Panel Session titled, "An Advanced Placement Exam in Engineering: Objectives, Assessment and Course Design." The panelists will report on and discuss the work underway in the College Board's Advanced Placement Program® (AP®) Engineering Curriculum Development and Assessment Committee. The Technical Program provides times and locations for these events.

DEC's Technical sessions emphasize proposed techniques and quantification in the field of design education and best practices in the field. This year's DEC Program consists of six technical sessions of paper presentations organized by topic areas. Specifically: New Topics and Content in Design Courses; Methods to Aid Learning; Building in Design and Advanced Manufacturing; Creativity and Innovation; Thinking in Design; and, Design Education Innovation. The conference Technical Program will provide the times and locations for these sessions. The DEC selected one paper for the DEC Conference Best Paper Award. The winning paper and authors will be announced during the DED Awards Lunch on Tuesday, August 4th.

The DEC is pleased to announce the start of an outreach program directed by Kathy Jacobson. Funded by the ASME Design Engineering Division, the project is developing a Mechanical Design and Engineering Girl Scout badge involving DED industry and academic members. The first Girl Scout badge workshop was held in Boston with enthusiastic participation by DEC members and industry practitioners. Join us at the DEC technical committee meeting for a report on the event and information on how to get involved.

We extend special appreciation to the following technical session Review Coordinators: Kenneth English, Amit Jariwala, Gül Kremer, Robert Nagel, Tahira Reid, Zahed Siddique, and Maria Yang. We give our sincerest thank to all the reviewers of technical papers.

Without their efforts no conference is possible. Finally, the entire DEC thanks the authors for submitting accounts of their teaching and research work to the DEC conference.

The annual DEC technical committee meeting will be held on Tuesday, August 4th, at 5:30 PM; everyone is welcome to attend. Our meeting is streamlined to respect members' participation on other committees. Most DEC Awards will be presented at the technical committee meeting.

We welcome you to the 12th International Conference on Design Education, an experience designed to be a successful and memorable event in Boston.



Linda C. Schmidt

Conference Chair
University of Maryland



Janet K. Allen

Program Chair
University of Oklahoma

20th Design for Manufacturing and the Life Cycle Conference (DFMLC)

The Design for Manufacturing and the Life Cycle Committee in the Design Engineering Division of the American Society of Mechanical Engineers welcomes IDETC participants to the 20th Annual Design for Manufacturing and the Life Cycle (DFMLC) Conference. The ASME Design for Manufacturing and the Life Cycle Conference is the main international forum for the exchange of technical and scientific information on the theory and practice of Integrated Product and Process Development, Sustainable Design and Manufacturing, Product Lifecycle Management (PLM), and Design for X (DFX) Methods. This conference provides a forum for researchers, practitioners, and educators from academia, government organizations, and industry to share their latest results and challenges with the research community.

We are happy to report that this conference continues to feature many new and exciting results and methods to be presented as part of the conference technical sessions. This year's DFMLC conference includes 59 technical papers in 14 sessions, as well as 2 panel sessions, as follows:

- Integrated Product and Process Development
- Sustainable Design and Manufacturing (Two Sessions)
- Life Cycle Decision Making (Two Sessions)
- Design for Manufacturing and Assembly (Two Sessions)
- Design for Additive Manufacturing
- Design for Quality, Reliability, and Cost
- Design for End of Life
- Design of Product-Service Systems (Joint Session with DAC)
- Design of Thermal and Energy Systems (Two Sessions)
- Sustainability of Industrial Systems (One Special Sessions and Two Panel Sessions)

We would like to thank all the authors for submitting papers, the paper reviewers for sharing their time and expertise, and the session chairs/co-chairs for their participation. Special thanks go to DFMLC Special Session Chair, Qing Wang, and the paper review coordinators/co-coordinators for managing the papers through the review process: Ryo Amano, Sara Behdad, Yong Chen, Jun-Ki Choi, Marcos Esterman, Mey Goh, Ashwani Gupta, Yan Leroy, Dominique Millet, Yayue Pan, Jeremy Rickli, Kazuhiro Saitou, Peter Sandborn, Shun Takai, Derrick Tate, Deborah Thurston, Benjamin Tyl, Qing Wang, Fu Zhao, and Marc Zolghadri. Your participation and hard work have made DFMLC a successful conference!

On Tuesday morning, two DFMLC sessions will feature an NSF-sponsored workshop on proposal writing for senior Ph.D. students and early career researchers. On Tuesday afternoon, the

Kos Ishii-Toshiba and the best paper awards will be presented during the DFMLC technical committee meeting. Two panel sessions will focus on the Impacts of Additive Manufacturing on DFM, DFA, and DFLLC (Tuesday), and on Sustainable Design and Manufacturing in a Product Life Cycle Perspective (Wednesday).

We invite the IDETC community to attend the awards ceremony to congratulate the award recipients and to participate in the technical committee meeting.

We welcome you to the 20th Design for Manufacturing and the Life Cycle Conference!



Karl Haapala

Conference Chair
Oregon State University



Romain Farel

Program Chair
Paris-Saclay Energy Efficiency (PS2E) Institute



Qing Wang

Program Co-Chair
Durham University, Durham, United Kingdom

27th International Conference on Design Theory and Methodology (DTM)

Welcome to the 27th International Conference on Design Theory and Methodology (DTM). Our conference is focused on fundamental design theories and the methodologies that emerge to apply them in an engineering context, with contributions provided by both researchers and practitioners. This year's DTM conference consists of 11 sessions with 3-5 papers per session. The session topics fall into the eight topics areas below:

- DTM-1: Biologically-Inspired Design
- DTM-2: Creativity and Ideation
- DTM-4: Design Computing
- DTM-5: Design of Complex Systems and Product Architecture
- DTM-7: Human Behavior in Design
- DTM-8: Managing Design Processes
- DTM-12: Trends and Technologies Impacting the Design Process
- DTM-13: User Preferences

This year, 100 papers were submitted to the DTM conference for peer review, of which 48 were selected for publication and presentation.

The process of selecting papers is at the heart of a successful conference. This year, we had an excellent group of reviewers who generously offered their time and expertise and assisted with selection decisions. As always, this peer review process was successfully managed by an exceptional group of DTM Review Coordinators: Alice Agogino, Saeema Ahmed-Kristensen, Marco Aurisicchio, Dan Braha, Jon Cagan, Amaresh Chakrabarti, Ozgur Eris, Georges Fadel, Scott Ferguson, Erin MacDonald, Dan Jensen, David Jensen, Kyoung-yun "Joseph" Kim, Spencer Magleby, Richard Malak, Scarlet Miller, Seth Orsborn, Rahul Rai, James Rinderle, Li Shu, Rob Stone, Debbie Thurston, Vimal Viswanathan and Maria Yang. We greatly appreciate the time and effort these individuals contributed to maintaining the high quality of this DTM conference.

This year, we had four papers nominated for the Best Paper Awards:

DETC2015-46295 – The Way Makers Prototype: Principles of DIY Design by Bradley Camburn, Karen Hui En Sng, K. Blake Perez, Kevin Otto, Daniel Jensen, Rich Crawford and Kristin Wood.

DETC2015-47929 – Creativity Predictors: Findings from Design-By-Analogy Ideation Methods' Learning and Performance by Diana Morena, Luciënne Blessing, Kristin Wood, Claus Vögele and Alberto Hernandez.

DETC2015-47625 – Considering Different Motivations in Design for Consumer-Behavior Change by Jayesh Srivastava and L. H. Shu.

DETC2015-47908 – Balancing Design Freedom and Brand Recognition in the Evolution of Brand Character by Alex Burnap, Jeffrey Hartley, Yanxin Pan, Richard Gonzalez and Panos Papalambros.

All papers are well deserving of the ultimate prize, but in the end the committee selected the paper by Alex Burnap, et al. Congratulations!

You are invited to attend our DTM Committee meeting held on Tuesday after the last sessions as this gives all members of the DTM and DED communities a chance to provide input on next year's conference.



Tolga Kurtoglu

Conference Chair

Palo Alto Research Center



Katja Hölttä-Otto

Program Chair

Singapore University of Technology and Design

2015 ASME/IEEE International Conference on Mechatronic and Embedded Systems and Applications (MESA)

I would like to extend my most sincere welcome to all attendees of the 2015 ASME/IEEE International Conference on Mechatronic and Embedded Systems and Applications.

It is an exciting time for the MESA community as we continue to grow and adapt while being motivated and responsive. As in the past, this conference includes a diversity of topics presented by authors from many countries. This will be an excellent and unique chance to foster technical interests and perspectives. I hope you take advantage of the opportunity to interact and contribute to the development of new research and technology. In addition to the many technical sessions, two keynote speeches are arranged. I also hope you enjoy the entirety of the conference and the many technical and social events at ASME IDETC. Throughout this conference, please stay engaged and keep proactive.

Many thanks go out to the paper reviewers and keynote speakers who have helped me to make the successful conference. I would like to extend a special thanks to all MESA technical committee members, previous chairs, and many session organizers who have guided me to keep on track. Special recognition must go to the IDETC organizers who have dedicated time and effort to help set up this conference. Lastly, I offer the warmest thanks to all conference attendees.

Again, welcome to Boston!



Ja Choon Koo, Ph.D.

Conference Chair

Sungkyunkwan University

9th International Conference on Micro- and Nanosystems (MNS)

On behalf of the ASME Technical Committee on Micro- and Nano-Systems it is our pleasure to welcome you to the ninth International Conference on Micro- and Nano-Systems (MNS) at the ASME IDETC 2015, held in Boston, MA.

This conference is a unique venue for presenting and exchanging ideas on the design, applied mechanics, dynamic systems, manufacturing, and controls aspects of micro- and nano-systems and follows the first eight successful years of the conference in Las Vegas, New York, San Diego, Montreal, Washington, Chicago, Portland, and Buffalo.

This year our conference accepted 44 full papers and brief presentations, which cover basic and applied research areas in the fields of micro/nano scale dynamics, manufacturing, mechanisms, surface engineering and contact mechanics with the specific goal of facilitate modeling, design and development of micro-robotics, MEMS, bio-MEMS, sensors and actuators.

It is our pleasure to announce also a jointly organized MNS/VIB/MSNDC Symposium on Dynamics of MEMS and NEMS.

As one of the highlights of our conference program, we are delighted to welcome Professor George Adams, College of Engineering Distinguished Professor in the Mechanical and Industrial Engineering Department at Northeastern University, to present our keynote speech titled "Novel Approaches to Characterizing Nanoscale Friction and Work of Adhesion of CNTs Using Measurements Followed by Modelling".

The MNS Committee Meeting (open to all MNS Participants) will take place at 5:30pm on Tuesday, August 4th. In this meeting, we will report on recent activities and discuss the future directions that are being considered by the MNS Committee. This meeting provides a great opportunity for anyone wanting to get directly involved in shaping the future of the MNS community.

We expect the 9th MNS conference to be an exciting forum on new ideas in micro- and nano-systems. As always, the conference owes its success to the authors for submitting high quality papers, to the paper reviewers for their diligent efforts, and to the symposia organizers for their efforts to advertise the conference and for their management of the review process to ensure the conference's high quality. We would like to sincerely thank all the people that have contributed their time to the success of this conference.

Welcome to Boston and to the 9th MNS Conference!!



Irene Fassi

Conference Chair

Institute of Industrial Technologies and Automation



Dumitru Caruntu

Program Chair

University of Texas-Pan American

39th Mechanisms and Robotics Conference (MR)

The Mechanisms and Robotics Technical Committee of the ASME Design Engineering Division welcomes you to the 39th Mechanisms and Robotics Conference, the premier international forum for the exchange of technical and scientific information on the theory and application of mechanical systems, mechanisms, and robotics. Since 1952, the ASME Mechanisms and Robotics conference has provided an international forum for the exchange of technical and scientific information on the theory and practice of mechanical and robotic systems.

We have an exciting conference program and slate of activities for the attendees, with 210 peer-reviewed technical papers organized into 11 technical symposia, two keynote speakers, one panel, workshops and tutorials, and the Student Mechanisms and Robotics Design Competition. Paper topics range throughout areas central to the design of mechanical, mechatronic, and robotic systems including kinematics, dynamics, design, analysis and validation, reconfigurable mechanisms, novel mechanisms and robots, software systems, educational practices, and various applications. This year, we launched a new symposium on Medical and Rehabilitation Robotics, which had papers from the upcoming areas of sensor-controlled robotic systems, rehabilitation-, soft-, and medical-robotics, prostheses, and exoskeleton design and development.

Submitted papers were eligible for a number of awards including the Mechanisms and Robotics Best Paper award, Freudenstein/General Motors Young Investigator award, A.T. Yang Memorial award, and Compliant Mechanisms Theory and Application awards. Since 2014, the authors of the best papers of the Mechanisms and Robotics conference are invited to submit enhanced archival versions of the papers to an IDETC Special Issue of the Journal of Mechanisms and Robotics.

The conference and program chairs would like to extend special thanks to all the volunteers who participated in the peer-review process to produce this high-quality program, especially the symposium organizers who coordinated the process:

MR-1: Planar Mechanism Analysis and Synthesis (Carl Nelson, Nina P. Robson)

MR-2: Spatial/Spherical Mechanism Analysis and Synthesis (Maria Alba Perez Gracia, Ketao Zhang)

MR-3: Robot Kinematics and Motion Planning (Gim Song Soh, Nilanjan Chakraborty)

MR-4: Robot/Machine Dynamics and Control (Joo H. Kim, Damien Chablat)

MR-5: Theoretical and Computational Kinematics (A.T. Yang Symposium) (Andrew Murray, Wei-Zhong Guo)

MR-6: Compliant Mechanisms and Micro/Nano Mechanisms (A. Midha Symposium) (Nima Tolou, Shikui Chen, Guangbo Hao, Guimin Chen)

MR-7: Medical and Rehabilitation Robotics (Andreas Mueller, Chin-Hsing Kuo, Evagoras Xydias)

MR-8: Novel Mechanisms, Robots and Applications (Philip Voglewede, Dongming Gan)

MR-9: Mobile Robots and Cable-Driven Systems (Yu Zhou, Jingjun Yu)

MR-10: Origami-Based Engineering Design (Larry Howell, Mary Frecker, James Joo)

MR-11: Software and Education in Mechanisms and Robots (David Myszka, Ilie Talpasanu)

MR-12: Student Mechanisms and Robotics Design Competition (Girish Krishnan)

We would like to thank Raffaele Di Gregorio, the chair of the Awards Committee and its members, for coordinating the selection of various aforementioned awards.

We would also like to draw your attention to the various special events within the MR conference. MR is sponsoring two keynote talks this year. The first one is by Sridhar Kota on “Strong, compliant and solid-state mechanical devices – For MEMS, aircraft wings and soft robots”, scheduled for Tuesday at 11:40am in Room 210. The other keynote is by Robert Wood on “Multi-scale, multi-material manufacturing based on folded composites: motivations, process technologies, and applications in robotics”, also scheduled for Tuesday at 2:00pm in Room 210.

There will also be a panel on “Future Directions in Mechanism and Robot Design Research and Education”, which will bring together renowned researchers and academicians to discuss the future directions in Mechanisms and Robotics research, interactions with industry, and education.

The MR conference level awards will be announced at the beginning of the Tuesday morning keynote session, but due to time constraints, they will be presented during the MR Committee Meeting scheduled for 7pm in Room 210 on Tuesday.

Throughout the afternoon on Monday, the finals of the ASME MR Student Mechanisms and Robotics Design Competition will be held in Room 210. Enjoy the interactive presentations and be sure to thank the organizers and judges for their efforts behind the scenes. The student competition awards will be presented at the beginning of the Tuesday panel session at 3:30pm in Room 210.

The open session meeting of the Mechanisms and Robotics Committee will be held at 7 pm on Tuesday in Room 210; all are welcome to attend.

A special thanks is owed to all of the authors, session chairs, and other volunteers who have contributed their efforts to the overall success of the conference. We hope that you enjoy the conference and look forward to your continued support in future Mechanisms and Robotics Conferences.



Anurag Purwar

Conference Chair

Stony Brook University



Xianwen Kong

Program Chair

Heriot-Watt University

11th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC)

and

27th Conference on Mechanical Vibration and Noise (VIB)

On behalf of the ASME Design Engineering Division Technical Committees on Multibody Systems and Nonlinear Dynamics (MSNDC-TC) and Vibration and Sound (TCVS), we welcome you to IDETC/CIE 2015 in historical Boston, Massachusetts. This year, in recognition of the mutual interests of these Technical Committees, we have decided to jointly sponsor a wide variety of sessions that collectively form the 11th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC) and 27th Conference on Mechanical Vibration and Noise (VIB). Following a rigorous peer review process, we have accepted a total of 272 briefs and papers for technical presentation. The accepted presentations have been grouped under specific themes ranging from the Dynamics of MEMS and NEMS to Industrial Applications of Dynamics, Vibrations and Acoustics.

We are honored this year to have a number of keynote speakers, including Professor Stuart Antman, recipient of the Lyapunov Award, Professor David Ewins, recipient of the J. P. Den Hartog Award, Dr. Maj. Matthew Snyder, Professor Robert Parker, recipient of the N. O. Myklestad Award, and Professor Maurizio Porfiri, recipient of the C. D. Mote, Jr. Early Career Award. We encourage anyone interested in dynamics and vibration to join us for these keynote sessions, which will be both informative and inspirational.

We are also pleased to highlight Monday's panel session, entitled "Present and Future Challenges in Nonlinear Dynamics and Vibrations: From Theory to Design", which we hope will contribute to peer discussion and help set future basic and applied research directions in these exciting research areas.

The MSNDC-TC meeting will take place at 5:30pm on Tuesday, August 4th. Likewise, the TCVS meeting will be held at 7:00pm on Tuesday, August 4th. In these open meetings we will report on the recent activities and future directions of the respective Technical Committees and their affiliated research communities.

We expect the 11th International Conference on Multibody Systems, Nonlinear Dynamics, and Control and the 27th Conference on Mechanical Vibration and Noise to be exciting forums for discussion of new ideas and challenges. However, this expectation would not exist without the extensive efforts of the Conferences' authors, who have submitted quality papers, the Conferences' paper reviewers, who have provided insightful

comments, and the several symposia organizers, who have not only helped advertise the Conferences but have helped manage the review process to ensure the Conferences' high quality and standards. We would like to sincerely thank all of the people that have contributed their time and effort to the success of this joint event.

Welcome to Boston, and thank you for your participation in the MSNDC and VIB Conferences!



Walter Lacarbonara

MSNDC Conference Chair

Sapienza University of Rome



Jeffrey F. Rhoads

VIB Conference Chair

Purdue University

ASME 2015 Power Transmission and Gearing Conference (PTG)

Welcome to the 2015 ASME Power Transmission and Gearing (PTG) Conference. We would like to thank all of the authors for choosing this forum to disseminate their latest research findings, and all of the practitioners who chose to attend this conference. The mix of leading researchers and practitioners from around the world makes this conference an ideal forum for enhancing power transmission and gearing engineering. We hope you will make full use of this unique opportunity to learn about the latest research works and their applications to address critical engineering issues, and to network and engage with your peers from across the globe.

PTG 2015 features approximately 60 papers covering a wide variety of gearing and power transmission research and applications. Topics that are covered include:

- Gear Design and Analysis
- Gear Strength and Durability
- Gear Dynamics and Noise
- Gear Manufacturing
- Lubrication and Efficiency
- Transmission Systems
- Transmission Components and Materials
- Bearings, Clutches, Couplings, Splines

Please join us for the Buckingham Lecture to be presented by Professor Philippe Velex of INSA, Lyon, France titled, "On some concepts and issues in gear dynamic simulations."

We acknowledge and thank the following individuals for their dedicated service to the PTG Committee and for their tireless efforts in organizing this conference:

Paris Altidis, Navistar
 Neil Anderson, Pratt & Whitney
 Richard Dippery, Kettering University
 Brian Dykas, Army Research Laboratory
 Qi Fan, The Gleason Works
 Rob Giachetti, Exponent
 Don Houser, Ohio State University
 Murat Inalpolat, University of Massachusetts
 Ahmet Kahraman, Ohio State University
 Albert Karvelis, Exponent
 Mohsen Kolivand, American Axle & Manufacturing

Timothy Krantz, NASA

David Lewicki, NASA

Sheng Li, Wright State University

Jacob Lin, John Deere

Alfred Pettinger, Engineering Systems, Inc.

Steve Siegert, Borg Warner

Avinash Singh, General Motors Corp

Jeremy Wagner, John Deere

Jon Williams, Hilliard Corp.

Brian Wilson, Romax Technology, Inc.

Carlos Wink, Eaton Corp.

Hai Xu, General Motors Corp.

We hope that you enjoy this conference, and please come back for the next PTG Conference in 2017. We would also like to invite you to provide us with some feedback on your experience, and suggestions of what we can do to make your experience more meaningful.



Robert Handschuh

Conference Chair
 NASA



Teik Lim

Program Chair
 University of Cincinnati

23rd Reliability, Stress Analysis, and Failure Prevention Conference (RASFP)

This year, the “Design Methods and Analyses” Topic of our Conference focuses mostly on Reliability considerations providing useful discussions and some new tools for assessing the seriousness of potential failure modes. We hope that these considerations will enable the designer to assure that their designs will function as intended for the prescribed design lifetime, as well as being competitive in the marketplace.

Six papers of our Conference address important reliability issues with considerations in: “Comprehensive Reliability Allocation Method of Feed Mixers Based on Fuzzy Synthetic Assessment”, “Sequential Multidisciplinary Design Optimization and Reliability Analysis using an Efficient Third-Moment Saddlepoint Approximation Method”, “Research on Surrogate Model Based on Local Radial Point Interpolation Method”, “Service-Life Assessment of Complex Dynamic Systems under Interval Uncertainty based on Bayesian Networks”, “Extensions of Bayesian Reliability Analysis by Using Imprecise Dirichlet Model”, and “Reliability Analysis and Performance Predictions of Aged Pipelines Subjected to Internal Corrosion – A Markov Modelling Technique”.

The second Topic of our Conference covers mostly Fatigue Analyses, and the discussions focus on: “A Modified Model for Non-linear Fatigue Damage Accumulation with Load Interaction Effects”, “Multiaxial Fatigue Life Prediction Based on Non-proportionality of Strain Path”, “Fatigue Life Analysis of an Automotive Tensioner through Strain-Life Approach”, and “Practical Method to Predict Total Fatigue Life of Welded Joints Structures”.

The third Topic involves “Material considerations for Design and Failure Prevention” with coverage in the areas of: “Comparison of Temperature and Stress Distributions for Pistons, Clearance Examination for Damage Prevention on Various Piston Skirt Ovalities and Designs for Carbon-Carbon Composite Piston vs. Convent”, “Reliability Analysis and Performance Predictions of Aged Pipelines Subjected to Internal Corrosion – A Markov Modelling Technique”, and “Physical Properties of LLDPE and PP Filled with Wood Flours”.

As summarized above, the Reliability, Stress Analysis, and Failure Prevention (RSAFP) Committee is participating in 2015 International Design Engineering Technical Conference with focus on: Design Methods and Analyses, with focus on Reliability and Failure Analysis; Fatigue Analyses, and Material considerations for Design and Failure Prevention. 14 papers related to these topics will be presented in three corresponding Sessions.

As Chair of 23rd Reliability, Stress Analysis, and Failure Prevention Conference, I would like to extend my thanks to all authors and reviewers of this Conference.



Erol Sancaktar

Conference Chair

University of Akron

SOCIAL FUNCTIONS AT A GLANCE

SUNDAY, AUGUST 2	MONDAY, AUGUST 3	TUESDAY, AUGUST 4	WEDNESDAY, AUGUST 5
<p>Registration 7:00am – 6:00pm Foyer, Level 2</p>	<p>Registration 7:00am – 6:00pm Foyer, Level 2</p>	<p>Registration 8:00am – 6:00pm Foyer, Level 2</p>	<p>Registration 8:00am – 3:00pm Foyer, Level 2</p>
<p>IDSC 8:00am – 5:00pm Room 210, Level 2</p>	<p>Breakfast 7:00am – 8:00am Foyer, Level 2</p>	<p>Breakfast / Plenary 8:00am – 9:30am Auditorium, Level 2</p>	<p>Breakfast / Panel 8:00am – 9:30am Auditorium, Level 2</p>
<p>IAM3D 8:00am – 5:00pm Room 207, Level 2</p>	<p>Coffee Break 9:40am – 10:00am Foyer, Level 2</p>	<p>Conference Expo 11:00am – 8:00pm Exhibit Hall C</p>	<p>Conference Expo 11:00am – 3:00pm Exhibit Hall C</p>
<p>FutureME Mini-Talks 5:30pm – 7:30pm Room 200, Level 2</p>	<p>Exhibit Hall Opening and AM3D Poster Session 10:50am – 12:30pm Exhibit Hall C, Level 2</p>	<p>Coffee Break 11:10am – 11:40am Exhibit Hall C, Level 2</p>	<p>Coffee Break 11:10am – 11:40am Exhibit Hall C, Level 2</p>
	<p>Conference Expo 11:00am – 5:00pm Exhibit Hall C, Level 2</p>	<p>Design Engineering Division Awards Luncheon 12:40pm – 2:00pm Auditorium, Level 2</p>	<p>Coffee Break 3:00pm – 3:30pm Foyer, Level 2</p>
	<p>Keynote Luncheon: The Engineering Behind Additive Manufacturing 12:30pm – 2:00pm Auditorium, Level 2</p>	<p>CIE Division Awards Luncheon 12:40pm – 2:00pm Room 312, Level 3</p>	<p>Technical Tour At MIT Laboratories 3:00pm – 5:00pm * Busses will depart promptly at 2:30pm</p>
	<p>Coffee Break 3:40pm – 4:10pm Exhibit Hall C, Level 2</p>	<p>Coffee Break 3:00pm – 3:30pm Exhibit Hall C, Level 2</p>	
	<p>Reception at JFK Library 6:30pm – 9:30pm * Busses will begin departing at 6:00pm</p>	<p>Student Networking and Team Design Competition 5:30pm – 7:00pm Innovation Alley in Exhibit Hall C, Level 2</p>	
		<p>Reception by Sponsors & Exhibitors 5:30pm – 8:00pm Exhibit Hall C, Level 2</p>	

SCHEDULE AT A GLANCE

MONDAY, AUGUST 3RD					TUESDAY, AUGUST 4TH		
	8:00am - 9:40am	10:00am - 11:40am	2:00pm - 3:40pm	4:10pm - 5:50pm	9:30am - 11:10am	11:40am - 12:40pm	
Room 101	DAC 3-1	DAC 3-2	DAC 4-1	DAC 4-2		DAC 13-1	
Room 102	DAC 17-1	DAC 17-2	DAC 17-3	DAC 16-1	DAC / DEC / EGD Keynote	DAC 7-1	
Room 103	DAC 9-1	DAC 9-2	DAC 9-3	DAC 18-1		DAC 15-1	
Room 104	DTM 2-1	DTM 13-1	DTM 4-1	DTM 12-1	DTM 2-2	DTM 1-1	
Room 105	DEC 1-1	DEC 2-1	DEC 3-1	DEC Panel		DEC 5-1	
Room 107	DFMLC 1-1	DFMLC 10-1	DFMLC 10-2	DFMLC 3-1	DFMLC WS Workshop	DFMLC Workshop	
Room 108	PTG 1-1	PTG 2-1	PTG 2-2	PTG 3-1	PTG 3-2	PTG 3-3	
Room 109	RSAFP 1-1	RSAFP 2-1	RSAFP 4-1		PTG 9-1	PTG 9-2	
Room 110	MESA 10-1	MESA 3-1	MESA 2-1	MESA 2-2	MESA 18-1	MESA Keynote	
Room 111	MESA 8-1	MESA 8-2	MESA 8-4	MESA 8-5	MESA 8-6		
Room 202	MR 7-1	MR 7-2	MR 7-4	MR 7-5	MR 8-1		
Room 203	MR 10-1	MR 10-3	MR 10-4	MR 10-5	MR 10-6		
Room 204	MR 1-1	MR 1-2	MR 1-3	MR 1-4	MR 1-5		
Room 206	MR 2-1	MR 2-2	MR 2-3	MR 2-4	MR 3-1		
Room 207	AM3D (See Schedule for Individual Sessions and topics)						
Room 209		BIOMED 5-1	BIOMED 2-1	DFMLC 12-2	BIOMED 7-1	BIOMED 7-2	
Room 210	MR 6-1	MR 6-2	MR 12-1	MR 12-2	MR 11-1	MR Keynote	
Room 300	MSNDC / VIB 7-1		MSNDC / VIB 7-2	MSNDC / VIB 7-3	MSNDC / VIB 7-4	MSNDC 20-1	
Room 301	MSNDC / VIB 6-1		MSNDC / VIB 6-2	MSNDC / VIB 3-1	MSNDC / VIB 3-2		
Room 302	MSNDC / VIB 2-1	MSNDC / VIB Panel	MSNDC / VIB 2-2	MSNDC / VIB 2-3	MSNDC / VIB 2-4	MSNDC / VIB Keynote	
Room 303							
Room 304	MSNDC / VIB 5-1	MSNDC / VIB 5-2	MSNDC / VIB 5-3	MSNDC / VIB 5-4	MSNDC / VIB 5-5		
Room 305	MSNDC 15-1		MSNDC 15-2	MSNDC 15-3	MSNDC / VIB 13-1		
Room 306	MSNDC / VIB 9-1	MSNDC / VIB 9-2	MSNDC / VIB 9-3	MSNDC / VIB 9-4	MSNDC / VIB 9-5	MSNDC / VIB 9-6	
Room 307	MNS 1-1	MNS 1-2	MNS 1-3	MNS 1-4	MNS Keynote	MNS 2-1	
Room 308	MSNDC / VIB 10-1	MSNDC / VIB 10-2	MSNDC / VIB 10-3	MSNDC / VIB 10-4		MSNDC / VIB 10-5	
Room 309	AVT 1-1	AVT Keynote	AVT 1-2	AVT 1-3	AVT Keynote		
Room 310	CIE 1-1	CIE 5-1	CIE 6-1	CIE 24-1	CIE Panel		
Room 311	CIE 2-1	CIE 2-2	CIE 13-1	CIE 13-2	CIE 14-1	CIE Keynote	
Room 312	CIE 4-1	CIE 4-2	CIE Panel	CIE Panel			
Room 313	CIE 3-1	CIE 18-1	CIE 19-1	CIE 19-2	CIE 11-1		

WEDNESDAY, AUGUST 5TH

2:00pm - 3:00pm	3:30pm - 5:10pm	9:30am - 11:10am	11:40am - 12:40pm	2:00pm - 3:00pm	3:30pm - 5:10pm
DAC 13-2	DAC 1-1	DAC 10-1	DAC 5-1		
DAC 7-2	DAC 6-1	DAC 12-1	DAC 11-1		
DAC 15-2	DAC 8-1	DAC 2-1	DAC 14-1		
DTM 5-1	DTM 7-1	DTM 8-1	DTM 5-2	DTM 5-3	
DEC Panel	DAC / DEC / DTM Panel	DEC 10-1	DEC 9-1	DFMLC 8-1	DFMLC 6-1
		DFMLC 2-1	DFMLC Panel	DFMLC 3-2	DFMLC 7-1
PTG Keynote	PTG 3-4	PTG 4-1	PTG 4-2	PTG 5-1	PTG 6-1
MESA 6-1	MESA 7-1	MESA 16-1	PTG 8-1	MESA 8-9	MESA 16-2
MESA 9-1	MESA 9-2	MESA 17-1	MESA Keynote	MESA 8-10	MESA 17-2
MESA 8-8	MESA 8-7	MESA 13-1		MESA 11-1	MESA 18-2
	MR 8-2	MR 8-3	MR 4-1	MR 5-2	MR 8-4
	MR 10-7	MR 9-1	MR 10-2	MR 9-2	MR 9-3
	MR 1-6	MR 5-1	MR 8-6	MR 8-5	MR 4-3
	MR 3-2	MR 3-4	MR 3-3	MR 4-2	
DFMLC Panel	BIOMED 7-3	DFMLC 5-1	DFMLC 5-2		DFMLC 2-2
MR Keynote	MR Panel	MR 6-3	MR 6-4	MR 6-5	MR 7-3
	MSNDC / VIB 7-5		MSNDC / VIB 8-1	MSNDC / VIB 8-2	MSNDC / VIB 8-3
	MSNDC / VIB 3-3		VIB 15-1	VIB 15-2	
MSNDC / VIB Keynote	MSNDC / VIB 2-5	MSNDC / VIB Keynote	MSNDC / VIB 11-1	MSNDC / VIB 11-2	MSNDC / VIB 11-3
	MSNDC 16-1		MSNDC 16-2	MSNDC 16-3	MSNDC 16-4
	MSNDC / VIB 5-6		MSNDC / VIB 5-7	MSNDC / VIB 5-8	MSNDC / VIB 5-9
MSNDC / VIB 13-2	MSNDC / VIB 13-3		MSNDC / VIB Keynote	MSNDC / VIB 14-1	MSNDC / VIB 14-2
	VIB 16-1	VIB 16-2	VIB 16-3	MSNDC / VIB 4-1	MSNDC / VIB 4-2
MNS 4-1	MNS 5-1	MNS 6-1	MNS 7-1	MNS 9-1	
MSNDC / VIB 12-1	MSNDC / VIB 12-2	AVT 5-1	AVT 5-2	AVT 6-1	AVT 6-2
AVT 2-1	AVT 2-2	AVT 3-1	AVT 3-2	AVT 4-1	AVT 7-1
BIOMED Keynote	MSNDC 17-1	CIE 7-1	MSNDC 17-2	MSNDC 17-3	MSNDC 17-4
CIE 26-1	CIE 24-2	CIE 17-1	CIE 10-1	CIE 17-2	CIE 17-3
		CIE Panel	CIE 9-1	CIE Panel	CIE Panel
CIE 11-2	CIE 11-3	CIE 22-1	CIE 20-1	CIE 11-4	CIE 11-5

DTM	VIB
DFMLC	RSAFF
DEC	PTG
DAC	MSNDC / VIB
CIE	MSNDC
BIOMED	MNS
AVT	MR
AM3D	MESA

KEYNOTE & LUNCHEON

Monday, August 3**12:30PM - 2:00PM**

Location: Auditorium, Level 2

THE ENGINEERING BEHIND ADDITIVE MANUFACTURING**Bruce Bradshaw**

Stratasys

STRATASYS' ADDITIVE MANUFACTURING SOLUTIONS

The featured keynote speakers will discuss how the expanding capabilities of additive manufacturing is transforming the world today and will become a disruptive force in established industries in the near future.

Stratasys manufactures 3D printing equipment and materials that create physical objects directly from digital data. Its systems range from affordable desktop 3D printers to large, advanced 3D production systems. Additive manufacturing technologies include FDM and PolyJet. Stratasys is the leader in developing versatile tools for innovative applications.

This presentation will deliver an overview of the Additive Manufacturing /3D Printing Market and its evolution—exploring the solutions and benefits realized by using these tools in manufacturing, entertainment, education, dental, automotive, aerospace and more.

Biography: Bruce Bradshaw leads Stratasys's Marketing efforts in North America. His experience in product marketing, product management, communication and messaging have helped position Stratasys as the leading 3D printer solution in the additive manufacturing market. Bruce is often an author of articles in leading industry publications such as Desktop Engineering, Product Development & Design and Design World as well as is often a featured speaker at events such as SME, PTC Live, SolidWorks World and more. He brings more than 20 years' experience of knowledge and expertise in technology, marketing and product positioning for organizations such as Stratasys.

**Hod Lipson**

Cornell University

3D PRINTING: THE NEXT 25 YEARS

3D Printers—machines that can automatically fabricate arbitrarily-shaped objects from almost any material—have evolved over the last three decades from limited and expensive prototyping equipment in the hands of few, to small-scale commodity production tools available to almost anyone. It's been broadly recognized that this burgeoning industrial revolution will transform almost every industry, and every aspect of our

lives. But where will this technology go next? This talk will describe why 3D printing is disruptive, and look at the evolution of additive manufacturing from its past to its future. The technology is advancing from printing parts in plastic and metal, to bio-printing and food printing, and from 3D printing passive parts to printing active, integrated systems, including electronics, actuators and sensors. Will we one day be able to print a robot that will walk out of the printer, batteries included?

Biography: Hod Lipson is a professor of engineering at Cornell University in Ithaca, New York, and a co-author of the award-winning bestseller "Fabricated: The New World of 3D printing" (translated to 7 languages). His work on self-aware and self-replicating robots, food printing, and bio-printing has received widespread media coverage including by The New York Times, The Wall Street Journal, Newsweek, Time, CNN, and the National Public Radio. Lipson has co-authored over 200 technical papers and speaks frequently at high-profile venues such as TED and the US National Academies. Hod directs the Creative Machines Lab, which pioneers new ways to make machines that create, and machines that are creative. For more information visit <http://lipson.mae.cornell.edu>.

**Jason Lopes**

Legacy Effects

3D PRINTING IN HOLLYWOOD - BRINGING THE IMAGINATION TO LIFE

This talk will show how special effects studio Legacy Effects has transformed their business model by embracing additive manufacturing and created a hybrid way of transforming digital concepts to physical reality to produce some of entertainments most iconic characters and moments. We will explore key moments, our pipeline, and amazing applications.

Biography: Jason Lopes is the lead systems engineer with Legacy Effects. Based in San Fernando, California, Legacy Effects (formerly Stan Winston Studio) is a special effects studio that has helped create some of the biggest Hollywood blockbusters of all time. Jason's credits include Avatar, Terminator Salvation, 2012, Thor, Iron Man 1, 2, & 3, Cowboys & Aliens, Real Steel, Life of Pi, Captain America 2, Robocop and Pacific Rim; amongst other successful TV and film productions.

Jason is a strong advocate of 3D printing, which has proven to be an invaluable tool in his production workflow, along with 3D scanning, 3D design and 3D modeling. He has been operating numerous 3D printing technologies for a number of years to assist in the production of stunning visual effects.

PLENARY & BREAKFAST

Tuesday, August 4**8:00AM - 9:30AM**

Location: Auditorium, Level 2

BORN IN BOSTON: LOCAL ADDITIVE MANUFACTURING INNOVATIONS SHAPING THE WORLD

Boston has long been a city on the forefront of innovation. This session will highlight some of the recent local innovations that are redefining the concept of modern manufacturing.



Grant Thomas-Lepore

GRABCAD

HOW SOFTWARE AND THE CLOUD ARE REVOLUTIONIZING 3D PRINTING

3D printing spent much of the 90's and 00's as a specialized tool for only a few niche applications, held back from entering the greater prototyping and manufacturing industry largely due to physical limitations in print quality, material properties, speed, and more. Such limitations necessitated an intense focus in the industry on improving hardware and materials. However, this had the unintentional side effect of keeping 3D printing software almost completely insulated from the greater disruptions improving software in other industries: the cloud, the SaaS business model, the "consumerization" of business software, and more. But with the explosion of 3D printing in the last few years this dynamic has changed, and software now needs to keep up. At GrabCAD, one of the largest communities of mechanical engineers in the world and recently acquired by the 3D printing company Stratasys, we are uniquely positioned to observe a number of trends sweeping the engineering and 3D printing software world. In this talk, I'll explore a number of those trends and highlight a few exciting examples of companies and individuals leading the charge.

Biography: Grant Thomas-Lepore balances engineering expertise with a keen visual eye. Experienced in product management, CAD manufacturing, and software development, Grant managed thousands of CAD files at Boston start-up Gemvara before moving to GrabCAD to create the GrabCAD Workbench—the world's easiest CAD file management tool. With Stratasys' acquisition of GrabCAD, he is excited to bring innovation to 3D printing software. He holds a patent and a mechanical engineering BSE degree from the University of Pennsylvania. When he's not coming up with creative product features, Grant can be found playing competitive ultimate frisbee, backpacking, or skiing.



Ian Ferguson

FormLabs

MOVING BETTER: LAUNCHING HIGH PERFORMANCE PRODUCTS FROM YOUR DESKTOP

The focus of this presentation will be on the technical side of how products are designed at Formlabs using the Form 1+ and how

companies like us have been using the 3D printer to launch kickstart campaigns and new products.

Biography: Ian Ferguson is lead engineer at Formlabs where he designs high-resolution desktop 3D printers for professional engineers, designers and makers. He has helped the company grow from a fledgling 3D printing startup to a 100 person team. In that time Formlabs has had an almost three million dollar Kickstarter campaign, shipped two 3D printers, been featured in a Netflix documentary and has figured out what it takes to build a precision machine tool and ship it to customers. Ian is passionate about what it takes to design, build and manufacture great products. He gets excited talking about issues from industrial and mechanical design down to embedded software. Before Formlabs Ian was with Bossa Nova Robotics where he developed connected toys, and before that worked on projects such as the DARPA Urban Challenge making autonomous cars. Ian holds a B.S.E in mechanical engineering from Princeton and a M.S.E. in robotics from the University of Pennsylvania.



Daniel Oliver

Voxel8

MOVING 3D PRINTING TO FINISHED PRODUCTS

Voxel8 is disrupting the design and manufacturing of electronic devices with a 3D printing platform that enables users to move beyond the prototype printing phase. The massive customization enabled by Voxel8 can quickly create devices in new form factors without the cost and waste of the traditional tooling, inventory and supply chain.

Biography: Daniel Oliver is a former systems engineer with Honeywell Aerospace and founder of Intelligent Mobility International, a social entrepreneurship enterprise he established to provide long-lasting, low-cost wheelchairs throughout the world. After earning his MBA from the Harvard Business School, Dan was a Blavatnik Fellow, where he spent a year commercializing science from the Lewis Lab. Dan received his B.S. in mechanical engineering from the California Institute of Technology.

PLENARY & BREAKFAST

Wednesday, August 5

8:00AM - 9:30AM

Location: Auditorium, Level 2

PANEL: ADDITIVE MANUFACTURING FOUNDERS AND FUTURISTS

This panel session will bring together the pioneers of the additive industry along with those advancing the technology to the next level

though continuous innovation and unique business solutions. The panel session will be moderated by Hod Lipson, Professor, Cornell University.



Tim Simpson (Moderator)

Penn State University



Joseph Beaman

University of Texas, Austin

Biography: Professor Joseph J. Beaman joined The University of Texas at Austin faculty in 1979 after receiving his Sc.D. from the Massachusetts Institute of Technology in Mechanical Engineering. His research interest is in Additive Manufacturing (AM). Professor Beaman initiated research in the area in 1985 and was the first academic researcher in the field. One of the most successful AM approaches, Selective Laser Sintering, was a process that was developed in his laboratory. He was one of the founders of DTM Corporation (now merged with 3D Systems), which markets Selective Laser Sintering. Dr. Beaman is a Fellow of ASME and the technical editor of the Journal of Dynamic Systems and Control. He serves on the Army Science Board and was on Board of Directors of Society of Manufacturing Engineers from 2012-2014. He was chair of the Department of Mechanical Engineering at the University of Texas from 2001 to 2012. He was elected to the National Academy of Engineers in 2013, received the FAME award in Additive Manufacturing in 2014, and elected National Academy of Inventors in 2015.



David Rosen

Georgia Tech

Biography: David Rosen is a Professor and Associate Chair for Administration in the School of Mechanical Engineering at the Georgia Institute of Technology. He is Director of the Rapid Prototyping & Manufacturing Institute at Georgia Tech. He received his Ph.D. at the University of Massachusetts in mechanical engineering. His research interests include computer-aided design, additive manufacturing, and design methodology. He has industry experience, working as a software engineer at Computervision Corp. and a Visiting Research Scientist at Ford Research Laboratories. He is a Fellow of ASME and has served on the ASME Computers and Information in Engineering Division Executive Committee. He is the recipient of the 2013 Solid Freeform Fabrication Symposium, International Freeform and Additive Manufacturing Excellence (FAME) Award.



Brent Stucker

3DSIM

Biography: Dr. Brent Stucker is Co-Founder & CEO of 3DSIM, a company focused on simulating additive manufacturing processes. Dr. Stucker has been involved in additive manufacturing research for more than 20 years, with projects ranging from new materials development for biomedical implants and aerospace/defense structures to multi-scale modeling and control of additive manufacturing machines. Prof. Stucker was a professor from 1997-2015, with various appointments at the University of Louisville, Utah State University, the University of Rhode Island and VTT Technical Research Center, Finland. Dr. Stucker led the establishment of the ASTM International Committee F42 on Additive Manufacturing Technologies in 2008 and was the first Chairman from 2009-2014. He was elected to the ASTM International Board of Directors in 2015. Dr. Stucker's awards include an Industrial Impact Award from the 2015 Additive World Conference, the 2012 Industry Achievement Award from the Society of Manufacturing Engineers, the 2010 Robert J. Painter Memorial Award by ASTM and SES for his leadership in the area of international standards, and the SLS Users Group "SLS Dinosaur Award" in 2015. Dr. Stucker received his B.S. from the University of Idaho and his Ph.D. from Texas A&M University, both in Mechanical Engineering.



Chris Williams

Virginia Tech

Biography: Christopher B. Williams is an Associate Professor with a joint appointment with the Department of Mechanical Engineering and the Department of Engineering Education at Virginia Tech. He is the Director of the Design, Research, and Education for Additive Manufacturing Systems (DREAMS) Laboratory and Associate Director of the Macromolecules and Interfaces Institute. His research contributions have been recognized by six Best Paper awards at international design, manufacturing, and engineering education conferences. He is a recipient of a National Science Foundation CAREER Award (2013), the 2012 International Outstanding Young Researcher in Freeform and Additive Fabrication Award, and the 2010 Emerald Engineering Additive Manufacturing Outstanding Doctoral Research Award. Chris holds a Ph.D. and M.S. in Mechanical Engineering from the Georgia Institute of Technology (Atlanta, Georgia) and a B.S. with High Honors in Mechanical Engineering from the University of Florida (Gainesville, Florida).

Please see page 62 for the complete AM3D program.

AVT KEYNOTE

Monday, August 3

**SESSION: AVT 8-1
10:00AM - 11:40AM**

Location: Room 309, Level 3



Steven M. Franz

General Dynamics Land Systems

BALANCED COMBAT VEHICLE DESIGN USING NON-LINEAR OPTIMIZATION AND MULTI-ATTRIBUTE UTILITY ANALYSIS (MAUA)

Abstract: This keynote speech will talk to the use of a structured decision-making process for the selection of vehicle subsystems within a combat vehicle design. The presentation will address how the design team applies an integrated set of tools and methods selected from Decision Analysis, Structured Decision Making (Trade Study or Analysis of Alternatives), Risk Management, and Operations Research Modeling and Simulation (M&S). System-level decisions can include a communications network, fleet of vehicles or watercraft, and port (air, land, sea) security concepts; decisions at the subsystem-level can include the selection of software packages, weapons, equipment, and resources.

This process describes how GDLS approaches the problem of achieving balanced design in a system. The process can be generalized for use on any “system” or “system-of-systems” involving hardware and/or software.

1. Identify driving requirements and gain Voice of the Customer.
2. Identify performance and burden evaluation criteria.
3. Identify subsystems to be traded and options for each.
4. Characterize subsystem options (generate/consolidate data).
5. Identify candidate system alternatives.
6. Conduct operational effectiveness analysis on candidate system alternatives.
7. Select preferred system alternative:
 - a. Finalize evaluation criteria and conduct additional system-level analysis to finalize data.
 - b. Elicit importance weights and utility curves from stakeholders for each evaluation criteria.
8. Conduct final SE review to verify subsystem-to-system integration and requirements compliance; generate report and brief customer.

Within the context of the process, two tools will be discussed. The Advanced Collaborative System Optimization Modeler (ACSOM) will be discussed in term of the characterization of system inputs resulting from billions of combinations of candidate subsystems across the vehicle systems. The use of search optimization techniques for discerning the pareto “efficient frontier” will be discussed. As well, the use of the commercially-available Logical Decisions for Windows (LDW) will be explained. The application of Multi-Attribute Utility Analysis (MAUA) using LDW will be shown as well as the interaction of decision-makers within the stakeholder conference.

As a practical application, an example from a previous military program will be used to show the process and the outcomes.

Biography: Steve Franz was named Senior Director of Advanced Programs for General Dynamics Land Systems in June of 2014. In his new role, Steve has overall program management responsibility for the Future Fighting Vehicle (FFV) program. Steve is also responsible for the Amphibious Combat Vehicle (ACV 2.0) contract effort, the company’s robotics program portfolio, and all Contract Research and Development (CRAD) activities. Steve joined General Dynamics Land Systems, a subsidiary of General Dynamics Corporation, in July of 1991 as a Project Engineer for Structures and Armor, and has continued to be promoted into positions of increasing responsibility within the company. With more than 25 years of engineering and design experience, Steve has worked extensively on combat vehicle development programs for the U.S. Army and U.S. Marine Corps. Before joining General Dynamics Land Systems, Steve served five years in the Army as an infantry officer, and two years as an engineer for General Motors Corporation’s Military Vehicles Operation. Franz also served nine years as an infantry officer with the National Guard in Indiana and Minnesota. Born in Alton, Illinois, Steve earned a bachelor’s degree from the United States Military Academy at West Point in Highlands, New York in 1984, with a concentration on Weapon Systems Engineering. He completed a master’s degree in mechanical engineering at the Georgia Institute of Technology in Atlanta, Georgia in 1988.

AVT MILLIKEN LECTURE

Tuesday, August 4

SESSION: AVT-8-2
9:30AM - 11:10AM

Location: Room 309, Level 3



J. Karl Hedrick

University of California at Berkeley

RECENT ADVANCES IN AUTOMOTIVE ACTIVE SAFETY SYSTEMS

Abstract: Recent advances in driver modeling and online controller optimization are reviewed and applied to semi-autonomous automotive systems that assist the driver in situations where the driver may be impaired by internal and/or external events. Analytical and experimental results for lane keeping, lane change, collision avoidance and adaptive cruise control systems for are presented.

Biography: Professor Hedrick is the James Marshall Wells Professor of Mechanical Engineering at the University of California at Berkeley. He teaches graduate and undergraduate courses in Automatic Control Theory. His research focuses on the application of advanced control theory to a wide variety of vehicle dynamic systems including automotive, aircraft and ocean vehicles. He is currently the Director of Berkeley's Vehicle Dynamics Laboratory. He served as the Chair of the Mechanical Engineering Department at UC Berkeley from 1999-2004. He served as the Director of the University of California PATH Research Center, a multi-disciplinary research program located at the Richmond Field Station from 1997-2003. PATH conducts research in a variety of advanced transportation areas including advanced vehicle control systems, advanced traffic management and information systems and technology leading to an automated highway system. Before coming to Berkeley he was a Professor of Mechanical Engineering at Massachusetts Institute of Technology from 1974-1988, where he served as Director of the Vehicle Dynamics Laboratory.

His research has concentrated on the development of nonlinear control theory and on its application to a broad variety of transportation systems including automated highway systems, power train control, embedded software design, formation flight of autonomous vehicles, and active suspension systems.

He was the chairman of the International Association of Vehicle System Dynamics (IAVSD) 20th Symposium, held in August of 2007 and was the editor of the Vehicle Systems Dynamics Journal. He is a Fellow of ASME where he has served as Chairman of the Dynamic Systems and Controls Division. He is also a member of SAE and AIAA. He served as the editor of the ASME Journal of Dynamic Systems, Measurements and Control.

He has been awarded a number of honors including the ASME Dynamic Systems and Control Division's Outstanding Investigator Award, 2000, the ASME DSM&C Journal's Best Paper Award (1983 & 2001), the IEEE Transactions on Control Systems and Technology's Outstanding Paper Award (1998), and the American Automatic Control Council's O. Hugo Schuck Best Paper Award (2003). He was awarded ASME's 2006 Rufus Oldenburger Medal which recognizes significant contributions and outstanding achievements in the field of automatic control. He presented the ASME Nyquist Lecture at the ASME DSCD conference in October, 2009. He was elected to the National Academy of Engineering in 2014.

BIOMED KEYNOTE

Tuesday, August 4

SESSION: BIOMED-1-1
2:00PM - 3:00PM

Location: Room 310, Level 3



Andrew J. Carter

TheraCell

INNOVATION IN MEDICAL DEVICES

Abstract: In this talk, Dr. Carter will draw on his significant experience in the medical devices field to present conclusions about the nature and importance of innovation in the medical device industry.

Biography: Andy Carter is an experienced executive with over 30 years of medical device experience, primarily in orthobiologics, orthopaedics, and biomaterials with more than 30 US patents and patent applications. Dr. Carter previously served as CTO at Anika Therapeutics (Nasdaq: ANIK); VP and General Manager at Spine Wave; 20 years at Smith and Nephew including Head of Materials Research, Program Manager, Orthopaedics and Group Director R&D at Smith and Nephew Endoscopy. He has managed both research and development programs.

CIE KEYNOTE

Monday, August 3

SESSION: CIE-32 VES - I, ME, MINE INTERFACES & VES

2:00PM - 3:40PM

Location: Room 312, Level 3



Hunter Hoffman

VR Analgesia Research Center

University of Washington

OCULUS RIFT AND BEYOND: ENGINEERING MEETS VIRTUAL REALITY

Abstract: The essence of immersive virtual reality is the illusion of going inside the computer generated world as if it is a place you are visiting. The essence of augmented virtual reality is to integrate digital images into the real world.

Immersive virtual reality is proving to be a powerful non-pharmacologic distraction for children with large severe burns during wound care, and Virtual Reality (in combination with conventional treatment) can help improve therapeutic outcome of patient being treated for very serious psychological problems such as Post-Traumatic Stress Disorder.

Smart phone display technology (e.g., iPhone) has caught on and quickly changed the world. Now, e.g., using Smartphone display screens for the VR goggles, Samsung, Facebook, Sony and Microsoft, Magic Leap, and video game companies are investing billions into making immersive virtual worlds and augmented reality widely available to mainstream the mainstream public in mass quantities (i.e., especially for “gamer” consumers but also a wide range of other applications).

As a result, powerful “new” immersive VR display technologies are becoming widely available in 2016, almost before the technology is ready. Very low cost VR goggles (e.g., \$1,500) are quickly improving and may eventually surpass in immersive quality the \$35,000 traditional wide field of view VR helmets currently available.

Engineering can contribute to the successful scramble to make virtual reality convincing without significant side effects e.g., cybersickness, and virtual reality has potential as a powerful new tool for engineers. In the panel discussion that follows this keynote we will get the audience’s ideas about engineering applications of immersive VR technology.

Biography: Hunter Hoffman conducted pre-graduate research on Reality Monitoring at Princeton University, was a co-recipient of the Satava Award for Medical Applications of Virtual Reality, and was named one of the top “fast 50” innovators of the next 10 years.

He has been studying virtual reality since joining Tom Furness’ HITLab in 1993. He studied “virtual reality monitoring” and tactile augmentation, the use of real objects to enhance the realism of virtual objects (including mixed reality virtual chocolate bars and that can be physically eaten). Hoffman has helped pioneer the use of VR to help treat patients for phobias (SpiderWorld) and civilian Post-Traumatic Stress Disorder (e.g, the World Trade Center World). Hoffman and clinical burn researcher Dave Patterson co-originated and spear-headed the use of the technique of using immersive virtual reality to distract severe burn patients during painful wound care procedures. Hoffman designed SnowWorld, the first virtual world designed for pain distraction, which also became an immersive Smithsonian National Museum of Design Triennial exhibition. To study the effects of VR on brain activity, Hoffman et al. designed a pair of photonic fiberoptic wide field of view fMRI magnet friendly VR goggles. Hoffman and Magula also designed water-friendly VR goggles with robot-like arm goggle holder to distract severe burn patients during wound care in the ICU tubroom at Shriners Galveston (clinical study in progress). Hoffman was named one of FastCompany magazines “Fast 50” innovators of the next 10 years.

Hoffman’s research has been published in peer reviewed journals in a number of disciplines. He published an article in Scientific American, and his research has been featured in popular main stream science news documentaries such as Scientific American Frontiers with Alan Alda, and NBC Nightly News with Brian Williams.

DAC/EGD/DEC KEYNOTES

Tuesday, August 4

SESSION: DAC-19-1

9:30AM - 11:10AM

Location: Room 102, Level 1

ENGINEERING FOR GLOBAL DEVELOPMENT

This Design Automation Committee (DAC) keynote is co-organized with Engineering for Global Development (EGD) at ASME with co-sponsorship from the Design Education Committee (DEC). The event will feature two international speakers renowned in the EGD space. Prof. Mugendi M’Rithaa (South Africa) and Dr. Mohammad Bilal Khan (Pakistan) will provide invaluable perspectives from emerging economies and will discuss the critical roles of design automation, design education, and engineering design in the global development context. The keynote will conclude with a series of lightning talks from members of DAC and EGD communities, discussing some of the foremost research challenges and trends in engineering for global development.



Mugendi K. M'Rithaa

Cape Peninsula University of Technology

DESIGN FOR DEVELOPMENT: AFRICAN ASPIRATIONS IN CONTEXT

Abstract: Africa is the world's second largest continent with some of the fastest growing economies globally. Whereas the continent is richly endowed with natural resources and a predominantly youthful population, many parts of the continent have stagnated or retrogressed from a developmental point of view. Additionally, the inherent advantages of harnessing design agency to catalyze this dynamic and promising region's developmental imperatives has yet to be fully realized.

Drawing on the speaker's own experience as a denizen of the continent, this presentation explores the Africa's myriad experimentations with a design for development agenda whilst concomitantly interrogating the opportunities and challenges for mainstreaming an arguably more progressive ethos of sustainable development via a designer lens. Further, a number of profitable collaborations have emerged wherein designers, engineers and allied professionals have pooled their intellectual capital on projects of socio-economic significance.

Keywords: Africa; Design for Development; Design for Sustainability; Industrial Design; Participatory Design, Sustainable Development Goals; World Design Capital 2014

Biography: Prof. Mugendi K. M'Rithaa is an industrial designer, educator and researcher at the Cape Peninsula University of Technology (CPUT) in Cape Town, South Africa. Mugendi is passionate about various expressions of socially responsive and responsible design, including Design for Social Innovation and Sustainability, Participatory Design, and Universal Design. He has a special interest in the pivotal role of design in advancing the developmental agenda on the African continent and beyond. He is associated with a number of international networks focusing on design within industrially developing/majority world contexts, and is currently the President-Elect of the International Council of Societies of Industrial Design (Icsid)—the body responsible for protecting and promoting the profession of industrial design globally.



Mohammad Bilal Khan

National University of Sciences and Technology
Pakistan

COMPLEMENTARY RESEARCH CONCEPTS AND DESIGN EXAMPLES

Abstract: A new paradigm in research comprising insight, imagination, reinventing thinking and correlation is introduced to supplement the

established project sequence of design, synthesis, measurement and analysis. The aim is to generate a shared understanding and strength of purpose that transcends the monotony of repetition and thus increase the intellectual and creative capital of the scientific community. The lack of "human factor" is identified as the major impediment to technical prowess and mankind has failed to realize the true potential of the universe despite huge investments. New renewables are hardly 3% of world energy matrix, our solar cell is only 20% efficient, the high density fuel combustion platforms reach peak efficiencies of 30-40%, the wind corridors are imploringly waiting exploitation all while the oceans beseech for viable hydrogen production. The CO2 emissions, our own handiwork, are pleading for conversion to clean and green liquid fuel at affordable cost.

In this talk, five design examples are shared on breakthrough technologies in the areas of interface engineering, ablatives, intelligent viscoelastic systems, photonic device nanostructures, and fast track biofuels. The design concept and evaluation of breadboard systems is presented to demonstrate the feasibility of these technology demonstrators that find widespread applications in aerospace, renewable energy, photonics and blast mitigation strategies.

Biography: Dr. Mohammad Bilal Khan is the founding Principal/Dean of the USAID-funded Center for Advanced Studies at NUST. Dr. Khan has worked across four continents on diverse projects ranging from energy systems to machine design to high-performance composites. He has been actively involved in advanced research in the areas of renewable energy, aerospace materials and interface engineering. He previously served as a consultant to the US Department of Energy and Pakistan Air Force. Dr. Khan is a member of the Higher Education Commission Experts Review Committee, co-chair of the Energy Sector Corporate Advisory Council NUST and chairman of the YMK educational foundation. He is also a member of the core energy group constituted by the Ministry of Science and Technology. He serves on the governing boards of several public and private universities. He is a recipient of the UK ORS award. In recognition to his meritorious services to the country, Dr. Khan has been awarded the President's Medal for Technology.

LIGHTNING TALKS



Stephen Harston

Title: The Design, Testing and Implementation of a Lifesaving Product in the Developing World

Abstract: There exist places in industry with the sole purpose of researching and developing innovative solutions to address needs at the bottom of the economic pyramid. Illustrated with real world examples, this talk will discuss the challenges and successes of designing, validating, manufacturing and monitoring products that are in use and impacting the lives of those in the developing world. One such product that will be discussed is the development of Arktec, an extremely efficient and passive cold-storage device designed to keep vaccines cold for a month by using only 10lbs of ice.

Biography: Dr. Stephen Harston has a passion for helping others. After graduating from Brigham Young University, he has used his background in Mechanical Engineering, Product Design and R&D to invent and design products that improve the lives of people in the developing world. Working closely with organizations such as the Bill and Melinda Gates Foundation, the World Health Organization, PATH, Global Good and others, he and his team at Intellectual Ventures Laboratory have developed products that are helping save lives in Africa. In addition to the success of the products in the field, these products have also been featured on CNN, Wired Magazine, 60 Minutes and PBS. One of Dr. Harston's products, a passive vaccine storage device, is currently on display at the Bezos Center for Innovation at the Museum of History and Industry in Seattle. Since 2001 Dr. Harston has been designing for, and traveling to, the developing countries of Africa and South America providing him an unfiltered view of everyday challenges in these regions and insight into how to approach them. Dr. Harston is an awarded lecturer and has been an invited speaker at several conferences.



Briana Lucero

Title: Solar Concentrators: Power and Heat for Economic Development

Abstract: Common sources of renewable energy include solar photovoltaics (PV), wind, and hydropower. These can provide the majority of electric power generation in some national grids and are often the only source of power in remote off-grid communities. The challenges facing renewable energy generators are the high cost of installation, intermittency, and mismatch between demand and supply, of which hydro has performed fairly well. These challenges are being met by new research into materials, systems design, and value chain optimization in concentrating solar power (CSP). Novel technical research in thermochemical transfer fluids, cascading solar receivers, recuperative water disassociation and thermal particle storage allow the CSP projects to be viable renewable applications to compete with hydropower. In this talk, three CSP projects are discussed in systems-level details as framed by their sustainability impacts and their sociotechnical opportunities for providing power to remote communities.

Biography: Dr. Briana Lucero is a Postdoctoral Research Fellow in The Ira A. Fulton Schools of Engineering at Arizona State University. She is a senior researcher within the Systems Engineering Environment and Studio (SEES) Laboratories with a focus on advanced energy systems modeling and optimization for the global economy. Her previous work in design-by-analogy and humanitarian engineering has laid a foundation for her current research in the design, optimization, and deployment of concentrating solar power systems in emerging markets. Her background as an aerospace engineer working on satellites and scientific imaging instrumentation at Ball Aerospace and Technologies Corporation has informed her use of systems engineering in basic science and applied research.



Jesse Austin-Breneman

Title: Design for Micro-Enterprise: An Approach to Product Design for Emerging Markets

Abstract: Emerging markets have been historically underserved by product developers. An increasing number of organizations from multi-national corporations to social enterprises are looking to these markets both as growth areas as well as opportunities for social impact. Results from previously performed designer interviews point to a recent trend within these organizations to pursue product opportunities that satisfy the unmet needs of micro-entrepreneurs. This talk presents findings from interviews with stakeholders in a public toilet franchise in East Africa and proposes guidelines for designing successfully for micro-entrepreneurs in emerging markets.

Biography: Jesse Austin-Breneman is an Assistant Professor of Mechanical Engineering at the University of Michigan, Ann Arbor. He recently completed post-doctoral work in the MIT Ideation Lab and the MIT Global Engineering and Research Lab. His research focuses on system-level approaches to difficult engineering design problems, such as product design for emerging markets. His work uses empirical studies, practitioner interviews and simulations to gain insight into issues facing multi-disciplinary design teams working in these fields. He is particularly interested in how teams manage competing objectives from the wide variety of stakeholders in emerging markets and in developing formal strategies for helping them do so.

MESA KEYNOTES

Tuesday, August 4

SESSION: MESA -20-1

11:40AM - 12:40PM

Location: Room 110, Level 1



Blas M. Vinagre

University of Extremadura, Badajoz, Spain

WHERE BIOMECHATRONICS MET FRACTIONAL CALCULUS

Abstract: Biomechatronics integrates the wide fields of Mechanics, Electronics and Biology to design and implement devices that interact with life systems, mainly humans, to help them to perform properly and, in some way, to repair the losses caused by trauma, disease, or birth defects. To achieve this goal, three main issues are involved: the modeling and analysis of biological functions and processes, the interface of the designed devices with the organism (sensors and actuators), and the design of the device itself to mimic the natural behaviors. Along its short history, Fractional Calculus (the integration and differentiation of general order) has been successfully applied for the control of mechatronic systems as well as for the modeling of biological ones. The aim of this talk is, after presenting the fundamental basis of Biomechatronics and Fractional Calculus, to give an overview of the contact points of this last one with the main research areas included in Biomechatronics, as well as to propose some ideas and perspectives for the use of it as a fundamental tool for the development of this discipline.

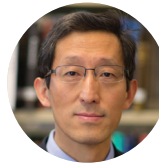
Biography: Prof. Blas M. Vinagre worked as R&D engineer and Head of Department at several companies from 1985 to 1994, mainly in Electronic War and Industry Automation. In 1994, he joined the Department of Electrical, Electronic and Control Engineering at University of Extremadura, Badajoz, Spain. He has been working in the area of Fractional Calculus Applications for over 17 years, and he is the author or coauthor of 2 books, over 40 journal papers, and 100 contributions to international conferences, mostly related to Fractional Order Systems (FOS) and Fractional Order Control (FOC). He has been involved as Principal Investigator in several research projects related to applying FOC to industrial processes, servomechanisms, biomechanics, flexible robotics, mobile robotics and autonomous vehicles. His interest in the field also includes stability theory, optimal and adaptive control, and controller implementation issues. Currently, he is the PI of a research project whose objective is the application of fractional order control strategies to mechatronic systems, and the Head of the Engineering Unit of the Technification Center for Paralympics Sport.

Wednesday, August 5

SESSION: MESA-20-2

11:40AM - 12:40PM

Location: Room 110, Level 1



Zuomin Dong

University of Victoria, Canada

MODELING, OPTIMIZATION AND REAL-TIME OPTIMAL CONTROL OF HYBRID ELECTRIC VEHICLES AND MARINE VESSELS

Abstract: Increasing environmental concerns give rise to advanced hybrid electric propulsion system technology for vehicles and ships with much higher energy efficiency and fewer emissions. Hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and fuel cell hybrid electric vehicles (FCHEVs); as well as green marine vessels with hybrid electric propulsion systems utilize multiple power plants and onboard energy storage system to support the optimal operation of all powertrain components at their peak efficiency. Intelligent traffic control systems optimize traffic flow to minimize traffic delay, save energy and reduce emissions. Smart grid systems improve the utilization of renewable energy and reduce network loss through optimal grid planning and operation.

These new technologies rely on two key supporting techniques: (a) high-fidelity multiphysics or mechatronics system modeling; and (b) global optimal design and real-time optimal control of the system. The complexity of the mechatronics systems and their optimal design/control problems presents real technical challenges and demands innovative solutions.

New developments on the supporting techniques and their applications to the developments of next generation HEVs/PHEVs and green ships will be presented in this talk. These include: (a) innovative powertrain architectures and hybrid transmission designs of PHEVs, as well as their advanced real-time optimal power control and real-time optimal energy management techniques; (b) design of diesel and fuel cell plug-in hybrid electric green ship propulsion system; (c) development of an integrated hybrid electric propulsion system modeling tool for marine vessels; and (d) additional applications of mechatronics system modeling and optimization to real-time optimal traffic control and smart grid optimization.

Biography: Zuomin Dong received his Ph.D. in Mechanical Engineering from the University at Buffalo, State University of New York in 1989, and immediately joined the faculty of University of Victoria. He is currently Professor and Chair of the Department of Mechanical Engineering and a member of the Institute for Integrated Energy Systems at University of Victoria. Dr. Dong is also a Professional

Engineer registered in British Columbia and a Fellow of CSME.

Dr. Dong's current research interests include: modeling, testing and design optimization of advanced hybrid electric vehicles, hybrid marine vessels, and fuel cell systems; metamodel based global optimization of complex, multiphysics systems; real-time optimal control of plug-in hybrid electric vehicles/ships, smart grid, traffic systems; automated optimal 5-axis CNC tool path planning and generation. These researches have been widely published in scientific journals and conference proceedings, and as industrial patents. Dr. Dong has been working closely with industry and served as director, consultant and collaborator of companies and government agencies. He also served as a member on the editorial boards of several international journals and organization committees of a number of international conferences. Dr. Dong has been a member of the Technical Committee (TC) on Mechatronic and Embedded Systems and Applications (MESA) and the Organization Committee of the MESA Conferences of ASME.

MNS KEYNOTE

Tuesday, August 4

SESSION: MNS-10-1

9:30AM - 11:10AM

Location: Room 307, Level 3



George G. Adams

Northeastern University

NOVEL APPROACHES TO CHARACTERIZING NANOSCALE FRICTION AND WORK OF ADHESION OF CNTS USING MEASUREMENTS FOLLOWED BY MODELING

Abstract: Measurements of quantities such as friction and work of adhesion at the nanoscale are inherently difficult due to the extremely small dimensions. In this talk we present two examples of nanoscale measurements in which the measured quantities differ significantly from the property which is to be determined. Modeling is used to calculate the desired quantity from what is measured. In some sense it can be said that this procedure is common to all measurements; however, here the difference between what is measured and what is determined is not only much greater than usual but also requires sophisticated modeling techniques.

Two examples are provided. First a testing device is used to induce and then measure the slack in a carbon nanotube bundle suspended over two cantilevers. Subsequently modeling is used to determine the nanoscale friction from the measured slack. Note that the slack

(measured quantity) and friction (desired property) are quite different. In the second example, two suspended bundles of carbon nanotubes adhere to each other as they span over a trench. Observation and measurement of the shape allows important information about the work of adhesion to be determined via modeling. Again the shape (measured quantity) and the work of adhesion (desired quantity) are very different.

Biography: Dr. George G. Adams is the College of Engineering Distinguished Professor in the Mechanical and Industrial Engineering Department at Northeastern University where he has served on the faculty for over thirty years. His areas of expertise are in contact mechanics, adhesion, and tribology; MicroElectroMechanical Systems (MEMS), especially RF MEMS switches and micromirrors; and nano-mechanics (including material characterization, adhesion, and mechanical and electrical contacts). He has published over 100 refereed journal papers and has had numerous research grants and contracts with government and industry. Dr. Adams is a Fellow of the ASME and of STLE, and is College of Engineering Distinguished Professor at Northeastern University.

MR KEYNOTES

Tuesday, August 4

SESSION: MR-13-1

11:40AM - 12:40PM

Location: Room 210, Level 2



Sridhar Kota

University of Michigan

STRONG, COMPLIANT AND SOLID-STATE MECHANICAL DEVICES - FOR MEMS, AIRCRAFT WINGS AND SOFT ROBOTS

Abstract: Traditionally, human-engineered mechanisms and mechanical devices employ a collection of rigid parts and joints that must be assembled, aligned and lubricated in order to function. By exploiting the natural elasticity of materials, rather than avoiding it, and designing for strength, rather than stiffness, sophisticated motions can be realized with minimum mechanical complexity. This relatively new paradigm in engineering design enables the creation of next-generation products with solid-state (monoform) mechanisms that are strong, compliant, precise, shape-adaptive, cost-effective, safe and reliable.

Designs in nature are suitably compliant (not rigid) and comparatively strong with monoform bodies generating sophisticated motions. Soft-bodied animals, such as worms, and octopi, equipped with muscles, fibers and pressurized liquid filled cavities, demonstrate very

robust and graceful, at times vigorous, movement within the flexible geometries of their bodies. The ability to alter the geometry of a structure in real time to adapt to differing conditions, is another important feature in nature's designs that offers utmost energy efficiency.

By exploiting the elasticity of conventional materials the Compliant Systems Design Laboratory (CSDL) has developed methods for designing compliant monoform mechanisms with distributed compliance since the mid-1990s. This talk will provide an overview of the design methods (topology and geometry optimization) and their applications to MEMS, medical devices, automotive, and shape-changing aircraft wings. The talk will also highlight recent developments at CSDL in elasto-fluidics including new design building blocks and their applications to soft robots, orthotics and more.

Biography: Sridhar Kota is the Herrick Professor of Engineering, Professor of Mechanical Engineering and the Director of Compliant Systems Design Laboratory. He developed pioneering methods for designing load-bearing compliant mechanisms with distributed compliance—a new paradigm in engineering design that exploits material elasticity. He authored over 200 technical papers and over 25 patents. He is the founder and President of FlexSys Inc., an engineering firm engaged in bio-inspired product design and has developed and flown (in 2014) a revolutionary aircraft with shape-changing wings.

Between 2009 -2012 Professor Kota served as the Assistant Director for Advanced Manufacturing at the White House Office of Science and Technology Policy (OSTP). In this role, he developed policy recommendations and implementation strategies to enhance U.S. manufacturing competitiveness, and to foster innovation-based manufacturing of emerging technologies. Prof. Kota initiated and championed the establishment of President Obama's National Manufacturing Innovation Institutes and has also helped create other initiatives, including National Robotics Initiative. After returning to the UM, he established an Institute for Manufacturing Leadership focusing on policy, education and outreach.

Tuesday, August 4
SESSION: MR-13-2
2:00PM - 3:00PM

Location: Room 210, Level 2



Robert Wood

Harvard University

MULTI-SCALE, MULTI-MATERIAL MANUFACTURING BASED ON FOLDED COMPOSITES: MOTIVATIONS, PROCESS TECHNOLOGIES, AND APPLICATIONS IN ROBOTICS

Abstract: Origami and Kirigami are viable methods for creating not only complex static structures, but also high-performance dynamic mechanisms. This talk will discuss manufacturing methods for complex devices and robots based upon three fundamental steps: (1) 2D machining and (2) lamination to create quasi-2D composites of arbitrary material composition that are then (3) folded into their functional forms. There are several key benefits to this approach including the relative ease of 2D machining (i.e., compared to 3D subtractive machining), the ease of integrating discrete components on the 2D composite prior to folding, the structural efficiency of folded beams and shells, and the scalability of the process. Several example devices and robots—including inexpensive self-assembling “printable” robots and robotic insects—will be used to illustrate these benefits and also highlight current challenges in automating the design workflow.

Biography: Robert Wood is the Charles River Professor of Engineering and Applied Sciences in Harvard's School of Engineering and Applied Sciences and a founding core faculty member of the Wyss Institute for Biologically Inspired Engineering. Prof. Wood completed his M.S. and Ph.D. degrees in the Dept. of Electrical Engineering and Computer Sciences at the University of California, Berkeley. He is founder of the Harvard Microrobotics Lab which leverages expertise in microfabrication for the development of biologically-inspired robots with feature sizes on the micrometer to centimeter scale. His current research interests include new micro- and meso-scale manufacturing techniques, fluid mechanics of low Reynolds number flapping wings, control of sensor-limited and computation-limited systems, active soft materials, wearable robots, and morphable soft-bodied robots. He is the winner of multiple awards for his work including the DARPA Young Faculty Award, NSF Career Award, ONR Young Investigator Award, Air Force Young Investigator Award, Technology Review's TR35, and multiple best paper awards. In 2010, Wood received the Presidential Early Career Award for Scientists and Engineers from President Obama for his work in microrobotics. In 2012, he was selected for the Alan T. Waterman award, the National Science Foundation's most prestigious early career award. In 2014, he was named one of National Geographic's "Emerging Explorers". Wood's group is also dedicated to STEM education by using novel robots to motivate young students to pursue careers in science and engineering.

MSNDC/VIB KEYNOTES

Tuesday, August 4

SESSION: MSNDC-18-1

2:00PM - 3:00PM

Location: Room 302, Level 3

**Stuart S. Antman**

2015 Lyapunov Award Recipient

University of Maryland

EFFECTS OF NONLINEAR MATERIAL RESPONSE ON THE DYNAMICS AND STABILITY OF STRUCTURES

Abstract: Many analytical and numerical models for structures are based on the use of linear stress-strain laws and the use of simple models for dissipative mechanisms. For structures that can suffer large deformations and that are subject to live or dynamical loads, very slight changes in constitutive functions (such as replacing a linear function with a nearby nonlinear function) could produce large changes in the behavior of solutions to the governing equations of motion. This lecture describes the effect of properly invariant constitutive equations, accounting for nonlinear elastic, viscous, and plastic effects, on the behavior of solutions of geometrically exact equations of motion for deformable solids. In particular, for many concrete problems there are thresholds in nonlinear material response separating qualitatively different behaviors of solutions. Among the phenomena to be discussed are self-sustained oscillations, parametric resonance, blowup, snap buckling, attractors for heavily-burdened bodies, and shock structure.

Biography: Stuart Antman was an undergraduate at Rensselaer Polytechnic Institute, where he entered the Mechanical Engineering program. After taking a semester of an introductory course on Mechanical Engineering, which was devoted mostly to the dynamics of the middle shaft of a 10-foot-long demonstration slide rule, he switched to a major in mathematics with the encouragement of his Calculus professor W. E. Boyce. The mathematics program required sophomore majors to take a course in Theoretical Mechanics (à la Synge & Griffith) given by C. C. Mow, which so fascinated Antman that he undertook a heavy minor in Mechanics. His fascination was increased by a senior-level course given by G. H. Handelman covering Cartesian tensor analysis, calculus of variations, linear elasticity, fluid dynamics and electromagnetism, together with representative steady-state and dynamical problems from each field. Antman's love of mechanics sent him to the graduate program in Aeronautics and Engineering Mechanics at the University of Minnesota. There his background in mechanics allowed him to take an extensive minor in mathematics oriented toward differential equations. He has

worked near the border between mechanics and applied mathematics ever since.

After receiving his doctorate in 1965 under the direction of W. H. Warner, Antman accepted a post-doctoral position at the Courant Institute of New York University. There J. B. Keller and he edited the book *Bifurcation Theory and Nonlinear Eigenvalue Problems*.

In 1972, Antman accepted a professorship in the Department of Mathematics at the University of Maryland, where he is now a Distinguished University Research Professor in the Department of Mathematics, the Institute for Physical Science and Technology, and the Institute for Systems Research. During the intervening years, he has held visiting appointments in Oxford, Edinburgh, Paris, Orsay, Palaiseau, Bonn, Darmstadt, Dortmund, Leipzig, Budapest, Rome, Providence, Hong Kong, and Mexico City.

Antman's doctoral thesis and a handful of subsequent papers were devoted to the derivation of geometrically exact nonlinear theories of rods and shells (and the resolution of associated paradoxes). The knowledge he gained from writing up the invited contributions to *Bifurcation Theory* formed the foundation of his subsequent work on the global bifurcation and buckling of nonlinearly elastic rods and shells. In the 1980's, Antman's work branched out to encompass shock structure in solids, dynamical (visco)-elasto-plasticity, electro-magneto-elasticity, the dynamics of heavily-burdened deformable bodies, steady-state and dynamical fluid-solid interactions, nonlinear oscillations and stability of structures, optimal control, attractors for the motions of nonlinearly viscoelastic solids, blowup of solutions in time, and dynamical analysis of quasistatic motions. The features common to this research are the use of geometrically exact descriptions (so that no $\sin x$ is ever approximated by x) and the use of general, properly invariant constitutive functions. As a consequence, this research often exhibits thresholds in material response separating qualitatively different behavior.

Antman is the author of *Nonlinear Problems of Elasticity* and *The Theory of Rods in the Handbuch der Physik*. He has served on the editorial boards of several journals on applied mathematics and on mechanics, having been editor-in-chief of the *Archive for Rational Mechanics and Analysis* for a decade. He is currently co-editor-in-chief of three Springer book series on applied mathematics. He is a Guggenheim fellow, an inaugural fellow of the Society for Industrial and Applied Mathematics, an inaugural fellow of the American Mathematical Society, a winner of the L. R. Ford Award of the Mathematical Association of America, and a winner of the von Kármán Prize of the Society for Industrial and Applied Mathematics.

Wednesday, August 5
SESSION: MSNDC-VIB-18-2
9:30AM - 11:10AM

Location: Room 302, Level 3



Matt Snyder

European Office of Aerospace Research and Development (EOARD), Air Force Office of Scientific Research

OPTIMIZATION OF MULTI-STATE RECONFIGURABLE AEROSTRUCTURES: VIBRATION CHALLENGES IN AEROSPACE VEHICLE DESIGN

Abstract: A reconfigurable aircraft is capable of in-flight shape change to increase mission performance or provide multi-mission capability. While configurability at some scale has always been a consideration in aircraft design (the Wright flyer used wing warping for roll-control), increasingly complex reconfiguration has been sought, such as that demonstrated by the Lockheed-Martin folding wing (DARPA Morphing Aircraft Structures program). However, the benefits achieved from reconfiguration can be offset by the weight penalty incurred from the actuation system and required supporting structure. As such, a design tool is required that efficiently produces a light weight reconfigurable structure and provides fundamental information to assist the structural engineer. Here a method for the constrained simultaneous optimization of a multi-state aircraft is a proposed where the flutter of the air vehicle is considered. The talk will conclude with a number of research challenges for future work to enhance the viability of reconfigurable vehicles and to take advantage of recent advancements in materials, manufacturing and structures related research.

Biography: Major Matt Snyder, United States Air Force, received his undergraduate degree in Mechanical Engineering from Cedarville University, Ohio and his PhD in Aircraft Structures from the Aeronautics Department of Purdue University. He taught as an Assistant Professor at the United States Air Force Academy in the Department of Engineering Mechanics where he was named the Engineering Mechanics Outstanding Academy Educator in 2007. He is currently an International Program Officer for the European Office of Aerospace Research and Development, London, UK, one of the overseas offices of the Air Force Office of Scientific Research. He manages an international research portfolio in the area of advanced aerospace materials and structures.

PTG KEYNOTE

Tuesday, August 4
SESSION: PTG-10-1
2:00PM - 3:00PM

Location: Room 108, Level 1



Philippe Velez

LaMCoS, INSA

ON SOME CONCEPTS AND ISSUES IN GEAR DYNAMIC SIMULATIONS

Abstract: In this presentation a number of classic concepts widely used in the simulations of gear dynamics are examined and some of their limitations are highlighted. Particular emphasis is placed on the concepts of mesh stiffness, mesh excitations and mesh damping. Depending on gear geometry and operating conditions, conventional approaches can prove inadequate and more complex models may be required. The notion of transmission error is critically assessed and the possibility of extending it to multi-mesh geared systems is discussed. Finally, the various sources of mesh damping are considered and it is shown that different damping mechanisms may prevail depending on the instant contact conditions between the tooth flanks.

Biography: Professor Velez received a MEng. in Mechanical Engineering from INSA Lyon (France) in 1984, PhD from the same establishment in 1988 and was appointed Full Professor of Mechanical Engineering in 1998. He currently serves as the Head of the 'Mechanical Systems and Contact' research group of LaMCoS (INSA Lyon) and is the Holder of the SAFRAN-INSA Chair on Innovative Mechanical Transmissions for Aeronautics.

VIB KEYNOTES

Wednesday, August 5**SESSION: MSNDC-VIB-18-2****9:30AM - 11:10AM**

Location: Room 302, Level 3

**Robert Parker**

2015 N. O. Myklestad Award Recipient

Virginia Tech

CYCLICALLY SYMMETRIC SYSTEM VIBRATION

Abstract: Cyclically symmetric, or rotationally periodic, systems arise in numerous rotating applications, including helicopter and wind turbine rotor assemblies, bladed disk assemblies, planetary gears, pendulum absorber systems, disk brakes, and many more. In most cases, these systems have been studied on their own without explicit consideration of their common mathematical structure and vibration features. It is possible, however, to analyze the vibration of the general class of cyclically symmetric systems, including gyroscopic effects, and that is the focus of this talk. The rotational periodicity leads to equations of motion that involve circulant matrices. Systems without any vibrating central components to which the cyclically symmetric substructures are attached have purely circulant matrices. Systems having central components, e.g., the central hub of an assembly of blades, are the larger group, however. Their model matrices are not circulant but have circulant sub-matrices. In both cases, the systems have highly structured modal properties and natural frequency spectra that can be derived and proved in surprising detail. This structure has useful practical implications that will be discussed for some example systems. While the main results will be presented for discrete systems described by matrix equations, comparisons will be made to cyclic symmetry phenomena in continuous systems. Bandgap phenomena (natural frequencies grouped into separated frequency bands) arise in some, but not all, situations. Examples showing when and how this occurs will be discussed.

Biography: Since 2013 Prof. Parker has served as the L. S. Randolph Professor in the Department of Mechanical Engineering at Virginia Tech. Previously he was a University Distinguished Professor and the Executive Dean at the University of Michigan-Shanghai Jiao Tong University Joint Institute and served 13 years on the faculty at Ohio State University. He received his M.S. and Ph.D. degrees from the University of California, Berkeley.

Prof. Parker's research examines the vibration and stability of high-speed mechanical systems. He has published over 100 archival journal papers and 120 conference papers. His individual research funding exceeds \$10M from a range of federal and industry spon-

sors. Prof. Parker has delivered over 60 keynote and invited lectures. He has consulted for several major companies where analyses using his research have solved major vibration problems in the automotive, helicopter, wind turbine, and aircraft engine industries.

Prof. Parker is a Fellow of ASME and the American Association for the Advancement of Science. The Chinese government selected him as an inaugural awardee for its 1000 Person Plan. He has received the US Presidential Early Career Award for Scientists and Engineers (PECASE), the National Science Foundation CAREER, and the US Army Young Investigator Awards, as well as the ASME Gustus Larson Award, Ford Chief Engineer Award, French government Poste Rouge Award, SAE Ralph Teetor Educational Award, ASEE's Global Engineering Educator and Outstanding Faculty Awards, and five separate research awards from Ohio State University.

He was invited by the US National Academy of Engineering to four Frontiers of Engineering Symposia in the US, China, Japan, and Germany. He serves on the Editorial Board of Mechanism and Machine Theory and served seven years as Associate Editor for the ASME Journal of Vibration and Acoustics and held leadership roles in several professional society committees.

Prof. Parker has been a Visiting Fellow at Risoe National Lab (Denmark), the University of New South Wales, the University of Sydney, Tokyo University, NASA Glenn Research Center, and INSA Lyon. He worked at The Aerospace Corporation for two years.

Tuesday, August 4**SESSION: VIB-17-1****11:40AM - 12:40PM**

Location: Room 302, Level 3

**David Ewins**

2015 J.P. Den Hartog Award Recipient

Imperial College London

EXCITING VIBRATIONS: THE ROLE OF TESTS IN AN ERA OF SUPERCOMPUTERS AND UNCERTAINTIES

Abstract: This lecture presents the case for achieving an optimum balance between, and integration of, Test and Simulation in modern Vibration Engineering. This is necessary to resolve the many issues and structural dynamics problems encountered in practice because of the inevitable systematic and stochastic uncertainties which are encountered at every stage of product development. These problems can be overcome through effective implementation of modern validation and verification procedures which will be shown to require the most advanced testing technologies to match those in simulation which are driven by continuing advances in computation technology. The lecture draws on examples spanning more than half

a century's practical experience in a range of industrial applications.

Background: Vibration in structures, machines and vehicles remains one of the major performance-limiting features, particularly so for the critical applications in the advanced aerospace, defense and power industries. As a result, designers of such engineering products demand techniques which enable them to eliminate or control any undesirable behavior such as excessive vibration, and to do so at the design stage. Increasingly, they turn to computer models to provide such a capability and at the same time raise their expectations of just how much can be done to remove vibration from the list of concerns. From a different perspective, customers and regulatory authorities expect evidence that the products they are being delivered will, indeed, be free from all the side effects that are associated with vibration. This means that tests must be done to provide such evidence and, here again, expectations and demands are raised in this process. Modern structural dynamics provides the technology required to meet these demands. It comprises three main skills—theoretical modelling, numerical analysis and experimental measurement—and the overarching theme of this lecture is the need for these three basic tools to be balanced and integrated. In effect, this means that as simulation techniques (modelling plus computation) improve—often dramatically because of great strides in computation—it is necessary for experimental techniques to keep step, not the least because the final stage in any product is the pass-off or certification test. In practice, and especially for the critical structures of advanced high-performance machinery, vehicles and plant, the ideal simulation-test integration comes when tests can complement and inform modelling activities and, equally, when advanced models can inform the design and conduct of the expensive pass-off tests. In both of these major endeavors (constructing a model than can be used with confidence to be used to design, and carrying out tests which convincingly demonstrate the predicted functionality across the operating spectrum) the underlying concern is to reduce uncertainties to an acceptable level. This, in turn, means ensuring that the levels of vibration experienced in service are such that the structural performance meets its designed levels of life, reliability and disturbance. The lecture will emphasise how today's state-of-the-art structural dynamics needs to be focused on the 'bottom line' in all vibration problems encountered in practice: managing vibration response levels across the structure and throughout its service life in order to satisfy the structural performance demands as well as those of functional performance.

Biography: David J. Ewins has spent the past 50 years studying and measuring vibration in a range of application areas—mostly in aerospace, defense and other hi-tech industries. Having studied at Imperial College London and Cambridge University, he has been based at Imperial as Professor of Vibration Engineering since 1983, with periods as Visiting Professor overseas in the USA, France, Switzerland and Singapore. Following partial 'retirement' in 2005, he spends part of his time at Imperial and part at Bristol University as Professor of Vibration Engineering. He sits on a number of advisory Boards and was Chairman of the Scientific and Technological

Advisory Board (STAB) for the CleanSky Programme from 2010-2014.

His research has focused on two main areas—Modal Testing and Vibrations in Turbomachinery, in the latter case, working closely with Rolls-Royce with whom he set up the Vibration UTC at Imperial in 1990. Current research priorities seek to ensure that the dynamics of engineering structures can be controlled by: (a) routinely including models of the joints that hold structures together, (b) accepting that all structures are non-linear to a degree, and (c) ensuring that modeling, prediction and measurement are fully integrated in the teaching, research and practice of structural dynamics.

He is a Fellow of the Royal Society and of the Royal Academy of Engineering, and of the Indian National Academy of Engineering.

Wednesday, August 5

SESSION: VIB-17-3

11:40AM - 12:40PM

Location: Room 305, Level 3



Maurizio Porfiri

2015 C.D. Mote, Jr. Early Career Award Recipient

Polytechnic School of Engineering, New York University

MODELING FINITE AMPLITUDE VIBRATIONS OF FLEXIBLE BEAMS IN VISCOUS FLUIDS

Abstract: The analysis of mechanical vibrations of flexible slender structures immersed in viscous fluids is of fundamental importance in many technical fields, across a wide range of length and force scales, from atomic force microscopy to naval engineering. One of the main challenges in this class of problems involves the prediction of the forces exerted on the oscillating structure by the fluid. In this talk, I will present a comprehensive modeling framework to interpret and predict the steady-state response of flexible beams oscillating in viscous fluids. We will depart from unsteady Stokes hydrodynamics to consider finite-amplitude structural vibrations, for which vorticity generation and transport modulate the fluid-structure interaction. To illustrate the methodology, I will focus on harmonic bending vibrations of a thin cantilever beam in an unbounded fluid. Theoretical results will be validated against direct three-dimensional fluid dynamics simulations and experiments on centimeter-size beams undergoing low frequency and finite amplitude underwater vibrations. Then, I will briefly touch on torsional vibrations and discuss the role of finite beam thickness, interactions with side walls, polychromatic excitations, and application to biomimetic propulsion and energy harvesting. I will conclude with a series of open questions and possible research directions.

Biography: Maurizio Porfiri was born in Rome, Italy in 1976. He

received M.Sc. and Ph.D. degrees in Engineering Mechanics from Virginia Tech, in 2000 and 2006; a "Laurea" in Electrical Engineering (with honors) and a Ph.D. in Theoretical and Applied Mechanics from the University of Rome "La Sapienza" and the University of Toulon (dual degree program), in 2001 and 2005, respectively. From 2005 to 2006 he held a Post-doctoral position with the Electrical and Computer Engineering Department at Virginia Tech. He has been a member of the Faculty of the Mechanical and Aerospace Engineering Department of New York University Polytechnic School of Engineering since 2006, where he is currently a Professor. He is engaged in conducting and supervising research on dynamical systems theory, multiphysics modeling, and underwater robotics. Maurizio Porfiri is the author of more than 180 journal publications and the recipient of the National Science Foundation CAREER award (Dynamical Systems program) in 2008. He has been included in the "Brilliant 10" list of Popular Science in 2010 and his research featured in all the major media outlets, including CNN, NPR, Scientific American, and Discovery Channel. Other significant recognitions include invitations to the Frontiers of Engineering Symposium and the Japan-America Frontiers of Engineering Symposium organized by National Academy of Engineering in 2011 and 2014, respectively; the Outstanding Young Alumnus award by the College of Engineering of Virginia Tech in 2012; the ASME Gary Anderson Early Achievement Award in 2013; the ASME DSCD Young Investigator Award in 2013; and the ASME C.D. Mote, Jr. Early Career Award in 2015.

CIE PANELS

Monday, August 3
SESSION: CIE-32-1
2:00PM - 3:40PM

Location: Room 312, Level 3

VES PANEL: I, ME, MINE INTERFACES & VES

Moderator: Robert Wendrich, University of Twente

The shift towards mainstream VR for the masses remains unlikely to reach the same pervasive levels as digital gaming. The main barriers identified at the inaugural ASME 2014 VES session on the potential of game-based ecosystems for innovation are the access to, the apparent knowledge gap of, and the adoption of alternative modus operandi for mechanical engineering. Gaming offers the communities of engineers, scientists and technologists new modes of human machine interaction. Games are engaging mechanisms of interaction while VES, particularly VR, has its own specificity in terms of advanced interactive interfaces, methods and tools. Coupling gaming with VR shows promise for ideation innovation. The requirements of engineering processes call for a change to fully benefit from gaming, i.e. motivation, user experiences, community building. Conversely the success of VR achievements, such as advanced visualization and multi-sensory interaction advances gaming. The main question is "How can humanity benefit and prosper from VR technologies to increase their quality of life with tools in mixed realities and interact/couple with their own devices (BYOD) that are interoperable and smart I, Me, Mine interfaces?" We encourage an open debate to build a vision of the future VES.

Panelists:

- Hunter Hoffman, University of Washington
- Jannicke Baalsrud Hauge, BIBA University of Bremen
- Theo Lim, Heriot Watt University
- Sylvester Arnab, University of Coventry
- Samir Garbaya, ENSAM
- Ioana Stanescu, ADLRO

Monday, August 3
SESSION: CIE-30-1
4:10PM - 5:50PM

Location: Room 312, Level 3

AMS PANEL: DIGITAL MANUFACTURING AND DESIGN INNOVATION

Moderator: Janis Terpenney, Iowa State University

This panel will focus on the Digital Manufacturing and Design Innovation (DMDI) Institute, one of the nation's first four National Network for Manufacturing Innovation institutes. Panelists include the DMDI executive director and chief technology officer and several industry, government, and university members of the institute. Panelists will share vision and purpose as well as foster lively discussion on the challenges, opportunities and means to transform, indeed revolutionize, American manufacturing.

Panelists:

- Dean Bartles, DMDI Institute, Executive Director
- William King, DMDI Institute, Chief Technology Officer
- Nathan Hartman, Purdue University
- Robert (Rob) Stone, Oregon State University

Tuesday, August 4
9:30AM - 11:10AM
SESSION: CIE-29-1

Location: Room 310, Level 3

CAPPD PANEL: DIVERGENT ENGINEERING

Moderator: Shuichi Fukuda, Keio University, Japan

Most current research is oriented toward Convergent Engineering. A clear goal is defined and the problem is solved by utilizing all possible means. Research by analogy is typical. A possibly effective solution is searched for in another field and is applied. But we have to remember that things can be done the other way around. How can the same idea be applied to different fields? This is important not only for inventions and innovations, but also for reducing overlaps across industries. If we could remove overlaps, we could reduce energy consumption, time and cost and could increase productivity considerably. In this panel, we will study practical cases of Divergent Engineering and will explore the future possibilities.

Wednesday, August 5
2:00PM - 3:00PM
SESSION: CIE-33-1

Location: Room 312, Level 3

CIE PANEL: INTERNET OF THINGS

Moderators: Marc Halpern, Gartner, Inc., Ram D. Sriram, National Institute of Standards and Technology

The Internet of Things (IoT) is a term that is being used to denote a network—typically the Internet—of devices that constantly monitor the environment and can result in “intelligent actions.” These devices can range from simple sensors to complex systems such as automobiles and buildings. There are several views of IoT in vogue. For example, ITU (International Telecommunication Union) and IERC (IoT-European Research Cluster) define IoT as “a global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual things have identities, physical attributes and virtual personalities, use intelligent interfaces and are seamlessly integrated into the information network.” In this panel experts from the academia, government, and the industry will present their views on this emerging technology.

Wednesday, August 5

SESSION: CIE-31-1

3:30PM - 5:10PM

Location: Room 312, Level 3

SEIKM PANEL: RESEARCH TRENDS AND GAPS IN SYSTEMS ENGINEERING AND KNOWLEDGE MANAGEMENT

Moderator: Farhad Ameri, Texas State University

Systems engineering and engineering knowledge management have been among the active areas of research in engineering design for decades. However, the research questions and emphasis have varied from time to time depending on the research drivers and motivations and the available tools and technologies. In recent years, design and manufacturing practices have been widely impacted by the advancement in cyber-enabled technologies, semantic web, cloud-based computing, simulation, and virtual reality. In this panel, the current research trends, gaps, challenges, and issues in systems engineering, knowledge and information management will be discussed. The objective of this panel is to provide researchers a better understanding of the key research gaps that need to be addressed collectively by the community. In this panel, the results of a survey conducted on research challenges and gaps in SEIKM topics will be presented as well. Participants from academia, industry, and government will share their viewpoints in this panel.

Wednesday, August 5

9:30AM - 11:10AM

SESSION: CIE-34-1

Location: Room 310, Level 3

CIE PANEL: ENGINEERING AND DESIGN OF COMPLEX SYSTEMS

Moderator: Josh Summers, Clemson University

The complexity of engineered systems has swelled in the last several decades, and this trend is likely to continue for the foreseeable future. While projects are becoming more complex, current engineering practice has largely evolved from a top-down approach that is the legacy of past successes. A fundamental rethinking of engineering methodologies is urgently needed if our nation is to ensure that the large complex systems critical to our national security, economy, and quality of life are resilient in the face of natural disasters, creative adversaries, and an unforeseeable future. In this panel, representatives from government, industry and academia will share perspectives on research opportunities in systems engineering theory and practices, as well as the education opportunities for providing the next generation of engineers with the corresponding knowledge and skills. The panelists will specifically focus on providing guidance to researchers in engineering design so that they can also contribute successfully towards research in systems engineering.

DAC/DEC/DTM PANEL

Tuesday, August 4

SESSION: DEC 7-1

TIME: 3:30PM - 5:10PM

Location: Room 105, Level 1

ADVANCES IN SYSTEMS REALIZATION: RESEARCH AND EDUCATION

A panel session on advances in systems realization over the past 25 years in honor of the 70th birthdays of Farrokh Mistree and Janet Allen.

Panelists:

Reid Bailey, University of Virginia

Wei Chen, Northwestern University

Pat Koch, SAS

Kemper Lewis, University at Buffalo

Jitesh Panchal, Purdue University

Carolyn Conner Seepersad, The University of Texas at Austin

Zahed Siddique, University of Oklahoma

Timothy Simpson, Pennsylvania State University

Warren Smith, University of New South Wales

Christopher Williams, Virginia Tech

DEC PANEL

Tuesday, August 4

SESSION: DEC-6-1

TIME: 2:00PM - 3:00PM

Location: Room 105, Level 1

AN ADVANCED PLACEMENT EXAM IN ENGINEERING: OBJECTIVES, ASSESSMENT, AND COURSE DESIGN

The purpose of this panel session is to report on and discuss the work currently pursued by the College Board's Advanced Placement Program® (AP®) Engineering Curriculum Development and Assessment Committee. The College Board is a not-for-profit organization that works to expand access to higher education, for example, through its SAT and Advanced Placement Programs. The College Board is currently planning for an AP exam in Engineering and is working with educators (both college and high school) to ensure that its AP course and examinations are appropriate for the students who take them, include the rigor needed to ensure acceptance by Colleges and Universities, and attract a high quality, diverse group of students.

Panelists:

- Leigh Abts, University of Maryland
- Roxanne Moore, Georgia Institute of Technology
- Daniel Frey, MIT
- Woodie Flowers, Massachusetts Institute of Technology
- Yvonne M. Spicer, National Center for Technological Literacy

DFMLC PANELS

Tuesday, August 4

SESSION: DFMLC-12-1

TIME: 2:00PM-3:00PM

Location: Room 209, Level 2

IMPACTS OF ADDITIVE MANUFACTURING ON DFM/ DFA AND DFLC

Moderator: Kazuhiro Saitou, University of Michigan

Panelists:

- Erhan Arisoy, Siemens Corporation
- Warren Dias, Altair Engineering

Rajeev Kulkarni, 3D Systems

Frank Liou, Missouri University of Science and Technology

Paul Witherell, National Institute of Standards and Technology

David Rosen, Georgia Institute of Technology

The production of parts with complex geometry, high variety and small to moderate production volumes is increasingly replaced by additive manufacturing processes (AM). Rumour is that the advent of AM is going to eliminate the classic arts of design for manufacturing and assembly since there is no practical limitation as to the type of geometry it can produce. Is that true? Are we really out of business? What about its implications on the product life cycle? The panel will gather experts in academia and industry and share their own views on how AM will transform the traditional concepts of DFM, DFA, and DFLC.

Wednesday, August 5

SESSION: DFMLC-12-3

TIME: 11:40AM-12:40PM

Location: Room 107, Level 1

SUSTAINABLE DESIGN AND MANUFACTURING IN A PRODUCT LIFE CYCLE PERSPECTIVE:

Moderator: Dr. Qing Wang, Durham University

Panelists:

- Bert Bras, Georgia Institute of Technology
- Marcos Esterman, Rochester Institute of Technology
- Sudarsan Rachuri, National Institute of Standards and Technology
- Paul Witherell, National Institute of Science and Technology
- Deborah Thurston, University of Illinois at Urbana-Champaign

Sustainability has become a major challenge of material and manufacturing companies. Competitive markets, regulations and customer awareness are some of the forces driving engineering design departments to consider life-cycle environmental, social and economic impacts. Hence, industry has encountered significant challenges in transitioning from a traditional profit-driven focus to a sustaining, evolutionary ecosystem. This panel will discuss the development and application of new approaches, methods and tools for embedding a sustainable approach in design and manufacturing from a life-cycle perspective.

MR PANEL

Tuesday, August 4

SESSION: MR-13-3

TIME: 3:30PM - 5:10PM

Location: Room 210, Level 2

FUTURE DIRECTIONS IN MECHANISM AND ROBOT DESIGN RESEARCH AND EDUCATION

Moderators: Venkat Krovi, University of Buffalo, USA and Anurag Purwar, State University of New York at Stony Brook, USA

Panelists: Michael J McCarthy, Sunil Agrawal, Jeff Ge, Clement Gosselin, Larry Howell

This panel will bring together renowned researchers in the MR community to discuss the future directions in Mechanisms and Robotics research, interactions with industry, and education.

MSDNC/VIB PANEL

Monday, August 3

SESSION: MSNDC-19-1

TIME: 10:00AM - 11:40AM

Location: 302, Level 3

PRESENT AND FUTURE CHALLENGES IN NONLINEAR DYNAMICS AND VIBRATIONS: FROM THEORY TO DESIGN

Moderators: Jeff Rhoads, Purdue University, Walter Lacarbonara, Sapienza University of Rome

The purpose of this joint MSNDC/VIB panel session is to discuss past and recent trends in the broad field of nonlinear dynamics and vibrations evolving from theory to design in the different application domains. The panel session, contributed by leading experts coming from diverse backgrounds, will put these trends under a magnifying lens and will address open problems and paradigms, big future challenges and the way these can affect education, research, and society.

Panelists:

Bala Balachandran, University of Maryland

Matthew Brake, Sandia National Laboratories

Hanna Cho, Texas Tech University

Noel Perkins, University of Michigan

Giuseppe Rega, Sapienza University of Rome

Steve Shaw, Michigan State University

Kimberly Turner, University of California, Santa Barbara

ASME RUTH AND JOEL SPIRA OUTSTANDING DESIGN EDUCATOR AWARD

Design Engineering Division



Alice M. Agogino

University of California at Berkeley

Biography: Alice M. Agogino is the Roscoe and Elizabeth Hughes Professor of Mechanical Engineering and is affiliated faculty at the Haas School of Business at the University of California at Berkeley. She directs the BEST (Berkeley Energy and Sustainability Technologies/ Berkeley Expert Systems Technologies / Berkeley Emergent Space Tensegrities) Lab and co-directs the Berkeley Institute of Design. Agogino served as Chair of the UC Berkeley Division of the Academic Senate and has served in a number of other administrative positions at UC Berkeley including Associate Dean of Engineering. Agogino served as Chair of the AAAS section on Engineering and Chair of the Advisory Committee for the Engineering Directorate of the National Science Foundation. She is a member of the National Academy of Engineering (NAE) and has served on a number of NAE committees. She has served as a member of a number of university advisory boards: CMU, Harvard/Radcliffe, KAUST, MIT and SUTD.

Agogino received a B.S. degree from the University of New Mexico (1975), M.S. degree from UC Berkeley (1978) and Ph.D. from Stanford University (1984). Prior to joining the faculty at UC Berkeley, Agogino worked in industry for Dow Chemical, General Electric and SRI International and continues to consult in product design. She has supervised 110 MS projects/theses, 41 doctoral dissertations and numerous undergraduate researchers. Agogino has authored over 250 peer-reviewed publications and has won numerous teaching, mentoring, best paper and research awards. She works with approximately 100 San Francisco Bay Area companies and nonprofits on a number of product design and sustainability class and research projects.

ASME BARNETT UZGIRIS PRODUCT SAFETY AWARD

Design Engineering Division



John R. Puskar

Prescient Technical Services

Biography: Mr. Puskar started his professional career at Standard Oil of Ohio, in Cleveland, Ohio as an Energy Systems Engineer in

1981. In 1984, he left to start his own engineering consulting firm which became CEC Combustion Services Group (CEC). Through his work at (CEC), Mr. Puskar has directly contributed to saving many lives and preventing explosions and fires throughout the world wherever gaseous fuels and combustion equipment are in use. Mr. Puskar's body of work over the past 30 years in this field are rooted in 5 major contributions: (a) Development of the world's first routinized system for detailed inspections and testing of combustion equipment, (b) Codes and standards development as part of 5 different committees over the past 10 years, (c) Development of recalled and defective combustion system component database, (d) The development of innovative training techniques and materials delivered to thousands of persons throughout the world related to fuels and combustion systems safety, and (e) Leadership and expertise regarding major industrial fires and explosions.

ASME J.P. DEN HARTOG AWARD

Design Engineering Division



David J. Ewins

Imperial College London

Biography: David J. Ewins has spent the past 50 years studying and measuring vibration in a range of application areas—mostly in aerospace, defense and other hi-tech industries. Having studied at Imperial College London and Cambridge University, he has been based at Imperial as Professor of Vibration Engineering since 1983, with periods as Visiting Professor overseas in the USA, France, Switzerland and Singapore. Following partial 'retirement' in 2005, he spends part of his time at Imperial and part at Bristol University as Professor of Vibration Engineering. He sits on a number of advisory Boards and was Chairman of the Scientific and Technological Advisory Board (STAB) for the CleanSky Programme from 2010-2014.

His research has focused on two main areas—Modal Testing and Vibrations in Turbomachinery, in the latter case, working closely with Rolls-Royce with whom he set up the Vibration UTC at Imperial in 1990. Current research priorities seek to ensure that the dynamics of engineering structures can be controlled by: (a) routinely including models of the joints that hold structures together, (b) accepting that all structures are non-linear to a degree, and (c) ensuring that modeling, prediction and measurement are fully integrated in the teaching, research and practice of structural dynamics.

He is a Fellow of the Royal Society and of the Royal Academy of Engineering, and of the Indian National Academy of Engineering.

DED ROBERT E. ABBOTT AWARD (Lifetime Service Award)

Design Engineering Division



William W. (Buddy) Clark

University of Pittsburgh

Biography: Professor Clark earned his BSME (1986), MSME (1988), and Ph.D. (1991) from Virginia Polytechnic Institute and State University. He joined the University of Pittsburgh as an Assistant Professor in 1992. He was promoted to Associated Professor in 1998 and Professor in 2005. He has served as the Graduate Coordinator for the Mechanical Engineering Department from 1997-2001 and as Acting Department Chair in 1999.

Professor Clark has served the ASME Design Engineering Division with distinction for many years. He has been an active member of the Vibration, Noise, Sound and Acoustics community since 1994, serving as a Technical Session chair at IMECE and the Biennial Conference on Vibration and Noise. He has been an Associated Editor of the ASME journal of Vibration and Acoustics. He was elected to the Technical Committee on Vibration and Sound in 1996 and has served as Secretary, Vice Chair and Chair of the Committee. He was also elected to the Executive Committee of the Design Engineering Division, serving in various roles including Executive Committee Chair.

DED LEONARDO DA VINCI AWARD

Design Engineering Division



Noel Perkins

University of Michigan

Biography: Professor Noel C. Perkins received his BS, MS and PhD degrees in Mechanical Engineering from the University of California, Berkeley in 1982, 1984 and 1986, respectively. He completed postdoctoral studies at the Sound and Vibration Institute at the University of Southampton in England prior to his return to the US in 1987 when he started his academic career in the Mechanical Engineering Department at the University of Michigan. He was promoted to the rank of Professor in 1999, named an Arthur F. Thurnau Professor by the University of Michigan in 2001, and named the Donald T. Greenwood Collegiate Professor of Engineering in 2009.

Professor Perkins' research expertise spans vibration, nonlinear and computational dynamics, biomechanics, and sensor and instrumen-

tation design. He is recognized for research contributions in five major areas: 1) the mechanics of single molecule DNA and DNA-protein interactions, 2) wireless inertial measurement units (IMUs) for human health and sports training, and the structural dynamics of 3) underwater cables, 4) axially moving materials, and 5) vehicle systems. He has served as the Technical Editor of the ASME Journal of Vibration and Acoustics and presently serves on the editorial boards of Sports Engineering, International Journal of Nonlinear Dynamics and Control, and the Journal of Vibroengineering. He has previously served in other editorial positions on numerous ASME and international journals.

Professor Perkins, an ASME Fellow, has received numerous awards for his research and teaching contributions including the ASME N. O. Myklestad Award, the Academic Challenge Award from Technical University of Munich, and the International Sports Product Organization Award. He twice received The GM Outstanding Distance Learning Faculty Award and is a past recipient of the SAE's Ralph R. Teetor Educational Award and the US Office of Naval Research Young Investigator Award.

Professor Perkins has been highly successful in translating his university-based research achievements to the private sector. In addition to serving as a technical advisor for the nine companies who have licensed his invention, he serves as a co-founder of Cast Analysis LLC, which manufactures and sells the world's only fly casting analyzer. He has extensive consulting experience and is frequently interviewed for articles and videos that feature his inventions.

DED THAR ENERGY ENGINEERING DESIGN AWARD

Design Engineering Division



Lei Zuo

Virginia Tech

Biography: Lei Zuo completed his PhD in mechanical engineering and two MS degrees in both mechanical and electrical engineering from MIT in 2005 and 2002. He also held a B.S. degree in automotive engineering from Tsinghua University. After working in industry for four years, Lei Zuo joined as faculty in the State University of New York at Stony Brook in 2008 and moved to Virginia Tech as an Associate Professor with tenure in 2014. He serves as an associated editor of ASME Journal of Vibration and Acoustics and a technical editor of IEEE-ASME Transaction on Mechatronics. He also serves as a member of numerous ASME technical committees including: the Design Engineering Division (DED) Vehicle Design TC, ASME DED TC of Vibration and Sound, and the ASME DED TC of Mechatronics and Embedded Systems and Applications.

Lei Zuo founded the Energy Harvesting and Mechatronics Research Lab and is the associate director of NSF I/UCRC Center for Energy Harvesting Materials and Systems (CEHMS) at Virginia Tech. Since September 2008 he has secured over \$5.6M in research grants (his portion is \$4.8M) from state and federal agencies such as: NSF, DOE, ONR, DOT, EPA, NYSERDA and SUNY/RF. He has authored/co-authored over 100 papers in journals and conferences, and holds several patents. He has helped start two companies including Energy Harvesting Technology LLC.

Lei Zuo has made significant contributions in energy harvesting and received a number of awards, including the 2014 SAE Ralph R. Teetor Educational Award, 2014 ASME Best Paper Award in Structures and Structural Dynamics, 2014 EPA P3 Award, and a 2011 R&D 100 award for "one of the one hundred best new technical products of the year". He has received four awards from the Energy Harvesting and Storage USA annual conferences and his work on energy design has been highlighted in ASME Mechanical Engineering Magazine, MIT Technology Review, New York Times, Discovery News, PhysOrg, and Newsday.

DESIGN AUTOMATION AWARD

Design Engineering Division



Wei Chen

Northwestern University

Biography: Professor Wei Chen holds the Wilson-Cook Chair in Engineering Design at Northwestern University, Evanston, Illinois, USA. She is being recognized as the 2015 Design Automation Awardee for her seminal contributions to the field of Design Automation that have advanced both theoretical development and practical applications of simulation-based design under uncertainty. She has made extensive contributions furthering the scholarship and use of robust design methods in engineering design. In addition, her research team (Integrated DEsign Automation Laboratory-IDEAL, <http://ideal.mech.northwestern.edu/>) has developed new algorithmic approaches that reduce the computational complexity of simulation-based design in practical problems that are characterized by expensive simulations and high dimensionality. Her technical leadership in advancing interdisciplinary research has been influential in establishing new research areas in design automation, such as model validation and uncertainty quantification, enterprise-driven decision-based design (DBD), and design of engineered materials systems.

Professor Chen has published 2 books, more than 200 referred publications including 120 journal papers, 6 book chapters, and 75 refereed conference proceedings. The high citation of her publications is a strong indicator of the recognition she has received from scholars in the design automation community. Her methods for design under uncertainty have been integrated into commercial

software that are widely used in industry such as iSIGHT® and Hyperworks®. Professor Chen's research contributions have garnered three best paper awards from the ASME Design Automation Conference (1998, 2012, and 2014), the National Science Foundation (NSF) Faculty Early Career Award, the Intelligent Optimal Design Prize, the SAE Ralph R. Teetor Educator Award, Pi Tau Sigma Gold Medal achievement award, and Sigma Xi Doctoral Dissertation Award.

Professor Chen has played a leadership role in various technical communities. She has served on the ASME Design Engineering Division (DED) Executive Committee (2009-2015). She was an elected member of the Design Automation Executive Committee (2002 to 2007) and served on the AIAA Multidisciplinary Design Optimization Technical Committee (1999-2004). She was also an elected Advisory Board member of the Design Society (2007-2013). She has served twice as an Associate Editor of the ASME Journal of Mechanical Design (2003-2006; 2010-2013) and was the Associate Editor of the Engineering Optimization (2007-2009). She is currently a Review Editor of Structural and Multidisciplinary Optimization, an Associate Editor of the SIAM/ASA Journal on Uncertainty Quantification (JUQ), an Editorial Board Member of the International Journal on Design Science, and the Department Editor for the IIE Transactions.

KOS ISHII-TOSHIBA AWARD

Design Engineering Division



Kazuhiro Saitou

University of Michigan

Biography: Kazuhiro Saitou is a professor of Mechanical Engineering at the University of Michigan, Ann Arbor. He has received B. Eng from the University of Tokyo, and MS and PhD from Massachusetts Institute of Technology (MIT), all in Mechanical Engineering. His research interest includes algorithmic synthesis of products and systems with application areas ranging from automotive and manufacturing to energy and biomedical. He has published over 180 journal and conference papers on these topics. He has served as an Associate Editor for the ASME Journal of Computing and Information Science in Engineering and the IEEE Transactions of Automation Science and Engineering, and is currently serving as Associate Editor for the ASME Journal of Mechanical Design, and Editor-in-Chief for the Conference Editorial Board of the IEEE Conference on Automation Science and Engineering. He was the Chair of Design Automation Technical Committee and of the Design for Manufacturing and the Life Cycle Technical Committee in the ASME Design Engineering Division. His awards include Outstanding Achievement Award from the System Engineering Division of Japan Society of Mechanical Engineers, the Outstanding Achievement Award from the Department of Mechanical Engineering at the University of Michigan, the CAREER Award from the National

Science Foundation and several best paper awards and best paper finalist awards from international conferences. He and his students recently won the Innovative Design Component Award for ARPA-E LITECAR Challenge. He is a Fellow of ASME and a senior member of IEEE.

DESIGN THEORY AND METHODOLOGY AWARD

Design Engineering Division



Clive Dym

Harvey Mudd College

Biography: Prof. Clive Dym has been a naturalized US citizen since 1954. He received his bachelor degree in civil engineering from The Cooper Union in June 1962, his Master of Science degree in applied mechanics from Polytechnic Institute of Brooklyn in June 1964, and his Ph.D. degree in Aeronautics and Astronautics from Stanford University in January 1967. Most recently, C. L. Dym was the Fletcher Jones Professor of Engineering Design (1991-2012) and Director of the Center for Design Education (1995-2012) at Harvey Mudd College. Dr. Dym has held appointments at the University at Buffalo; the Institute for Defense Analyses; Carnegie Mellon University; Bolt, Beranek and Newman; and the University of Massachusetts at Amherst. He was the department head at UMass (1977-85) and chair of his department at Harvey Mudd (1999-2002). He has authored or coauthored 96 refereed journal articles, was Founding Editor of the journal *Artificial Intelligence for Engineering Design, Analysis, and Manufacturing*, and has served on the editorial boards of several other journals, including the ASME's *Journal of Mechanical Design*.

Dr. Dym is a Fellow of the Acoustical Society of America, the American Society of Mechanical Engineers, the American Society of Civil Engineers and the American Society for Engineering Education, and is a Member of the American Academy of Mechanics. Dr. Dym's awards include: the Joel and Ruth Spira Outstanding Design Educator Award (ASME, 2004), the Archie Higdon Distinguished Educator Award (Mechanics Division, ASEE, 2006) and the Bernard M. Gordon Prize for Innovation in Engineering (NAE, 2012).

MECHANISMS AND ROBOTICS AWARD

Design Engineering Division



Jian Sheng Dai

King's College London

Biography: Jian Sheng Dai is a world leader and founder in developing a field of research and practice in reconfigurable mechanisms. He coined and advocated the idea of reconfigurable mechanisms as a promising concept to bridge the gap between versatile but expensive robots, and efficient but non-flexible machines.

As a pioneer in many aspects of research in mechanisms and robotics, Prof. Dai carried out research on reconfigurable and dexterous packaging since 1996, initiated origami mechanisms with the equivalent-mechanism principle since 1996, proposed metamorphic mechanisms in 1998, created ankle rehabilitation mechanisms based on the lower-mobility parallel-mechanism principle in 1998, invented the metamorphic multi-fingered hands in 2004, and delivered metamorphic parallel mechanisms with novel rT and vA reconfigurable joints since 2009, making many impressive contributions to the field of mechanism theory and mechanical design.

In his 25 years of study of screw theory, Prof. Dai established himself as an international leading figure in the field of theoretical kinematics particularly in screw theory from his work on finite twists in early 1990s to the continuing publications on screw systems and screw algebra in the last twenty years, creating the screw-system approach associated with the group theory for mechanism analysis and synthesis and cultivating finite displacement screws in the context of matrix groups, leading to a recently published book entitled "Geometrical Foundation and Screw Algebra of Mechanisms and Robotics" in Chinese translated from the English original that is to be published.

Prof. Dai received his BEng in 1982 and MSc in 1984 from Shanghai Jiao Tong University, and a PhD in kinematics and robotics from the University of Salford in the UK in 1993. He is the Chair in mechanisms and robotics at the King's College London, establishing the International Centre for Advanced Mechanisms and Robotics (CAMAR) at Tianjin University where he is the honorable Chair Professor.

Prof. Dai is a recipient of several conference and journal best paper awards, ASME/IEEE outstanding service awards, King's College London Overall Supervisory Excellence Award, and the Mechanisms Innovation Award from the Chinese mechanisms committee. He is a Fellow of the ASME and IMechE, and has published over 400 works, including three books.

LYAPUNOV AWARD Design Engineering Division



Stuart S. Antman

University of Maryland

Biography: Prof. Stuart Antman received his B.S. degree in 1961 from Rensselaer Polytechnic Institute and his M.S. and Ph.D. degrees from the University of Minnesota in 1963 and 1965. He held a postdoctoral position at the Courant Institute of New York University from 1965 to 1967. He then joined the New York University faculty as an Assistant Professor in 1967. In 1969, he was promoted to Associate Professor, a position that he held for three years before transferring to a full professorship at the University of Maryland in 1972. He was appointed Distinguished University Professor in 2001.

Prof. Antman's research centers on dynamic and steady-state nonlinear problems for deformable bodies, modeled as rods, shells, or fully three-dimensional solids. He is a contributor of methods of nonlinear analysis and computation for problems in solid mechanics including the analysis of geometrically exact theories of deformation for nonlinear problems of elasticity and viscoelasticity. Prof. Antman is a recipient of several distinguished awards, including a John S. Guggenheim Memorial Foundation Fellowship, the Lester R. Ford Award of the Mathematical Association of America in 1987, the Mathematics and Computer Science Award from the Washington Academy of Sciences in 2010, and the prestigious Theodore von Karman Prize of the Society for Industrial and Applied Mathematics in 1999, awarded for a notable application of mathematics to mechanics and or the engineering science made during the five to ten years preceding the award.

N. O. MYKLESTAD AWARD Design Engineering Division



Robert Parker

Virginia Tech

Biography: Since 2013 Prof. Parker has served as the L. S. Randolph Professor in the Department of Mechanical Engineering at Virginia Tech. Previously he was a University Distinguished Professor and the Executive Dean at the University of Michigan-Shanghai Jiao Tong University Joint Institute and served 13 years on the faculty at Ohio State University. He received his M.S. and Ph.D. degrees from the University of California, Berkeley.

Prof. Parker's research examines the vibration and stability of

high-speed mechanical systems. He has published over 100 archival journal papers and 120 conference papers. His individual research funding exceeds \$10M from a range of federal and industry sponsors. Prof. Parker has delivered over 60 keynote and invited lectures. He has consulted for several major companies where analyses using his research have solved major vibration problems in the automotive, helicopter, wind turbine, and aircraft engine industries.

Prof. Parker is a Fellow of ASME and the American Association for the Advancement of Science. The Chinese government selected him as an inaugural awardee for its 1000 Person Plan. He has received the US Presidential Early Career Award for Scientists and Engineers (PECASE), the National Science Foundation CAREER, and the US Army Young Investigator Awards, as well as the ASME Gustus Larson Award, Ford Chief Engineer Award, French government Poste Rouge Award, SAE Ralph Teetor Educational Award, ASEE's Global Engineering Educator and Outstanding Faculty Awards, and five separate research awards from Ohio State University.

He was invited by the US National Academy of Engineering to four Frontiers of Engineering Symposia in the US, China, Japan, and Germany. He serves on the Editorial Board of Mechanism and Machine Theory and served seven years as Associate Editor for the ASME Journal of Vibration and Acoustics and held leadership roles in several professional society committees.

Prof. Parker has been a Visiting Fellow at Risoe National Lab (Denmark), the University of New South Wales, the University of Sydney, Tokyo University, NASA Glenn Research Center, and INSA Lyon. He worked at The Aerospace Corporation for two years.

C.D. MOTE, JR. EARLY CAREER AWARD Design Engineering Division



Maurizio Porfiri

New York University

Biography: Maurizio Porfiri was born in Rome, Italy in 1976. He received M.Sc. and Ph.D. degrees in Engineering Mechanics from Virginia Tech, in 2000 and 2006; a "Laurea" in Electrical Engineering (with honors) and a Ph.D. in Theoretical and Applied Mechanics from the University of Rome "La Sapienza" and the University of Toulon (dual degree program), in 2001 and 2005, respectively. From 2005 to 2006 he held a Post-doctoral position with the Electrical and Computer Engineering Department at Virginia Tech. He has been a member of the Faculty of the Mechanical and Aerospace Engineering Department of New York University Polytechnic School of Engineering since 2006, where he is currently a Professor. He is engaged in conducting and supervising research on dynamical systems theory, multiphysics modeling, and

underwater robotics. Maurizio Porfiri is the author of more than 180 journal publications and the recipient of the National Science Foundation CAREER award (Dynamical Systems program) in 2008. He has been included in the “Brilliant 10” list of Popular Science in 2010 and his research featured in all the major media outlets, including CNN, NPR, Scientific American, and Discovery Channel. Other significant recognitions include invitations to the Frontiers of Engineering Symposium and the Japan-America Frontiers of Engineering Symposium organized by National Academy of Engineering in 2011 and 2014, respectively; the Outstanding Young Alumnus award by the College of Engineering of Virginia Tech in 2012; the ASME Gary Anderson Early Achievement Award in 2013; the ASME DSCD Young Investigator Award in 2013; and the ASME C.D. Mote, Jr. Early Career Award in 2015.

DARLE W. DUDLEY AWARD Design Engineering Division



Faydor L. Litvin

University of Illinois – Chicago (retired)

Biography: Beginning in 1979, Dr. Faydor Litvin was a professor of mechanical engineering and the Director of the Gear Research Center at the University of Illinois at Chicago. Prior to assuming this position, he taught and performed research in Russia, initially at St. Petersburg State Polytechnic University (1947 – 64) and then at St. Petersburg Institute of Precision Mechanics and Optics, (1964 – 78), where he was professor and head of the department of mechanisms theory and machine elements.

His teaching experience includes analysis and kinematics of mechanisms, theory of gearing and applications, advanced theory of gearing, dynamics of machinery, analysis and design of manipulators, and special topics in advanced kinematics and dynamics of mechanisms. Dr. Litvin has performed research in the area of mechanisms, manipulators, theory of gearing, computerized design, and generation and simulation of meshing of gear drives; and has supervised the research of 84 Ph.D. Students.

To his credit are 25 inventions, including three U. S. patents. His patent, Apparatus and Method for Precision Grinding Face Gear, has singularly provided a way to reduce the weight of helicopter transmissions by 40 percent, promoting fuel savings, reduced emissions and lower seat prices. The grinding method invented by Dr. Litvin has for the first time enabled a way to grind hardened face gears that will provide the same level of safety as spiral bevel gears. His efforts have opened the way for the use of these low cost, high capacity gears in applications the will significantly benefit the aerospace, automotive and shipping industries.

Dr. Litvin is credited with nearly 300 publications, including 10 monographs. He served as associate editor of the journal Computer

Methods in Applied Mechanics and Engineering, the honorary editorial advisory board of the journal Mechanism and Machine Theory and the editorial board of the journal Gearing and Transmissions.

Dr. Litvin’s books Theory of Gearing and Gear Geometry and Applied Theory (co-authored with Alphonso Fuentes) are widely used by researchers and practicing engineers. As of November 2014, the book Gear Geometry and Applied Theory has been cited more than 1550 times and the book Theory of Gearing has been cited 580 times.

DESIGN AUTOMATION (DAC) BEST PAPER AWARD

Authors: Yi (Max) Ren, Alparslan Emrah Bayrak, Panos Papalambros

DETC2005-46836 “EcoRacer: Optimal Design and Control of Electric Vehicles Using Human Game Players”

ADVANCED VEHICLE TECHNOLOGIES BEST PAPER AWARD (AVT)

Authors: Federico Ballo, Massimiliano Gobbi, Giampiero Mastinu, Giorgio Prevati, Roberto Zerboni

DETC2015-46607 “Motorcycle Tire Modeling”

ADVANCED VEHICLE TECHNOLOGIES BEST STUDENT PAPER AWARD (AVT)

Authors: Tomonari Furukawa, Kuya Takami, Xianqiao Tong, Daniel Watman, Abbi Hamed, Ravindra Ranasinghe, Gamini Dissanayake

DETC2015-47936 "Map-based Navigation of an Autonomous Car Using Grid-based Scan-to-Map Matching"

Advanced Vehicle Technologies Finalists of Best Student Papers (AVT)

Authors: Alberto Doria, Luca Taraborrelli, Nicola Segliani

DETC2015-46103: "The Effect Of Front Fork Compliance On The Stability Of Bicycles"

Authors: Namcheol, Kang, Jong-Jin, Bae, Jong Beom, Suh

DETC2015-46589: "Structural Stiffness Of Tire Calculated From Strain Energy"

DESIGN FOR MANUFACTURING AND THE LIFE CYCLE BEST PAPER AWARD (DMFLC)

Authors: Ian C. Garretson, Kevin W. Lyons, Mahesh Mani, Swee Leong, Matthew D. Carter, Ann E. Simmons, and Karl R. Haapala

DETC2015-46765 "Unit Manufacturing Process Models for Ferromagnetic and Non-ferromagnetic Alloy Surface Inspection Methods"

MECHANISMS AND ROBOTICS BEST PAPER AWARD (MR)

Authors: Ahmad Alqasimi and Craig Lusk

DETC2015-47526 "Shape-Morphing Space Frame (SMSF) Using Linear Bistable Elements."

DESIGN EDUCATION COMMITTEE BEST PAPER AWARD (DEC)

Authors: Trina C. Kershaw, Rebecca L. Peterson, Molly A. McCarthy, Adam P. Young, Carolyn Conner Seepersad, Paul T. Williams, Katja Hölttä-Otto, and Sankha Bhowmick

DETC2015-47650 "A Cross-Sectional and Longitudinal Examination of the Development of Innovation Capability in Undergraduate Engineering Students."

2015 EXCELLENCE IN RESEARCH AWARD

Computers and Information in Engineering Division



John G. Michopoulos

Naval Research Laboratory

Biography: Dr. John Michopoulos is a Research Scientist/Engineer and director of Computational Multiphysics Systems Lab (CMSL) of the Center of Computational Materials Sciences in the Materials Science and Technology Division at the Naval Research Laboratory (NRL). He received a M.Sc. in Civil Engineering and a Ph.D. in Applied Mathematics and Theoretical and Experimental Mechanics from the National Technical University of Athens, Greece, and has pursued post-doctoral studies at Lehigh University, Bethlehem, PA, on computational multi-field modeling of continua and Fracture Mechanics. During his graduate and post-doctoral years he worked as a research scientist and engineer for the Institute of Fracture and Solid Mechanics, the Center and Health Sciences at Lehigh University and as an adjunct faculty of Mechanical Engineering at Lafayette College, Easton, PA. Prior to joining NRL he has been a senior research scientist for Geo-Centers Inc. and prior to that Research Scientist at the Institute of Fracture and Solid Mechanics at Lehigh University as well as adjunct faculty at both the Dept. of Mechanical Engineering and Mechanics at Lehigh University Bethlehem, PA and at Lafayette College, Easton, PA. He has also served as founding member and chief technology officer of three companies.

In his research program, he oversees multi-physics and information in engineering research and development, operations and initiatives at CMSL. Current major initiatives include research and development of linking performance to material trough data and specification driven methodologies, electromagnetic launcher dissipative mechanism modeling and simulation, heterogeneous integrated computational, sensing and communication grids via data-driven multidisciplinary and holistic approaches and environments, engineering sciences research, development and management in areas of computational, theoretical and experimental multiphysics, platform/structure simulation based design, mechatronic/robotic data-driven characterization of continua, automation of research, distributed supercomputing, and multiphysics design optimization. His work has been captured in more than 250 publications including books and 8 patents that he has authored and co-authored. He has been honored with 60 performance and leadership awards including the P.S. Theocaris Award from the National Academy of Athens in 2013 and the 2014 Wolfram Innovator award.

Dr. Michopoulos a Fellow of ASME and served on the ASME Computers and Information in Engineering Division Executive Committee from 2007-2012. He was and Associate Editor of the ASME Journal of Computers and Information Science in Engineering for two 3-year terms and is an member of the editorial board of

the Journal of Computational Sciences, and is lead editor of the ASME Book series Advances in Computers and Information in Engineering Research. He is also a founding member of the International Science and Technology Outreach Society.

2015 BEST DISSERTATION AWARD Computers and Information in Engineering Division



Sagar Chowdhury

Purdue University

Biography: Dr. Sagar Chowdhury is a Postdoctoral Research Associate at Purdue University. He is currently working with Professor David Cappelleri in the Multiscale Robotics and Automation Research Group on developing a mobile microrobot platform for advanced manufacturing applications. Before joining Purdue, he was a Postdoctoral Research Associate in the Department of Mechanical Engineering at the University of Maryland, focusing on autonomous navigation, robot motion planning, and surgical robotics.

Dr. Chowdhury received his Ph.D. from the Department of Mechanical Engineering at the University of Maryland, College Park (UMD). He worked with Professor Satyandra K. Gupta on automated optical micromanipulation of biological cells. His research at UMD was recognized with several awards including: the 2013 George Harhalakis Outstanding Systems Engineering Graduate Student Award (from the Institute of Systems Research, UMD), third place in the 2013 Dean's Doctoral Research Awards Competition (in the A. James Clark School of Engineering, UMD), and a 2012 best paper award (by the CIE division, ASME).

Prior to that Dr. Chowdhury obtained his masters in Mechanical Engineering from the University of Oklahoma, Norman (OU). During his masters, he worked on studying the shape similarity to develop common platform for a family of products under the supervision of Professor Zahed Siddique. His research at OU was recognized with the 2009 Outstanding Research Performance Award by the Aerospace and Mechanical Engineering Department. He also received the best paper award in the 6th International Conference on Design Education (DEC) in 2009.

Dr. Chowdhury received his Bachelor's Degree in Mechanical Engineering from Bangladesh University of Engineering and Technology (BUET) in 2007.

2015 LIFETIME ACHIEVEMENT AWARD Computers and Information in Engineering Division



Shuichi Fukuda

Keio University, Tokyo Metropolitan Institute of Technology, and Tokyo Metropolitan University

Biography: Outside of Japan, he worked as Consulting Professor, Department of Mechanical Engineering at Stanford University, Visiting Professor at Cranfield University (UK), Visiting Professor at West Virginia University, and Visiting Professor, Learning Laboratory and Visiting Researcher, Department of Engineering Economic Systems, both at Stanford University. In Japan, he worked as Research Instructor, Department of Precision Machinery, University of Tokyo, Associate Professor, Welding Research Institute, Osaka University, Visiting Associate Professor, Institute of Industrial Science, University of Tokyo and he served as Professor, Dean of Engineering, Dean of Information Systems and Library and Director, Center for University-Industry-Government Collaboration at TMIT.

He served as the CIE Division Chair and Deputy Technical Group Leader, Systems and Design Group of ASME and the Design and Systems Division Chair of JSME, Vice President of the IEEE Reliability Society and the President of ISPE. He led the Design Engineering Group at Science Council of Japan and was the Leader of the Strategic Deployment in Engineering Project at Engineering Academy of Japan.

Dr. Fukuda's research activities are divergent. He worked together with many engineers in different fields such as shipbuilding, civil engineering, welding engineering, material processing, management of technology, etc. But his underlying interest is consistent. It is decision-making. He believes that engineering is here to make our dreams come true and to make that happen, we have to look into the future and make satisficing decisions as to which goal we should be heading for. He is especially interested in emotional aspects of decision making. He believes emotion helps us control the uncontrollable in engineering and helps us build up trust, trust between human and human and trust between human and product. He published 106 journal papers and 45 books, among which are Emotional Engineering, Vol.1-Vol.3 recently published. He has received 29 Awards.

Dr. Fukuda received his Bachelor, Master and Doctoral degrees in Mechanical Engineering, all from University of Tokyo. He is a Fellow and Life Member of ASME, Fellow and Life Member of IEICE (Institute of Electrical, Information and Communication Engineers), Fellow of ISPE (International Society for Productivity Enhancement), a Honorary Member of JSME, a Glory Member of REAJ (Reliability Engineering Association of Japan) and a Member of the Engineering Academy of Japan.

2015 LEADERSHIP AWARD

Computers and Information in Engineering Division



Richard Riff

Biography: Dr. Richard Riff is an internationally recognized authority in the field of Computer-Aided Design, Manufacturing, Engineering (CAD-CAM-CAE) and PLM.

Dr. Riff retired from Ford Motor Company where he served as a Director in IT, and was responsible for leading an office for business process methods and information and research, innovation and advance IT application. A major part of the activity of his office was the reconstruction and rebuilding of the information for the industrial backbone of Ford. Dr. Riff served as the chief architects for the information backbone, which includes all the major processes like bill of material, configuration management, order fulfillment, and order to delivery. In addition to that, he was involved with the advanced study and research on new PLM systems and engineering software.

He also served as one of the Technical Fellows, which is the highest technical position at Ford. The role of Ford's Technical Fellows is to provide understandable, technically sound advice to the Chief Technical Officer, the CIO and to the Company executive management as a whole: influencing strategic direction on key product and process matters, contributing to Corporate technical strategies, using competitive benchmarking to analyze and improve products, technologies and processes, and ensuring the transfer of knowledge across organizations and the continued growth of the Company's in-house expertise.

Prior to those responsibilities, Dr. Riff was the Director of Ford C3P program, which is CAD, CAM, CAE, and Product Information Management. He established the program and ran it for few years. Before that he was the Chief Engineer of Mechanical Design, Automotive Component Division. Initially, Dr. Riff joined Ford Motor Company in 1989 as a CAE Technical Specialist, for Automotive Parts Operations Electronics Division.

Before coming to Ford, he was Professor of Aerospace Structures at Georgia Institute of Technology in Atlanta, Georgia, and at the Technion Institute of Technology in Israel, where he received a B.S., M.S., and D.Sc. in Aeronautical and Mechanical Engineering. He has authored more than seventy technical publications in his areas of specialization, including CAE, CAD/CAM, structural and dynamic Finite Element Analysis (FEA), pre and post-processors, descriptive geometry and material constitutive laws.

Besides his accomplishments at Ford, Dr. Riff had a significant impact on engineering software priorities and strategies across the global automotive industry. In 1996, he established GAAG (Global Automotive Advisory Group) a collaborative association of all the Automotive OEM's to work together on communicating automotive software priorities as well as software development, implementation,

and service with the major PLM software companies. He continues to serve on its Advisory Board. In 2001, the CAD Society recognized him with a Lifetime Achievement Award for his outstanding body of work pushing the envelope of the possible in design and engineering. In addition, Dr. Riff served on the committee of the National Academy of Engineering for supporting lifelong learning on engineering topics.

Dr. Riff continues to consult to the PLM Industry and with the automotive companies. He also serves as a Director of the following Companies: Geometric, MSC Software, and C4UC.

2015 BEST DISSERTATION AWARD

Computers and Information in Engineering Division



John Steuben

Naval Research Laboratory

Biography: John Steuben is a National Research Council Postdoctoral Research Associate working in the Computational Multiphysics Systems Lab at the US Naval Research Laboratory. He holds bachelor's and master's degrees in mechanical engineering, as well as a doctorate in engineering systems, from the Colorado School of Mines. At present his research is focused on the development of models and simulation tools in the domain of additive manufacturing.

In 2009, John began his graduate studies at the Colorado School of Mines under the mentorship of Dr. Cameron Turner. His initial research focused on the development of robust optimization techniques for Non-Uniform Rational B-spline (NURBs) based surrogate models. This research found several applications in diverse fields such as robot path planning and geotechnical materials characterization. An interesting offshoot of this work, involving the robust optimization of mixed-integer problems, received a best paper award at the 2012 IDETC/CIE conferences.

John began his doctoral studies under the continuing guidance of Cameron Turner in 2011. His thesis centered on the topic of massively parallel engineering simulations on graphics processing units (GPGPU computing), with a particular focus on the interrelationships between the concepts of parallelization, synchronization, and approximation. As part of this work, John developed novel Boundary Element Method (BEM) and Discrete Element Method (DEM) simulations which achieved high computational performance. Also in 2011, John took an internship position at Los Alamos National Laboratory, working to develop robotic hardware and software systems for nuclear materials handling.

In 2012, John began participating in the Naval Research Enterprise Internship Program, working at the US Naval Research Laboratory (NRL) under the supervision of Dr. John Michopoulos. This research, which continues through the present day, was devoted to the development of surrogate model approaches for the characteri-

zation of composite materials. In concert with his ongoing research into parallel computing, John developed a fast characterization approach which reduced the computing time required to characterize material specimens (tested in NRL's six degree-of-freedom automated test frame) from 24 hours to approximately 30 seconds. This work, in combination with BEM and DEM simulations developed at the Colorado School of Mines, formed the basis for his doctoral dissertation which was completed in late 2014.

Since January 2015, John has been conducting postdoctoral research at NRL with funding from the National Research Council. This work has been focused on the development of computationally efficient multiphysics simulations of additive manufacturing processes and components. DEM methods, in conjunction with the use of surrogate models and multi-axial robotic testing, will be used to provide greater insight into the behavior of additively manufactured materials than is currently achievable. By doing so, this research will allow the design and fabrication of novel, useful, and efficient structures and components across a wide range of engineering disciplines.

"Decision-Centric Modeling of Complex Networked Strategic Systems"

Lena D. Johnson

University of Maryland – College Park

"A Compliant, Under-actuated Model of the Human Hand"

Omar Magdy Galil

Florida Institute of Technology

"An Empirical and Computational Study to Measure the Information Content of Free-Hand Sketches"

Shaurya Shriyam

University of Maryland – College Park

"Optimal Task Scheduling In Human-Robot Industrial Collaboration Arising From Perception System Failures"

CIE POSTER AWARD WINNERS

Amirhossein H. Memar

University at Buffalo SUNY

"A Virtual Reality Environment for Task Allocation in a Multi-Human Multi-Robot Collaborative Framework"

Caitlin Stack

Colorado School of Mines

"Towards a Functional Modeling Method for Optimizing Prognostic Health Monitoring Systems"

Gerid Paquette

Florida Institute of Technology

"Utilization of Eye Tracking to Gauge User Preferences Early in the Design Process"

Hang Ye

University at Buffalo SUNY

"Additive Manufacturing for Mass Customization"

Joseph D. Thekinen

Purdue University

COMMITTEE MEETINGS	TIME	ROOM
Sunday, August 2, 2015		
Design Engineering Division Meetings		
Design Engineering Division Executive Committee	12:00pm – 07:00pm	209
Management Division Executive Committee	01:00pm – 05:00pm	205
Tuesday, August 4, 2015		
Design Engineering Division - Technical Committee Meetings		
ASME Research Committee on the Mechanics of Jointed Structures Planning Meeting	05:30pm – 06:30pm	303
Design Engineering Division General Committee Meeting	02:00pm – 06:00pm	207
Vehicle Design (AVT)	07:00pm – 08:30pm	309
Design Automation (DAC)	06:30pm – 08:30pm	102
Design Education (DEC)	05:30pm – 07:00pm	105
Design for Manufacturing and the Life Cycle (DFMLC)	03:30pm – 05:10pm	107
Design Theory and Methodology (DTM)	05:30pm – 07:00pm	104
Mechatronic and Embedded Systems and Applications (MESA)	05:30pm – 07:00pm	110
Micro & Nanosystems (MNS)	05:30pm – 07:00pm	307
Mechanisms and Robotics (MR)	07:00pm – 10:00pm	210
Multibody Systems & Nonlinear Dynamics (MSND)	05:30pm – 07:00pm	302
Power Transmission and Gearing (PTG)	05:30pm – 07:00pm	108
Vibration and Sound (TCVS)	07:00pm – 08:30pm	304
CIE Division Meetings		
CIE Committee Meeting	07:00pm – 08:30pm	313
Wednesday, August 5, 2015		
CIE Division - Technical Committee Meetings		
Advanced Modeling & Simulation (AMS)	12:40pm – 02:00pm	310
Computer-Aided Product and Process Development (CAPPD)	12:40pm – 02:00pm	311
Systems Engineering, Info. & Knowledge Management (SEIKM)	12:40pm – 02:00pm	312
Virtual Environments and Systems (VES)	12:40pm – 02:00pm	313
ASME Standards and Certification Committee Meetings		
Y14 Subcommittee 46 on Dimensioning and Tolerancing for Additive Manufacturing	9:30am – 06:00pm	200
Y14 Subcommittee 46 Project Team	1:00pm – 06:00pm	205

Workshop and Tutorial attendance is complimentary to full registrant attendees of IDETC/CIE 2015. Due to limited seating, attendees must have pre-registered in order to attend.

TUTORIALS

T1: ROBOT LIMB VIRTUAL PROTOTYPING DESIGN AND CONTROL

Organizers/Speakers: Ferdinando Cannella, Istituto Italiano di Tecnologia, Italy

Time: 1:00pm – 5:00pm
Location: Room 301, Level 3

Description: This tutorial shows the fundamental principles and theoretical concepts to design a robotic limb and a control implementation using both the analytical and numerical approach. That permits to the participants to combine and to exploit these two methods to solve the kinematic and dynamic equations of a robot limb. The Multi-Body Dynamics (MBD) numerical method, in fact, is well known in the industrial R&D, but it is not so widespread in the academic environment; therefore this tutorial aims to prove that it could be a useful tool to support also the basic research. For this aim, the demo will help to demonstrate that the numerical results not only will match with the analytical one, but also with the experimental tests. The attendees will experience that the control works both for the virtual and physical model.

Moreover, the participants will be fully trained to design the complete robot limb at their home. During the tutorial, emphasis will be placed on walking participants through the building and validation of the numerical model with the experimental one. Attendees should bring their laptops computers with Matlab installed, since the workshop will combine theoretical explanations with practice on the computer.

T2: ANALYSIS AND SYNTHESIS OF COMPLIANT MECHANISMS

Organizers/Speakers: Haijun Su, Ohio State University

Time: 1:00pm – 5:00pm
Location: Room 302, Level 3

Description: Compliant mechanisms transform motion and forces (at least partially) through the deflection of their flexible elements. Compared with traditional kinematic mechanisms, the advantages of compliant mechanisms include no binding (monolithic design), concise design (flexible members serving multiple functions), light (smaller part number), low maintenance (no bearing, no lubrication), and high precision (no backlash, no wear). Compliant mechanisms have been applied to numerous applications ranging from precision machinery, robotic devices to MEMS sensors and medical devices

and so on. Design and analysis of compliant mechanisms remains a challenge due to the knowledge between two fields: kinematics and mechanics.

This tutorial covers recent developments in mathematical methods and computational for analysis and synthesis of compliant mechanisms. The topics include: nonlinear beam theories such as Euler and Timoshenko beam theories, general pseudo-rigid-body models, kinetostatic analysis and synthesis, screw theory, compliance matrices, mobility analysis/synthesis. Also, a tutorial of a computational compliant mechanism design tool recently developed at the Ohio State University will be given.

T3: FRACTIONAL ORDER MECHANICS - AN INTRODUCTION

Organizers/Speakers: YangQuan Chen, University of California, Merced

Time: 1:00pm – 5:00pm
Location: Room 305, Level 3

Description: This workshop will provide an introduction to a new emerging field of study known as “fractional order mechanics (FOMech).” Fractional calculus is about differentiation or integration of non-integer order. Traditional calculus uses integer order differentiation or integration. As mechanics goes into the micro and nano worlds, more and more “anomalous” behaviors are being observed in materials such as porous medias, particulate systems, soft matters etc. The inherent nature of memory, or hereditary, or long range dependence, or long range interactions in the mechanic systems at the smaller scale prompts us to take a look of the modeling tools we are using. It turns out that using integer order calculus based tools may limit our insight into the mechanical behaviors at all scales. This workshop will focus on introducing “fractional order mechanics (FOMech)” by covering: (1) Motivations and real world needs; (2) Mathematical foundations; (3) Fractional mechanics in classical sense (Bagley-Torvik); (4) Fractional Euler Lagrange mechanics; and (5) Fractional variational principles.

T4: PARALLEL COMPUTING ON GRAPHICS PROCESSING UNIT (GPU) CARDS FOR APPLICATIONS IN MECHANICAL ENGINEERING

Organizers/Speakers: Dan Negrut, Radu Serban, University of Wisconsin, Madison

Time: 8:00am – 5:00pm
Location: Room 304, Level 3

Description: This workshop provides an overview of CUDA-enabled GPU computing followed by a hands-on GPU programming session.

The participants will use their laptops to remotely log into a GPU cluster and practice, through concrete hands-on examples, parallel programming in CUDA. The workshop will conclude with a discussion of library support for GPU computing and of SPIKE::GPU, a library for the GPU solution of large sparse linear systems.

T5: INTRODUCTION TO NON-CONTACT, FULL FIELD VIBRATION MEASUREMENTS AND ADVANCED DATA ANALYSIS (INVITED TUTORIAL)

Organizers/Speakers: Arend von der Lieth, Polytec

Time: 1:00pm – 5:00pm
Location: Room 303, Level 3

Description: This workshop is geared towards everyone interested in non-contact vibration data analysis with a focus on full-field vibration measurements. After an introduction to laser Doppler vibrometry and presentation of some typical examples the user will get to experience scanning laser vibrometers in an extensive hands-on session. Participants are welcomed to bring their own test samples if they can be excited easily. The workshop will cover topics relevant to non-contact, full field vibration measurements and advanced data analysis, including:

- Making measurements using a scanning vibrometer
- Basics of Laser Doppler Vibrometry and typical applications
- Data analysis and processing.

WORKSHOPS

W1: HOW TO MAKE 3D PRINTING WORK FOR YOUR COMPANY (INVITED WORKSHOP)

Organizers/Speakers: Mike Vasquez

Time: 9:00am – 11:30am
Location: Room 206, Level 2

Description: The 3D Printing industry is growing rapidly and there are a lot of options for businesses of all kinds to engage with the technology. This workshop will focus on how companies can best approach, integrate, and expand 3D Printing technologies to meet their business objectives. Several case studies will be presented to give those less familiar with the technology a framework to help them think through the question of how to make 3D Printing work for them.

W2: DEVELOPING IDEATION FLEXIBILITY AT YOUR INSTITUTION: CO-CREATION OF THE IDEATION TRIO

Organizers/Speakers: Seda Yilmaz, Iowa State University

Time: 8:00am – 12:00pm
Location: Room 203, Level 2

Description: The aim of the Workshop on Co-Creation of the Ideation TRIO is to provide a diverse set of participants with an understanding of our research and the materials we have developed to support ideation flexibility, as well as a venue in which they can develop specific plans for using these materials in their own classrooms/organizations and develop new materials and activities as well. The intent is for participants to collaborate with the research team in co-creating pedagogical materials for their classrooms (if they are engineering educators) or training materials for their professions (if they are practicing engineers). We aim for participants to return to their institutions / organizations fully prepared and committed to integrating these approaches and materials into their curricula and to collecting student outcomes and case examples that will be shared with the greater community. Professionals will also benefit from the workshop, as they will have a new set of tools they can use for their own engineering problems in their domains. (www.ideationflexibility.org)

W3: EMOTIONAL ENGINEERING IN AN AGE OF MATERIAL DIGITALIZATION

Organizers/Speakers: Shuichi Fukuda, Keio University

Time: 1:00pm – 5:00pm
Location: Room 204, Level 2

Description: Today is called a digital age. But digitalization and discretization are different. Discretization just divides the continuum into elements. But digitalization reformulates our experiences and attach new meanings. Material digitization is expected to provide us with a versatile tool for emotional design just as FEM did for analyzing a continuum of any shape.

W4: MANAGING YOUR ACADEMIC CAREER LIKE AN ENTREPRENEUR**

Organizers/Speakers: Susan Finger, Carnegie Mellon University

Time: 1:00pm – 5:00pm
Location: Room 202, Level 2

Description: An academic career spans many years and many roles, accompanied by changes in research interests, technologies, administrators, national priorities, and more. As graduate students, our focus is on research and career paths; as junior faculty, our focus is on research, teaching and service for promotion and tenure; as mid-career and senior faculty, our focus tends to deepen and be

driven by a passion whether it be for a research area or an educational goal. For most of us, our careers have been dominated by expectations given in terms of numbers: number of papers, number of research dollars, number of citations, number of PhD students advised and graduated. Stepping back and reflecting on the careers of our colleagues who have had successful and fulfilling careers we see that yes they have had success with numbers – but their focus has been driven by a passion to contribute and their ability to embrace their career very much like an entrepreneur with goals, resources, and constraints. While much of the terminology of business – buying, selling, employing may seem out of place in academia, the underlying idea of heralding resources to fulfill goals is not. This workshop explores the advantages of thinking of an academic career as an enterprise, which requires strategic planning, careful day-to-day management, investment in the future, willingness to collaborate, sales, networking and some risk taking. Participants will learn and share strategies and methods that have been successful.

This workshop will be the seventh annual workshop event of the Broadening Participation Committee of the ASME DED. The workshop is designed to provide graduate students and faculty members from underrepresented groups with professional development activities and to give them the opportunity to make connections with an international network of supportive researchers in their field. In addition to skill development, this workshop will support the development of a network of people within the community from underrepresented groups. This year's workshop leader will be Dr. Robert Brown. Dr. Brown is the founding director of the Bioeconomy Institute (BEI) at Iowa State University, a university-wide initiative that coordinates research, educational, and outreach activities related to biobased products and bioenergy. The BEI has helped established several new research enterprises at ISU including the NSF-sponsored Center for Biorenewable Chemicals, the Biobased Industries Center, the Biocentury Research Farm, the Biorenewables Research Laboratory Building, the NSF-sponsored EPRSCoR RII project, and the USDA-sponsored CenUSA Bioenergy project. Dr. Brown has published over 120 refereed papers and is PI or co-PI on over \$70 million in cumulative research funding. He is a Fellow of the American Society of Mechanical Engineering, a Distinguished Iowa Scientist of the Iowa Academy of Science, and the recipient of the David R. Boylan Eminent Faculty Award for Research at ISU in 2002. He received an R&D 100 Award from Research and Development Magazine in 1997 and was named one of the "Top 100" researchers in bioenergy by Biofuels Digest in 2011.

** Note: Registration for this workshop is being handled separately from the main conference registration. If you are interested in attending this workshop, please complete the workshop survey via the following link: <https://www.surveymonkey.com/s/BPart2015>

W5: SUCCESS AS A STUDENT RESEARCHER: A DISCUSSION OF BEST PRACTICES

Organizers/Speakers: Bryony Dupont, Oregon State University, Scott Ferguson, North Carolina State University

Time: 1:00pm – 5:00pm
Location: Room 203, Level 2

Description: The objective of this workshop is to create a forum for students attending the IDETC / CIE conferences to learn about and discuss best practice to achieve success as a student researchers. Faculty and Ph.D. students from the design community will present best practices and ways to identify / avoid the common pitfalls that students commonly face. Topics will range from research skills (e.g., how to conduct a literature review, how to develop a research plan) to social skills (how to work with your lab-mates, how to interact with your advisor). Discussion will take place via panels, presentations, and open question periods. It is expected that student attendees will also have opportunities to build cross-university relationships and get excited for the conference.

W6: INTRODUCTION TO MANAGING COMPLEX SYSTEMS

Organizers/Speakers: Franz-Josef Kahlen, University of Capetown

Time: 8:00am – 12:00pm
Location: Room 202, Level 2

Description: Engineers and managers are presented with major challenges during the application of engineering content in the presence of often unknown cause-effect chains and networks. Concerns raised by engineers as well as hiring managers always refer to their deficiencies in understanding complexity in systems, how such complexity can be visualized to distributed stakeholders in a project, assessment challenges of the overall performance of a machine, as opposed to the detailed functions of a component, as well as establishing criteria for, and transparency of decision-making. This workshop addresses the above deficiencies from a holistic perspective, accounting for issues in communications, teamwork across discipline and geographic borders, and project / design status visualization. It is the objective of this workshop to present an introductory exposure to and awareness of complex systems, the presence and drivers of systems, and generally to create an understanding that organizational health requires strong engineering content, supported by management skills and transparent decision-making cultures.

Monday, August 3

AM INDUSTRY OVERVIEW - TECHNOLOGY AND BUSINESS LANDSCAPE

Level 2, Hynes CC, Room 207 8:00am - 8:50am

ADDITIVE MANUFACTURING - AERIAL MAP OF THE AM ECO-SYSTEM

Ivan Madera, Morf3D, Irvine, NY, United States

SCALING LAWS OF ADDITIVE MANUFACTURING PROCESSES

A. John Hart, Massachusetts Institute of Technology, Somerville, MA, United States

ECONOMICS OF AN AM STRATEGY

Level 2, Hynes CC, Room 207 8:50am - 9:40am

DETERMINING COST-EFFECTIVENESS OF ADDITIVE MANUFACTURING

Zach Simkin, Senvol, New York, NY, United States

METAL 3D PRINTING INSIGHTS ON "WHY YOU SHOULD GET STARTED AND HOW"

Tuan Trampham, ARCAM, Boston, MA, United States

AM IMPLEMENTATION

Level 2, Hynes CC, Room 207 10:00am - 10:50am

THE HIDDEN COSTS YOU NEED TO KNOW- A PROCESS FOR BUYING A 3D PRINTER.

W. Daniel Fraser, Fraser- AIS, Bala Cynwyd, PA, United States

HOW TO MEASURE THE EFFECTIVENESS OF 3D PRINTING IN YOUR ORGANIZATION

Mike Vasquez, Ph.D., 3Degrees, Chicago, IL, United States

POSTER SESSION - DIGITAL MANUFACTURING

Level 2, Hynes CC, Exhibit Hall C 10:50am - 12:30pm

Session Chair: Brian Rosenberger, Lockheed Martin, New York, NY, United States

Session Co-Chair: Fuewen Frank Liou, Missouri University Of Science And Technology, Rolla, MO, United States, Vikas Prakash, Case Western Reserve University, Cleveland, OH, United States, Y.

Kevin Chou, The University of Alabama, Tuscaloosa, AL, United States

ADDITIVE MANUFACTURING IN MICRO AIR VEHICLE STUDIES

Karkala Prajwal Kamalaksha, CSIR-National Aerospace Laboratories, Bangalore, India, SURAJ C S, Abel J. Nelly, National Aerospace Laboratories, Bangalore, India

INTEGRATING MANUFACTURING DATA INTO DESIGN PROCESS INCREASES THE PRODUCT MANUFACTURABILITY

Maureen Fang, Purdue University, West Lafayette, IN, United States

A 3D-PRINTED IN-VITRO EYE CHAMBER FOR STUDYING EMULSIFICATION OF TAMPONADE

Anderson Ho Cheung Shum, The University of Hong Kong, Hong Kong, Hong Kong

DEVELOPMENT OF UNIBODY ROBOTIC MECHANISMS FOR MEDICAL APPLICATIONS USING MULTI-MATERIAL ADDITIVE MANUFACTURING

Arnaud Bruyas, François Geiskopf, Pierre Renaud, ICube-AVR team, Strasbourg, France

3D PRINTED SURGICAL MANIPULATOR FOR MINIMALLY INVASIVE LUMBAR DISCECTOMY SURGERY

Benjamin Johnson, Purdue University, West Lafayette, IN, United States, Brian Cole, Englewood Orthopedic Associates, Englewood, NJ, United States, David Cappelleri, Purdue University, West Lafayette, IN, United States

TRANSFORMATIVE LEARNING AND ENGAGEMENT OF THE 21ST CENTURY STEM WORKFORCE USING 3-D PRINTING AT ARMSTRONG STATE UNIVERSITY

Wayne Johnson, Jay Hodgson, Joshua Lambert, Scott Mateer, Brandon Quillian, Armstrong State University, Savannah, GA, United States

THE USE OF ADDITIVE MANUFACTURING TO FABRICATE STRUCTURAL COMPONENTS FOR WEARABLE ROBOTIC DEVICES

Raymond Churchwell, Kevin Hollander, SpringActive, Tempe, AZ, United States

GEOMETRIC ERROR QUANTIFICATION IN FUSED DEPOSITION MODELING

John Gerdes, US Army Research Laboratory, Aberdeen Proving Ground, MD, United States, Oluwakayode Bamiduro, Howard University, Washington, DC, United States, Jeffrey Westrich, Jaret Riddick, US Army Research Laboratory, Aberdeen Proving Ground, MD, United States

3D PRINTING OF MICRO-ENGINEERED FLEXIBLE LITHIUM-ION BATTERIES USING GUMMY CONDUCTORS

Sepehr Nesaei, Wang (Will) Yu, Weihong (Katie) Zhong, Arda Gozen, Washington State University, Pullman, WA, United States

FDM OF ABS/PLA SHORT FIBER REINFORCED COMPOSITES: EFFECTS ON STRUCTURAL PROPERTIES BASED ON ADHESION BETWEEN MATRIX AND REINFORCING MECHANISM

Weston Grove, Meng Zhang, Emmett Hull, Kansas State University, Manhattan, KS, United States

3D PRINTING'S ROLE IN INSPIRING TOMORROW'S ENGINEERS

AJ (Alfonso) Perez, NVBOTS, Boston, MA, United States

DEVELOPMENT OF PHOTOPOLYMER NANOCOMPOSITE INK FOR 3D PRINTING

Jun Wei, Xiaoying Qi, Hongyi Yang, Jingying Lim, Singapore Institute of Manufacturing Technology, Singapore, Singapore

PERFORMANCE OF 3D PRINTED MULTI-MATERIAL STRUCTURAL SYSTEMS WITH GRADED INTERLAYER

S Kumar, Masdar Institute of Science and Technology, Abu Dhabi, United Arab Emirates.

APPLICATION OF BIO-INSPIRED DESIGN TO MINIMIZE MATERIAL DIVERSITY

Jacquelyn Nagel, Katie S. McCullar, Katherine E. Kelly, Christopher Graves, James Madison University, Harrisonburg, VA, United States, Steven A. Underhill, James Madison University, Fredericksburg, VA, United States

EXPLORATION OF INTERACTIONS BETWEEN PRINTING PARAMETERS, HEAT TREATMENT, AND FLEXURAL STRENGTH OF PLA PARTS GENERATED BY FDM PROCESS

Kody Smith, David Hieronymus, Nizar Kamel, Robert Prins, Robert Nagel, James Madison University, Harrisonburg, VA, United States

UNDERSTANDING THE BOND FAILURES IN ULTRASONIC ADDITIVE MANUFACTURING

Qing Mao, Nicole Coutris, Georges Fadel, Clemson University, Clemson, SC, United States

DESIGN FOR ADDITIVE MANUFACTURING CONSIDERING MANUFACTURABILITY

Masayuki Tanaka, Toshiba Corporation, Yokohama, Kanagawa, Japan

MECHANICAL PROPERTIES OF SELECTED LASER MELTED NI-BASED COMPOSITES REINFORCED BY DIFFERENT CONTENTS OF TIC NANO-PARTICLES

Seung Ki Moon, Xiling Yao, Nanyang Technological University, Singapore, Singapore, Guijun Bi, Singapore Institute of Manufacturing Technology, Singapore, Singapore

ASSESSMENT OF DIMENSIONAL INTEGRITY AND SPATIAL DEFECT LOCALIZATION IN ADDITIVE MANUFACTURING (AM) USING SPECTRAL GRAPH THEORY (SGT)

Prahalad Rao, Binghamton University (SUNY), Binghamton, NY, United States, Zhenyu Kong, Virginia Polytechnic Institute and State University, Blacksburg, VA, United States, Chad Duty, Oak Ridge National Laboratories, Oak Ridge, TN, United States, Rachel Smith, University of California - Irvine, Irvine, CA, United States, Vlastimil Kunc, Lonnie Love, Oak Ridge National Laboratories, Oak Ridge, TN, United States

SHORT FIBRE REINFORCED THERMOPLASTICS - A NEW MATERIAL GENERATION FOR FDM?

Wilfried Elspass, Zurich University of Applied Sciences, Winterthur, Switzerland

DESIGN FOR FDM: CONSTRAINING THE UNCONSTRAINED

Giacomo Fornasini, Linda Schmidt, University of Maryland, College Park, MD, United States

DESIGN FOR ADDITIVE MANUFACTURING: SUPPORT MATERIAL ELIMINATION THROUGH TOPOLOGY OPTIMIZATION WITH MAXIMUM OVERHANG CONSTRAINTS

Andrew Gaynor, James Guest, Johns Hopkins University, Baltimore, MD, United States

MODELING AND SIMULATION OF METAL-BASED ADDITIVE MANUFACTURING: A LITERATURE REVIEW

Qian Ye, Shikui Chen, Qing Chang, Stony Brook University, Stony Brook, NY, United States

MODEL-BASED CONTROL FOR RADIATION-BASED COMPOSITE LAMINATE FABRICATION IN A LAYER-BY-LAYER PROCESS

Adamu Yebi, Clemson University, Greenville, SC, United States

FABRICATION OF POROUS ALUMINA CERAMICS WITH CORN STARCH IN A LOW-COST AND EFFECTIVE WAY

Zhengwei Nie, Yuyi Lin, University Of Missouri, Columbia, MO, United States

GUIDELINES FOR LOW COST ADDITIVE MANUFACTURING

Alex Clark, Intuitive Research and Technology, Huntsville, AL, United States

KEYNOTE - THE ENGINEERING BEHIND 3D PRINTING

Level 2, Hynes CC, Auditorium 12:30pm - 2:00pm

3D PRINTING IN HOLLYWOOD - BRINGING THE IMAGINATION TO LIFE

Jason Lopes, Legacy Effects, Studio City, CA, United States

3D PRINTING: THE NEXT 25 YEARS

Hod Lipson, Cornell University, Ithaca, NY, United States

STRATASYS' ADDITIVE MANUFACTURING SOLUTIONS

Bruce Bradshaw, Stratasys, Billerica, MA United States

DESIGN METHODS: CANDIDATE PART SELECTION

Level 2, Hynes CC, Room 207 2:00pm - 2:50pm

COMPONENT REDESIGN WITH A FOCUS ON FUNCTION

Joseph Manzo, Titan Industries, Mesa, AZ, United States

THE ADVANCES OF ELECTRON BEAM MELTING FOR HIGH VOLUME PRODUCTION

Frank Medina, Arcam, Mölndal, Sweden

3D PRODUCT DEFINITION BASED DESIGN & MULTIPHYSICS FOR AM

Level 2, Hynes CC, Room 207 2:50pm - 3:40pm

THE IMPORTANCE OF POINT-WISE THERMAL HISTORY PREDICTIONS FOR UNDERSTANDING AND CONTROLLING METAL LASER SINTERING

Brent Stucker, 3DSIM, Park City, UT, United States

3D MODEL-BASED PRODUCT DEFINITION FOR ADDITIVE MANUFACTURING: OPPORTUNITIES AND CHALLENGES

Bryan Fischer, MBD360, Sherwood, OR, United States

PANEL: STANDARDS, PATHWAYS FOR PROGRESS

Level 2, Hynes CC, Room 207 4:10pm - 5:30pm

Moderator: Darrell Wallace, Youngstown State University, Youngstown, OH

John Slotwinski, The Johns Hopkins University Applied Physics Laboratory, Laurel, MD, United States, Jennifer Herron, Action Engineering, Lakewood, CO, United States, Simin Zhou, UL, New York, NY, United States, Dave Edstrom, Memex Automation, Burlington, ON, Canada, Kevin Jurrens, Nist, Gaithersburg, MD, United States

Tuesday, August, 04

BORN IN BOSTON: LOCAL AM INNOVATIONS SHAPING THE WORLD

Level 2, Hynes CC, Auditorium 8:00am - 9:30am

MOVING 3D PRINTING TO FINISHED PRODUCTS

Daniel Oliver, Voxel8, Somerville, MA, United States

MOVING BETTER: LAUNCHING HIGH PERFORMANCE PRODUCTS FROM YOUR DESKTOP

Ian Ferguson, Formlabs, Somerville, MA, United States

HOW SOFTWARE AND THE CLOUD ARE REVOLUTIONIZING 3D PRINTING

Grant Thomas-Lepore, GrabCAD, Cambridge, MA, United States

DESIGN METHODS: CAD / CAE TOOLS

Level 2, Hynes CC, Room 207 9:30am - 10:20am

DESIGN FOR ADDITIVE MANUFACTURING: EMERGING TOOLS AND GUIDELINES

David Rosen, Georgia Tech, Marietta, GA, United States

GOAL DIRECTED DESIGN AND THE FUTURE OF MAKING

Gordon Kurtenbach, Autodesk, Waltham, MA, United States

DESIGN METHODS: TOPOLOGY OPTIMIZATION

Level 2, Hynes CC, Room 207 10:20am - 11:10am

TOPOLOGY OPTIMIZATION FOR ADDITIVE MANUFACTURING: OPPORTUNITIES AND CHALLENGES

Krishnan Suresh, University of Wisconsin, Madison, WI, United States

TOPOLOGY OPTIMIZATION WITH ADDITIVE MANUFACTURING FOR STRUCTURE APPLICATIONS

Wenjiong Gu, United Technologies Research Center, East Hartford, CT, United States

MATERIALS DESIGN AND MICROSTRUCTURE

Level 2, Hynes CC, Room 207 11:40am - 12:40pm

HIGH PERFORMANCE COMPUTING AND ADDITIVE MANUFACTURING: OVERCOMING THE BARRIERS TO MATERIAL CERTIFICATION

Wayne King, Lawrence Livermore National Laboratory, Livermore, CA, United States

MATERIAL CHALLENGES AND DIRECTIONS FOR ADDITIVE MANUFACTURING IN OIL & GAS APPLICATIONS

Meng Qu, Schlumberger-Doll Research (SDR), Cambridge, MA, United States

INDUSTRIAL APPLICATIONS OF AM

Level 2, Hynes CC, Room 207 2:00pm - 3:00pm

METAL ADDITIVE MANUFACTURING IN DIESEL ENGINES,

Roger England, Cummins, Inc., Loudon, TN, United States

BLURRING THE LINES BETWEEN DESIGN & MANUFACTURING

Brenan McCarragher, Draper Laboratory, Cambridge, MA, United States

AM EQUIPMENT TECHNOLOGY REVIEW

Level 2, Hynes CC, Room 207 3:30pm - 4:20pm

AM / 3DP TECHNOLOGY: A SUMMARY OF EQUIPMENT, MATERIAL AND PROCESSES

Tim Shinbara, The Association For Manufacturing Technology, McLean, VA, United States

PANEL: AM ROADMAPS

Level 2, Hynes CC, Room 207 4:20pm - 5:10pm

Moderator: J. David Rowatt, Schlumberger

Todd Palmer, Pennsylvania State University, State College, PA, United States, John Wilczynski, NCDMMM, Blairsville, PA, United States

Wednesday, August 5

AM FOUNDERS & FUTURISTS

Level 2, Hynes CC, Room 207

8:00am – 9:30am

AM FOUNDERS & FUTURISTS

Joseph Beaman, University of Texas – Austin, Austin, TX, United States, David Rosen, Georgia Tech, Marietta, GA, United States, Christopher Williams, Virginia Tech, Blacksburg, VA, United States, Brent Stucker, 3DSIM, Park City, UT, United States

AM RESEARCH: TECHNOLOGIES OF TOMORROW

Level 2, Hynes CC, Room 207

10:20am – 10:50am

OPTIMIZATION OF ADDITIVELY MANUFACTURED MULTI-MATERIAL LATTICE STRUCTURES USING GENERALIZED OPTIMALITY CRITERIA

Tino Stankovic, Jochen Mueller, Paul Egan, and Kristina Shea, ETH, Zürich, Switzerland

AM VALIDATION & VERIFICATION: PART 1

Level 2, Hynes CC, Room 207

10:50am – 11:20am

IN-PROCESS 3D GEOMETRY MEASUREMENT AND RECONSTRUCTION FOR DIRECT METAL LASER SINTERING

Donald Godfrey, Honeywell Aerospace, New York, NY, United States

CONTROL OF TI-6AL-4V SOLIDIFICATION MICROSTRUCTURE IN THE ARCAM EBM PROCESS

Jack Beuth, Carnegie Mellon University, Pittsburgh, PA, United States

AM VALIDATION & VERIFICATION: PART 2

Level 2, Hynes CC, Room 207

11:20am – 12:30am

METROLOGY AND INSPECTION OF PARTS MADE USING ADDITIVE PROCESSES

Marcin Bauza, Carl Zeiss Industrial Metrology, Maple Grove, MN, United States

METROLOGY IN ADDITIVE MANUFACTURING

Brad Etter, Alicona Corporation, Bartlett, IL, United States

WORKSHOP: AMERICA MAKES WORKFORCE/EDUCATION ROADMAPING (INVITE ONLY)

Level 2, Hynes CC, Room 200

12:40pm – 3:30pm

Monday, August, 03

AVT-1

Advances in Ground Vehicles Dynamics and Controls

AVT-1-1

ADVANCES IN GROUND VEHICLES DYNAMICS AND CONTROLS

Level 3, Hynes CC, Room 309

8:00am - 9:40am

Session Chair: Vladimir Vantsevich, The University of Alabama at Birmingham, Hoover, AL, United States

Session Co-Chair: Xiaobo Yang, Oshkosh Corporation, Oshkosh, WI, United States, Namcheol Kang, Kyungpook National University, Daegu, Republic of Korea

RACK FORCE ESTIMATION FOR ELECTRIC POWER STEERING

Technical Publication. DETC2015-46228

Thomas Weiskircher, Clemson University, Greenville, SC, United States, Steve Fankem, TU Kaiserslautern, Kaiserslautern, Rheinland-Pfalz, Germany, Beshah Ayalew, Clemson University, Greenville, SC, United States

THE AUGMENTED ELECTRONIC STABILITY PROGRAM WITH SEMI-ACTIVE AIR SUSPENSION INTEGRATED

Technical Publication. DETC2015-47202

Guangqiang Wu, Ye Guanghu, Tongji University, Shanghai, China

ANTI-LOCK WHEEL SLIP CONTROL WITH AN ADAPTIVE SEARCHING ALGORITHM FOR THE OPTIMAL SLIP

Technical Publication. DETC2015-47347

Ning Pan, Liangyao Yu, Zhizhong Wang, Lei Zhang, Jian Song, Tsinghua University, Beijing, China

A COOPERATIVE DRIVING NLMPCC FOR REAL TIME COLLISION AVOIDANCE

Technical Publication. DETC2015-47463

Edoardo Sabbioni, Francesco Braghin, Ugo Rosolia, Politecnico di Milano, Milano, Italy, Andrew Alleyne, University of Illinois at Urbana-Champaign, Urbana, IL, United States, Stijn De Bruyne, Siemens PLM Software, Leuven, Belgium

na-Champaign, Urbana, IL, United States, Stijn De Bruyne, Siemens PLM Software, Leuven, Belgium

SPRUNG MASS MOTION EMULATION IN A BRAKING TEST RIG

Technical Publication. DETC2015-47691

Chunjian Wang, Qian Wang, Jeffery Anderson, Beshah Ayalew, Clemson University, Greenville, SC, United States

CIE-1

Advanced Modeling and Simulation (AMS General)

CIE-1-1

ADVANCED MODELING AND SIMULATION (AMS GENERAL)

Level 3, Hynes CC, Room 310 8:00am - 9:40am

Session Chair: Panchapakesan Venkataraman, Rochester Institute of Technology, Rochester, NY, United States

APPROXIMATE ANALYTICAL SOLUTION FOR LAMINAR FLOW OVER A BACKWARD STEP

Technical Publication. DETC2015-46177

Panchapakesan Venkataraman, Rochester Institute of Technology, Rochester, NY, United States

CFD ANALYSIS OF 3D FLOW FOR 1.4 MW FRANCIS TURBINE AND MODEL TURBINE MANUFACTURING

Technical Publication. DETC2015-46258

Ulku Ece Ayli, Alper Kaplan, Huseyin Cetinturk, Berat Kavurmaci, Gizem Demirel, Kutay Celebioglu, Selin Aradag, TOBB University of Economics and Technology, Ankara, Ankara, Turkey

ABSTRACTION OF SEMANTIC MID-SURFACE BASED ON RIB-FEATURE RECOGNITION

Technical Publication. DETC2015-47054

Huawei Zhu, Yusheng Liu, Zhejiang University, Hangzhou, China

RISK-BASED PATH PLANNING OPTIMIZATION METHODS FOR UAVS OVER INHABITED AREAS

Technical Publication. DETC2015-47407

Eliot Rudnick-Cohen, Jeffrey Herrmann, Shapour Azarm, University of Maryland, College Park, MD, United States

STOCHASTIC EVENT DETECTION IN NEEDLE-TISSUE INTERACTIONS

Technical Publication. DETC2015-47384

Inki Kim, Adam Gordon, Scarlett Miller, Pennsylvania State University, University Park, PA, United States

**CIE-2
COMPUTER-AIDED PRODUCT AND PROCESS DEVELOPMENT**

CIE-2-1 (CAPPD GENERAL) - I

Level 3, Hynes CC, Room 311 8:00am - 9:40am

Session Chair: Gaurav Ameta, Washington State University, Pullman, WA, United States

Session Co-Chair: Rahul Rai, University at Buffalo SUNY, Buffalo, NY, United States

INTERGRATING RULE-BASED SYSTEMS AND DATA ANALYTICS TOOLS USING OPEN STANDARD PMML

Technical Publication. DETC2015-46412

Yunpeng Li, Utpal Roy, Syracuse University, Syracuse, NY, United States, Y. Tina Lee, Sudarsan Rachuri, NIST, Gaithersburg, MD, United States

SPATIAL GRAMMAR FOR DESIGN SYNTHESIS TARGETING PERCEPTIONS: CASE STUDY ON BEAUTY

Technical Publication. DETC2015-46449

Marta Perez Mata, Saeema Ahmed-Kristensen, Technical University of Denmark, Kongens Lyngby, Denmark, Kristina Shea, ETH Zurich, Zurich, Switzerland

DESIGN REPOSITORY AND ANALOGY COMPUTATION VIA UNIT LANGUAGE ANALYSIS (DRACULA) REPOSITORY DEVELOPMENT

Technical Publication. DETC2015-46640

Briana Lucero, Cameron Turner, Colorado School of Mines, Golden, CO, United States, Julie Linsey, Georgia Institute of Technology, Atlanta, GA, United States

SKIN MODEL SHAPES: OFFERING NEW POTENTIALS FOR MODELLING PRODUCT SHAPE VARIABILITY

Technical Publication. DETC2015-46701

Benjamin Schleich, Friedrich-Alexander-University Erlangen-Nürnberg, Erlangen, Germany, Nabil Anwer, Luc Mathieu, Ecole Normale Supérieure de Cachan, Cachan, France, Sandro Wartzack, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany

AUTOMATED IMPORT OF XML-FILES CONTAINING OPTIMIZED GEOMETRIC DATA TO 3D-CAD-MODELS OF NON-LINEAR INTEGRAL BIFURCATED SHEET METAL PARTS

Technical Publication. DETC2015-47076

Thiago Weber Martins, Katharina Albrecht, Reiner Anderl, Technische Universität Darmstadt, Darmstadt, Germany

**CIE-4
Virtual Environments and Systems (VES General)**

**CIE-4-1
VIRTUAL ENVIRONMENTS AND SYSTEMS (VES GENERAL) - I**

Level 3, Hynes CC, Room 312 8:00am - 9:40am

Session Chair: Rafael Radkowski, Iowa State University, Ames, IA, United States

Session Co-Chair: Francesco Ferrise, Politecnico di Milano, Milano, Italy

TURN-KEY SOLUTIONS: VIRTUAL REALITY

Technical Publication. DETC2015-46174

Rustin Webster, Alex Clark, Intuitive Research and Technology Corporation, Huntsville, AL, United States

ARCHITECTURE FOR INTEGRATED DEVELOPMENT OF COMPLEX SYSTEMS WITH MODEL-BASED SYSTEM

Level 3, Hynes CC, Room 313 8:00am – 9:40am

SPECIFICATION AND SIMULATION

Technical Publication. DETC2015-46312

Jürgen Roßmann, RWTH Aachen University, Aachen, Germany, Roman Dumitrescu, Fraunhofer Institute for Production Technology, Paderborn, Germany, Oliver Stern, RIF e.V. Institute for Research and Transfer, Dortmund, Germany, Christoph Averdung, CPA Redev GmbH, Siegburg, Germany, Michael Schluse, RWTH Aachen University, Aachen, Germany, Christian Bremer, Fraunhofer Institute for Production Technology, Paderborn, Germany, Florian Blümel, RIF e.V. Institute for Research and Transfer, Dortmund, Germany, Malte Rast, Martin Hoppen, RWTH Aachen University, Aachen, Germany, Michael Hillebrand, Fraunhofer Institute for Production Technology, Paderborn, Germany

ASSEMBLY-DESIGN-ORIENTED SEMANTIC MODELING AND ASSEMBLY CONFIGURATION SIMULATION IN VIRTUAL ENVIRONMENT

Technical Publication. DETC2015-47280

Xiumin Fan, Li Tian, Qichang He, Keyan Liu, Shanghai Jiaotong University, Shanghai, China

HAPTIC ASSEMBLY USING SKELETAL DENSITIES AND FOURIER TRANSFORMS

Technical Publication. DETC2015-47923

Morad Behandish, Horea Ilies, University Of Connecticut, Storrs, CT, United States

THE ENVIRONMENTAL IMPACT ASSESSMENT OF A COMPANY'S MANUFACTURING SYSTEM

Technical Publication. DETC2015-48077

Dimitrios Anagnostakis, James Ritchie, Theodore Lim, Heriot-Watt University, Edinburgh, Scotland, Conor Craig, Jamie Speedie, Progress Rail Services, Edinburgh, Scotland

CIE-3 Systems Engineering Information Knowledge Management (SEIKM General)

CIE-3-1 SYSTEMS ENGINEERING INFORMATION KNOWLEDGE MANAGEMENT (SEIKM GENERAL)

Session Chair: Farhad Ameri, Texas State University, San Marcos, TX, United States

Session Co-Chair: Christopher Hoyle, Oregon State University, Corvallis, OR, United States

A SYSTEM OF MULTI-SENSOR FUSION FOR ACTIVITY MONITORING OF INDUSTRIAL TRUCKS IN LOGISTICS WAREHOUSES

Technical Publication. DETC2015-46169

Cyril Alias, University of Duisburg-Essen, Cagdas Oezguer, University of Duisburg- Essen, Duisburg, Germany, Qingjin Yang, Dalian Qinteng Technology Co. Ltd., Dalian, China, Bernd Noche, University of Duisburg-Essen, Transport Systems and Logistics, Duisburg, Germany

RISK ATTITUDE INFORMED ROUTE PLANNING IN A SIMULATED PLANETARY ROVER

Technical Publication. DETC2015-46385

Adam R. Short, Douglas L. Van Bossuyt, Colorado School of Mines, Golden, CO, United States

DETECTION OF CHILLER ENERGY EFFICIENCY FAULTS USING EXPECTATION MAXIMIZATION

Technical Publication. DETC2015-47000

Rong Lily Hu, University of California Berkeley, Berkeley, CA, United States, Jessica Granderson, Lawrence Berkeley National Laboratory, Berkeley, CA, United States, Alice Agogino, University of California Berkeley, Berkeley, CA, United States

INTEGRATED CAPTURE AND REPRESENTATION OF PRODUCT INFORMATION IN COMPUTER-AIDED PRODUCT DEVELOPMENT

Technical Publication. DETC2015-47299

Erik Lejon, Michael Lundin, Andreas Dagman, Peter Jeppsson, Mats Näsström, Lulea University of Technology, Luleå, Sweden

EXPLORING REQUIREMENT CHANGE PROPAGATION THROUGH THE PHYSICAL AND FUNCTIONAL DOMAIN

Technical Publication. DETC2015-47746

Phyo Htet Hein, Varun Menon, Beshoy Morkos, Florida Institute of

Technology, Melbourne, FL, United States

DAC-3
Decision Making in Engineering Design

DAC-3-1
DECISION-MAKING IN ENGINEERING DESIGN I

Level 1, Hynes CC, Room 1018:00am - 9:40am

Session Chair: Kemper Lewis, University at Buffalo, Buffalo, NY, United States

Session Co-Chair: Sara Behdad, University at Buffalo, Buffalo, NY, United States

SOLUTION SPACE EXPLORATION IN MODEL-BASED REALIZATION OF ENGINEERED SYSTEMS

Technical Publication. DETC2015-46457

Maryam Sabeghi, University of Oklahoma, OKC, OK, United States, Warren Smith, Australian Defence Force Academy, Canberra, Australia, Janet Allen, Farrokh Mistree, University of Oklahoma, Norman, OK, United States

DESIGN AS A SEQUENTIAL DECISION PROCESS: A METHOD FOR REDUCING DESIGN SET SPACE USING MODELS TO BOUND OBJECTIVES

Technical Publication. DETC2015-46909

Simon Miller, Timothy Simpson, Pennsylvania State University, University Park, PA, United States, Michael Yukish, PSU/ARL, State College, PA, United States

SIMULATING VARIABILITY OF REWORK COST AND MARKET PERFORMANCE ESTIMATES IN PRODUCT REDESIGN

Technical Publication. DETC2015-47598

Kayla Von Hagel, Scott Ferguson, North Carolina State University, NC, United States

UNDERSTANDING THE UTILIZATION OF INFORMATION STIMULI IN DESIGN DECISION MAKING USING EYE GAZE DATA

Technical Publication. DETC2015-46495

Youyi Bi, Murtuza Shergadwala, Tahira Reid, Jitesh H. Panchal, Purdue University, West Lafayette, IN, United States

CHANGING SUBSYSTEM INFORMATION STRATEGIES USING WEIGHTED OBJECTIVES: INCREASING ROBUSTNESS TO BIASED INFORMATION PASSING

Technical Publication. DETC2015-47667

Jesse Austin-Breneman, Bo Y Yu, Maria Yang, Massachusetts Institute of Technology, Cambridge, MA, United States

Simulation-Based Design Under Uncertainty

DAC-17-1
SIMULATION-BASED DESIGN UNDER UNCERTAINTY I

Level 1, Hynes CC, Room 1028:00am - 9:40am

Session Chair: Zissimos Mourelatos, Oakland University, Rochester, MI, United States

Session Co-Chair: Xiaoping Du, Missouri University of Science And Technology, Rolla, MO, United States

RELIABILITY-BASED DESIGN OPTIMIZATION IN X-SPACE USING ENSEMBLE OF GAUSSIAN RELIABILITY ANALYSES (EOGRA)

Technical Publication. DETC2015-46130

Po Ting Lin, Shu-Ping Lin, Chung Yuan Christian University, Chungli, Taoyuan, Taiwan

TOPOLOGY OPTIMIZATION WITH LOAD UNCERTAINTY AS AN INHOMOGENEOUS EIGENVALUE PROBLEM

Technical Publication. DETC2015-46912

Wei Song, Euihark Lee, Hae Chang Gea, Rutgers University, Piscataway, NJ, United States, Limei Xu, University of Electronic Science and Technology of China, Sichuan, China

DEVELOPMENT OF A CONSERVATIVE MODEL VALIDATION METHOD FOR RELIABLE DESIGN

Technical Publication. DETC2015-46982

Min-yeong Moon, Hyunkyoo Cho, University of Iowa, Iowa City, IA, United States, Nicholas Gaul, RAMDO Solutions, LLC, Iowa City, IA, United States, David Lamb, David Gorsich, US ARMY RDECOM - TARDEC, Warren, MI, United States

DESIGN SENSITIVITY METHOD FOR SAMPLING-BASED RBDO WITH FIXED COV

Technical Publication. DETC2015-47359

Hyunkyoo Cho, Kyung Choi, University of Iowa, Iowa City, IA, United States, David Lamb, US Army TARDEC, Warren, MI, United States, Ikjin Lee, University of Connecticut, Storrs, CT, United States

SEQUENTIAL COOPERATIVE ROBUST OPTIMIZATION (SCRO) FOR MULTI-OBJECTIVE DESIGN UNDER UNCERTAINTY

Technical Publication. DETC2015-47885

Joshua Hamel, Seattle University, Seattle, WA, United States

**DAC-9
Design of Engineering Materials and Structures****DAC-9-1
DESIGN OF ENGINEERING MATERIALS AND STRUCTURES I**

Level 1, Hynes CC, Room 103 8:00am - 9:40am

Session Chair: Julian Norato, University of Connecticut, Storrs, CT, United States

Session Co-Chair: Guang Dong, Tesla Motors, Fremont, CA, United States

B-SPLINE BASED ROBUST TOPOLOGY OPTIMIZATION

Technical Publication. DETC2015-46076

Yu Gu, Illinois Institute of Technology, Chicago, IL, United States, Xiaoping Qian, University of Wisconsin, Madison, Madison, WI, United States

TOWARDS NONLINEAR MULTIMATERIAL TOPOLOGY OPTIMIZATION USING UNSUPERVISED MACHINE LEARNING AND METAMODEL-BASED OPTIMIZATION

Technical Publication. DETC2015-46534

Kai Liu, Andres Tovar, Indiana University-Purdue University Indianapolis, Indianapolis, IN, United States, Emily Nutwell, Duane Detwiler, Honda R&D Americas, Raymond, OH, United States

A SET-BASED DESIGN METHOD FOR MATERIAL-GEOMETRY STRUCTURES BY DESIGN SPACE MAPPING

Technical Publication. DETC2015-46760

David Rosen, Georgia Institute of Technology, Marietta, GA, United States

ON DESIGN OF MECHANICAL METAMATERIALS USING LEVEL SET BASED TOPOLOGY OPTIMIZATION

Technical Publication. DETC2015-47518

Xiao Wang, Shikui Chen, Lei Zuo, Stony Brook University, Stony Brook, NY, United States

TOPOLOGY OPTIMIZATION OF CELLULAR MATERIALS WITH MAXIMIZED ENERGY ABSORPTION

Technical Publication. DETC2015-47757

Josephine Carstensen, Reza Lotfi, Johns Hopkins University, Baltimore, MD, United States, Wen Chen, Jan Schroers, Yale University, New Haven, CT, United States, James Guest, Johns Hopkins University, Baltimore, MD, United States

**DEC-1
New Topics & Content in Design Courses****DEC-1-1
NEW TOPICS & CONTENT IN DESIGN COURSES**

Room 105

8:00 am - 9:30am

Session Chair: Bryony Dupont, Oregon State University, Corvallis, OR, United States

Session Co-Chair: Jeffrey Mountain, Norwich University, Northfield, VT, United States

DEVELOPMENT OF ENGINEERING UNCERTAINTY REPOSITORY

Technical Publication. DETC2015-46172

Xiaoping Du, Missouri University Of Science And Technology, Rolla, MO, United States

STUDYING THE IMPACT OF INCORPORATING AN ADDITIVE MANUFACTURING BASED DESIGN EXERCISE IN A LARGE, FIRST YEAR TECHNICAL DRAWING

AND CAD COURSE

Technical Publication. DETC2015-47312

Tian Chen, Paul Egan, Fritz Stöckli, Kristina Shea, ETH Zurich, Zurich, Switzerland

INTEGRATING PLC THEORY AND PROGRAMMING INTO ADVANCED CONTROLS COURSES

Technical Publication. DETC2015-46868

Alexander S. Miller, William Singhose, Georgia Technology, Atlanta, GA, United States, Urs Glauser, Zurich University of Applied Sciences, Winterthur, Switzerland

IMPLEMENTING CREATIVITY EVALUATION TOOLS INTO THE CONCEPT SELECTION PROCESS IN ENGINEERING EDUCATION

Technical Publication. DETC2015-47396

Elizabeth Starkey, Chris Gosnell, Scarlett Miller, Pennsylvania State University, University Park, PA, United States

IMPROVING SENIOR DESIGN STUDENT PERFORMANCE THROUGH INTEGRATION OF PRESENTATION INTERVENTION PLAN

Technical Publication. DETC2015-47604

Amanda Bessette, Beshoy Morkos, Florida Institute of Technology, Melbourne, FL, United States, Shraddha Sangelkar, Pennsylvania State University Erie, Erie, PA, United States

DFMLC-1 Integrated Product and Process Development

DFMLC-1-1 INTEGRATED PRODUCT AND PROCESS DEVELOPMENT

Level 1, Hynes CC, Room 107 8:00am – 9:40am

Session Chair: Romain Farel, PS2E, Jouy-en-Josas, France

Session Co-Chair: Qingjin Peng, University of Manitoba, Winnipeg, MB, Canada

A MANUFACTURING AGENT TO RETRIEVE MACHINING

KNOWLEDGE IN MODEL-BASED MANUFACTURING

Technical Publication. DETC2015-46046

Lei Yang, General Electric Global Research Center, Shanghai, China, Charles R. Gilman, General Electric Global Research Center, Niskayuna, NY, United States, Ming Jia, General Electric Global Research Center, Shanghai, China

A NOVEL METHOD OF NORMAL ESTIMATION FOR 3D SURFACE RECONSTRUCTION

Technical Publication. DETC2015-46484

Xiaocui Yuan, Nanchang University, Nanchang, China, Qingjin Peng, University of Manitoba, Winnipeg, MB, Canada, Lushen Wu, Huawei Chen, Nanchang University, Nanchang, China

DESIGN COUPLING SEQUENCE: A SEQUENCE OF FUNCTIONAL COUPLING CONCEPTS TO REDUCE THE COMPLEXITY FOR THE CONCEPT IMPROVEMENT

Technical Publication. DETC2015-46956

Chu-Yi Wang, Stephen C. Lu, Ang Liu, University of Southern California, Los Angeles, CA, United States

RISK IDENTIFICATION METHOD FOR ENGINEERING DESIGN PROJECT BASED ON RISK CHAIN MECHANISM MODEL

Technical Publication. DETC2015-47155

Yutaka Nomaguchi, Chunzhi Dong, Hirota Nakashima, Kikuo Fujita, Osaka University, Suita, Osaka, Japan

STUDY ON LIFE ENHANCEMENT OF INJECTION MOLDS THROUGH STATIC AND FATIGUE STRESS ANALYSIS

Technical Publication. DETC2015-47988

Srinivasa P. Regalla, Arun K. Bethavolu, BITS Pilani, Hyderabad, Telangana, India

DTM-2 Creativity and Ideation

**DTM-2-1
CREATIVITY AND IDEATION I**

Level 1, Hynes CC, Room 104 8:00am – 9:40am

Session Chair: Alice Agogino, University of California Berkeley, Berkeley, CA, United States

Session Co-Chair: Katja Holtta-Otto, Singapore University of Technology and Design, Singapore

THE WAY MAKERS PROTOTYPE: PRINCIPLES OF DIY DESIGN

Technical Publication. DETC2015-46295

Bradley Camburn, Karen Hui En Sng, K. Blake Perez, Kevin Otto, Singapore University of Technology & Design, Singapore, Singapore, Daniel Jensen, United States Air Force Academy, Colorado Springs, CO, United States, Rich Crawford, University of Texas, Austin, TX, United States, Kristin Wood, Singapore University of Technology and Design, Singapore, Singapore

PATTERNS OF CREATIVE DESIGN: PREDICTING IDEATION FROM PROBLEM FORMULATION

Technical Publication. DETC2015-46537

Mahmoud Dinar, Yong-Seok Park, Jami Shah, Arizona State University, Tempe, AZ, United States, Pat Langley, The University of Auckland, Auckland, New Zealand

CREATIVITY PREDICTORS: FINDINGS FROM DESIGN-BY-ANALOGY IDEATION METHODS? LEARNING AND PERFORMANCE

Technical Publication. DETC2015-47929

Diana Moreno, Lucienne Blessing, University of Luxembourg, Luxembourg, Luxembourg, Kristin Wood, Singapore University of Technology and Design, Singapore, Singapore, Claus VÖgele, University of Luxembourg, Luxembourg, Luxembourg, Alberto Hernandez, Tecnológico de Monterrey (ITESM), Monterrey, Mexico

DISCOVERY OF MENTAL METADATA USED FOR ANALOGY FORMATION IN FUNCTION-BASED DESIGN

Technical Publication. DETC2015-46963

Ryan Arlitt, Oregon State University, Corvallis, OR, United States, Chiradeep Sen, Florida Institute Of Technology, Melbourne, FL,

United States, Anthony Nix, Robert Stone, Oregon State University, Corvallis, OR, United States

MY IDEA IS BEST! OWNERSHIP BIAS AND ITS INFLUENCE ON ENGINEERING CONCEPT SELECTION

Technical Publication. DETC2015-46478

Christine Toh, Arti Patel, Andrew Strohmetz, Scarlett Miller, Pennsylvania State University, University Park, PA, United States

**MESA-8
Fractional Derivatives and Their Applications**

**MESA-8-1
UNIVERSAL FRACTIONAL CALCULUS**

Level 1, Hynes CC, Room 111 8:00am – 9:40am

Session Chair: Nima Rafibakhsh, Oregon State University, Corvallis, OR, United States

Session Co-Chair: Shun Takai, Northern Illinois University, DeKalb, IL, United States

IS OUR UNIVERSE ACCELERATING DYNAMICS FRACTIONAL ORDER?

Technical Publication. DETC2015-46216

Caibin Zeng, South China University of Technology, Guangzhou, Guangdong, China, YangQuan Chen, University of California, Merced, Merced, CA, United States, Igor Podlubny, Technical University of Kosice, Kosice, Slovakia

MATHEMATICAL CLASSIFICATION OF THE SPIRAL AND RING GALAXY MORPHOLOGIES BASED ON THE FRACTIONAL TRIGONOMETRY

Technical Publication. DETC2015-46279

Carl F. Lorenzo, NASA Glenn Research Center, Cleveland, OH, United States, Tom Hartley, University of Akron, Columbus, OH, United States

QUANTITATIVE ANALYSIS OF SINGULARITIES FOR FRACTIONAL ORDER SYSTEMS

Technical Publication. DETC2015-46879

Yan Li, Shandong University, Jinan, Shandong, China, YangQuan Chen, University of California, Merced, Merced, CA, United States

CONSTRAINED CONTROL FOR BRUSHLESS DC MOTORS WITH FRACTIONAL FRICTION COMPENSATION

Technical Publication. DETC2015-47508

Yanan Qiu, Zhiyong Dai, Northwestern Polytechnical University, Xi'an, Shaanxi, China, YangQuan Chen, University of California Merced, Merced, CA, United States, Xiaogeng Liang, Northwestern Polytechnical University, Xi'an, Shaanxi, China

**MESA-10
Mechatronics for Electrical Vehicular Systems**

**MESA-10-1
MECHATRONICS FOR ELECTRICAL VEHICULAR SYSTEMS**

Level 1, Hynes CC, Room 110 8:00am - 9:40am

Session Chair: Szauter Ferenc, Szechenyi Istvan University, Gyor, Hungary

Session Co-Chair: Dávid Czeglédi, Széchenyi István University, Gyor, Hungary

OPTIMIZATION OF REAL-TIME BASED INFO-COMMUNICATION SYSTEM FOR COLLECTING SELECTIVE WASTE

Technical Publication. DETC2015-46720

Ádám Titrik, István Lakatos, Széchenyi István University, Gyor, Hungary, Dávid Czeglédi, Széchenyi István University, Gyor, Hungary

DETERMINATION OF POWER AND TORQUE CURVES OF ELECTRIC DRIVEN VEHICLES BASED ON DIAGNOSTIC METHODS

Technical Publication. DETC2015-46724

István Lakatos, Dániel Pup, Széchenyi István University, Gyor, Hungary, Dávid Czeglédi, Széchenyi István University, Gyor, Hungary

COMPLEX ANALYSIS OF THE DYNAMIC EFFECTS OF CAR POPULATION ALONG THE TRAJECTORIES

Technical Publication. DETC2015-47075

Szauter Ferenc, Szechenyi Istvan University, Gyor, Hungary, Peter Tamas, Budapesti Muszaki Egyetem, Budapest, Hungary, Bokor Jozsef, MTA - Hungarian Academy of Sciences, Budapest, Hungary

ANALYSIS OF THE COMPLEX ENVIRONMENTAL IMPACT ON URBAN TRAJECTORIES

Technical Publication. DETC2015-47077

Peter Tamas, Budapesti Muszaki Egyetem, Budapest, Hungary, István Lakatos, Széchenyi István University, Gyor, Hungary, Szauter Ferenc, Szechenyi Istvan University, Gyor, Hungary

**MR-1
Planar Mechanism Analysis and Synthesis**

**MR-1-1
PLANAR SYNTHESIS I**

Level 2, Hynes CC, Room 204 8:00am - 9:40am

Session Chair: Ronald Zimmerman, MAGNA Seating of America, White Lake, MI, United States

Session Co-Chair: Kaustubh Sonawale, University of California Irvine, Irvine, CA, United States

REDUCING STRUCTURAL ERROR IN FUNCTION GENERATING MECHANISMS VIA THE ADDITION OF LARGE NUMBERS OF FOUR-BAR MECHANISMS

Technical Publication. DETC2015-47457

Hessein Ali, Andrew Murray, David Myszka, University of Dayton, Dayton, OH, United States

DESIGN OF EIGHT-BAR LINKAGES FOR RECTILINEAR MOTION

Technical Publication. DETC2015-47804

Kaustubh Sonawale, J. Michael McCarthy, University Of California, Irvine, Irvine, CA, United States

PLANAR LINKAGE SYNTHESIS FOR FUNCTION GENERATION USING POLES AND ROTATION ANGLES

Technical Publication. DETC2015-46240

Ronald Zimmerman, MAGNA Seating of America, White Lake, MI, United States

THE SADDLE POINT PROGRAMMING OF THE CIRCLE AND SLIDING POINT FOR KINEMATIC SYNTHESIS OF PLANAR LINKAGES

Technical Publication. DETC2015-47057

Delun Wang, Wei Wang, Dalian University of Technology, Dalian, China, Shudong Yu, Ryerson University, Mississauga, ON, Canada

ON THE SYNTHESIS OF THREE-POSITIONS RIGID-BODY GUIDANCE MECHANISMS

Technical Publication. DETC2015-46874

Giorgio Figliolini, Pierluigi Rea, University of Cassino and Southern Lazio, Cassino, Italy

MR-2
Spatial/Spherical Mechanism Analysis and Synthesis
MR-2-1
KINEMATIC AND SINGULARITY ANALYSIS METHODS

Level 2, Hynes CC, Room 206 8:00am – 9:40am

Session Chair: Giorgio Figliolini, DiCEM/University of Cassino & Southern Lazio, Cassino, Italy

Session Co-Chair: Offer Shai, Tel Aviv University, Ramat Aviv, Israel, Xianwen Kong, Heriot-Watt University, Edinburgh, Scotland

RECONFIGURATION ANALYSIS OF A 2-DOF 3-4R PARALLEL MANIPULATOR WITH PLANAR BASE AND PLATFORM

Technical Publication. DETC2015-46219

Xianwen Kong, Heriot-Watt University, Edinburgh, Scotland, Jingjun Yu, Beihang University, Beijing, China, Duanling Li, BUPT, Beijing, China

KINEMATIC ANALYSIS OF SPHERICAL FOUR-BAR LINKAGES VIA THE INFLECTION CUBIC AND THALES ELLIPSE

Technical Publication. DETC2015-47571

Giorgio Figliolini, DiCEM/University of Cassino & Southern Lazio, Cassino, Italy, Jorge Angeles, McGill University, Montreal, QC, Canada

COMBINATORIAL METHOD FOR CHARACTERIZING SINGULAR CONFIGURATIONS IN PARALLEL MECHANISMS

Technical Publication. DETC2015-46755

Avshalom Sheffer, Offer Shai, Tel Aviv University, Ramat Aviv, Israel

KINEMATIC ANALYSIS OF A 3-PSP SPATIAL MOTION PLATFORM

Technical Publication. DETC2015-48068

Luc Baron, Ecole Polytechnique, Montreal, QC, Canada

INVERSE KINEMATICS OF DISCRETELY ACTUATED BALL-JOINT MANIPULATORS USING WORKSPACE DENSITY

Technical Publication. DETC2015-46803

Hui Dong, Harbin Institute of Technology, Harbin, Heilongjiang, China, Taosha Fan, Johns Hopkins University, Baltimore, MD, United States, Zhijiang Du, Harbin Institute of Technology, Harbin, Heilongjiang, China, Gregory Chirikjian, Johns Hopkins University, Baltimore, MD, United States

MR-6
Compliant Mechanisms and Micro/Nano Mechanisms (A. Midha Symposium)
MR-6-1
COMPLIANT MECHANISMS FAST FORWARD AND INTERACTIVE I

Level 2, Hynes CC, Room 210 8:00am – 9:40am

Session Chair: Nima Tolou, Delft University of Technology, Delft, Netherlands

Session Co-Chair: Guimin Chen, Xidian University, Xi'an, Shaanxi, Shaanxi, China

EXTENDED NONLINEAR ANALYSIS OF EXACTLY-CONSTRAINED COMPLIANT COMPOUND PARALLELOGRAM MECHANISMS

Technical Publication. DETC2015-46158

Guangbo Hao, Haiyang Li, University College Cork, Cork, Ireland, George Joseph, National Institute of Technology Calicut, Kozhikode, India

SYNTHESIS OF CONSTANT TORQUE COMPLIANT MECHANISMS

Technical Publication. DETC2015-46179

Hong Zhou, Hari N. Prakashah, Texas A&M University-Kingsville, Kingsville, TX, United States

MODELING LARGE SPATIAL DEFLECTIONS OF SLENDER BISYMMETRIC BEAMS IN COMPLIANT MECHANISMS USING CHAINED SPATIAL-BEAM-CONSTRAINT-MODEL (CSBCM)

Technical Publication. DETC2015-46387

Guimin Chen, Ruiyu Bai, Xidian University, Xi'an, Shaanxi, Shaanxi, China

DECOUPLED COMPLIANT MECHANISM RECONFIGURATION BASED ON POSITION SPACE CONCEPT FOR REDUCING PARASITIC MOTION

Technical Publication. DETC2015-46434

Haiyang Li, Guangbo Hao, University College Cork, Cork, Ireland

TOPOLOGY OPTIMIZATION OF LARGE-DISPLACEMENT FLEXURE HINGES

Technical Publication. DETC2015-46444

Min Liu, Xianmin Zhang, South China University Of Technology, Guangzhou, China, Sergej Fatikow, University of Oldenburg, Oldenburg, Germany

CONSTRAINT-FORCE-BASED (CFB) MODELLING OF COMPLIANT MECHANISMS

Technical Publication. DETC2015-46481

Haiyang Li, Guangbo Hao, University College Cork, Cork, Ireland

PSEUDO-RIGID BODY MODELS FOR END-LOADED HEAVY CANTILEVER BEAMS

Technical Publication. DETC2015-46526

Philip J. Logan, Craig Lusk, The University of South Florida, Tampa, FL, United States

AN ANALYTICAL FORMULATION FOR THE LATERAL SUPPORT STIFFNESS OF A SPATIAL FLEXURE STRIP

Technical Publication. DETC2015-46591

Marijn Nijenhuis, University of Twente, Enschede, Overijssel, Netherlands, J.P. Meijaard, Olton Engineering Consultancy, Enschede, Netherlands, J.L. Herder, University of Twente, Enschede, Netherlands, Shorya Awtar, University of Michigan, Ann Arbor, MI, United States, D. M. Brouwer, University of Twente, Enschede, Netherlands

A METHOD FOR DETERMINING LOAD-DEPENDENT STIFFNESS OF FLEXURES

Technical Publication. DETC2015-46628

Ezekiel Merriam, Jared Bruton, Spencer Magleby, Larry Howell, Brigham Young University, Provo, UT, United States

A SHAPE-CONTROLLED COMPLIANT MICROARCHITECTURED MATERIAL

Technical Publication. DETC2015-46643

Luke Shaw, Jonathan Hopkins, University of California Los Angeles, Los Angeles, CA, United States

A VARIABLE-STIFFNESS STRAIGHT-LINE COMPLIANT MECHANISM

Technical Publication. DETC2015-46650

Jeffrey Hawks, Mark Colton, Larry Howell, Brigham Young University

ty, Provo, UT, United States

DESIGN OF A CONSTANT-FORCE FLEXURE MICROPOSITIONING STAGE WITH LONG STROKE

Technical Publication. DETC2015-46672

Qingsong Xu, University of Macau, Macau, Macau

A FULLY COMPLIANT CONSTANT VELOCITY UNIVERSAL JOINT

Technical Publication. DETC2015-46813

Davood Farhadi Machekposhti, Nima Tolou, Justus Herder, Delft University of Technology, Delft, South Holland, Netherlands

CONCEPTUAL DESIGN OF 2-DOF FLEXURE-BASED SENSING MECHANISMS FOR SUPERCONDUCTOR GRAVITY GRADIENT

Technical Publication. DETC2015-46827

Ming Jia, Ruipeng Jia, Jingjun Yu, Beihang University, Beijing, China

MR-7

Medical and Rehabilitation Robotics

MR-7-1

LATEST RESULTS IN MEDICAL ROBOTICS

Level 2, Hynes CC, Room 202

8:00am – 9:40am

Session Chair: Keisuke Arikawa, Kanagawa Institute Of Technology, Kanagawa, Japan

Session Co-Chair: Venkat Krovi, University at Buffalo, Buffalo, NY, United States

ROBOTIC PHYSICAL EXERCISE AND SYSTEM (ROPES): A CABLE-DRIVEN ROBOTIC REHABILITATION SYSTEM FOR LOWER-EXTREMITY MOTOR THERAPY

Technical Publication. DETC2015-46393

Aliakbar Alamdari, Venkat Krovi, University at Buffalo, Buffalo, NY, United States

THE DESIGN AND MANUFACTURING FOR A NOVEL ROLLING CONTACT GRIPPING MECHANISM

Technical Publication. DETC2015-46516

Clayton Grames, Jordan Tanner, Brian Jensen, Spencer Magleby, Larry Howell, Brigham Young University, Provo, UT, United States, Ryan Steger, Intuitive Surgical, Sunnyvale, CA, United States

DESIGN OF A PARTIALLY COMPLIANT, THREE-PHALANX UNDERACTUATED PROSTHETIC FINGER

Technical Publication. DETC2015-47055

Marco Groenewegen, Milton Aguirre, Justus Herder, Delft University of Technology, Delft, Netherlands

DESIGN AND CONTROL OF A THREE FINGER HAND EXOSKELETON FOR TRANSLATION AND ROTATION OF A SLENDER OBJECT

Technical Publication. DETC2015-47058

Shyam Sunder Nishad, Anupam Saxena, Ashish Dutta, Indian Institute of Technology Kanpur, Kanpur, Uttar Pradesh, India

ANALYZING MOTION PROPERTIES OF PROTEINS AFFECTED BY LOCALIZED STRUCTURES FROM A ROBOT KINEMATICS PERSPECTIVE

Technical Publication. DETC2015-47010

Keisuke Arikawa, Kanagawa Institute Of Technology, Kanagawa, Japan

MR-10

Origami-Based Engineering Design

MR-10-1

DESIGN AND OPTIMIZATION OF ORIGAMI MECHANISMS

Level 2, Hynes CC, Room 203

8:00am – 9:40am

Session Chair: James Joo, Air Force Research Laboratory, Wright-Patterson Air Force Base, OH, United States

Session Co-Chair: Hai-Jun Su, The Ohio State University, Columbus, OH, United States

THE KINEMATIC PRINCIPLE FOR DESIGNING DNA ORIGAMI MECHANISMS: CHALLENGES AND OPPORTUNITIES

Technical Publication. DETC2015-46833

Hai-Jun Su, Carlos Castro, Alexander Marras, Lifeng Zhou, The Ohio State University, Columbus, OH, United States

DESIGN OPTIMIZATION AND CHALLENGES OF LARGE FOLDING ORIGAMI STRUCTURES

Technical Publication. DETC2015-47420

Kazuko Fuchi, Wright State Research Institute, Beavercreek, OH, United States, Philip R. Buskohl, Giorgio Bazzan, UES, Inc., Beavercreek, OH, United States, Michael F. Durstock, Gregory Reich, Richard A. Vaia, James Joo, Air Force Research Laboratory, Wright-Patterson Airforce Base, OH, United States

OPTIMIZATION OF A DYNAMIC MODEL OF MAGNETIC ACTUATION OF AN ORIGAMI MECHANISM

Technical Publication. DETC2015-47458

Landen Bowen, Kara Springsteen, Mary Frecker, Timothy Simpson, Pennsylvania State University, University Park, PA, United States

A PRELIMINARY PROCESS FOR UNDERSTANDING ORIGAMI-ADAPTED DESIGN

Technical Publication. DETC2015-47559

Jessica Morgan, Spencer Magleby, Brigham Young University, Provo, UT, United States, Robert Lang, Robert J. Lang Origami, Alamo, CA, United States, Larry Howell, Brigham Young University, Provo, UT, United States

DESIGN AND OPTIMIZATION OF A WATERPROOF SHAPE-SHIFTING SURFACE

Technical Publication. DETC2015-47595

Andrew Katz, Craig Lusk, The University of South Florida, Tampa, FL, United States

**MNS-1/MSNDC-1/VIB-1
Dynamics of MEMS and NEMS**

**MNS-1-1/MSNDC-1-1/VIB-1-1
DYNAMICS OF MEMS AND NEMS I**

Level 3, Hynes CC, Room 307

8:00am – 9:40am

Session Chair: Slava Krylov, Tel Aviv University, Tel Aviv, Israel

Session Co-Chair: Mohammad Younis, Binghamton University, Binghamton, NY, United States

TOWARDS AN EVALUATION OF STIFFNESS PARAMETERS OF MICRO-BEAMS

Technical Publication. DETC2015-47098

Salem Bashmal, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia

FREE VIBRATION OF MICROMEMBRANES SUBJECT TO PRESTRESS AND PRESSURE

Technical Publication. DETC2015-46365

Andrea Arena, Walter Lacarbonara, Sapienza University of Rome, Rome, Italy

STATIC EQUILIBRIUM ANALYSIS OF A CANTILEVER MEMS/NEMS CAPACITIVE SWITCH MODEL

Technical Presentation Only. DETC2015-47529

Devin Kalafut, Anil Bajaj, Arvind Raman, Purdue University, West Lafayette, IN, United States

LATCHING CRITERIA IN BISTABLE PRESTRESSED CURVED MICRO BEAMS

Technical Publication. DETC2015-47036

Lior Medina, Tel Aviv University, Tel Aviv, Israel, Rivka Gilat, Ariel University, Ariel, Israel, Slava Krylov, Tel Aviv University, Tel Aviv, IL, Israel

AN EXPERIMENTAL INVESTIGATION OF THE DYNAMIC BEHAVIOR OF AN IN-PLANE MEMS SHALLOW ARCH UNDER ELECTROSTATIC EXCITATION

Technical Publication. DETC2015-47070

Abdallah Ramini, Abdullah Hafiz, Mohammed Bellaredj, Qais M Al Hennawi, Thuwal, Jeddah, Saudi Arabia, Mohammad Younis, King Abdullah University of Science & Technology, Thuwal, Saudi Arabia

MSNDC-5/VIB-5
Nonlinear Dynamical Systems and Phenomena

MSNDC-5-1 /VIB-5-1
NONLINEAR DYNAMICS OF CONTINUOUS SYSTEMS

Level 3, Hynes CC, Room 304 8:00am - 9:40am

Session Chair: Phillip Bayly, Washington University, Saint Louis, MO, United States

Session Co-Chair: Paulo B. Goncalves, Pontifical Catholic University, Rio de Janeiro, RJ, Brazil

NONLINEAR DYNAMICS OF FUNCTIONALLY GRADED CYLINDRICAL SHELLS WITH INTERNAL FLUID

Technical Publication. DETC2015-46038

Roger O.P. Montes, Frederico Silva, Zenón Del Prado, Federal University of Goiás, Goiânia, Brazil, Paulo B. Goncalves, Pontifical Catholic University, Rio de Janeiro, Brazil

NONLINEAR DYNAMICS OF A COMPOSITE CARBON NANOTUBES THIN SHELL

Technical Publication. DETC2015-46182

Xiangying Guo, Wei Zhang, Beijing University of Technology, Beijing, China

UNSTABLE OSCILLATIONS AND NONLINEAR WAVE PROPAGATION IN FLAGELLA

Technical Publication. DETC2015-46920

Phillip Bayly, Kate Wilson, Washington University in Saint Louis, Saint Louis, MO, United States

EXPERIMENTS ON BUCKLING AND SELF-EXCITED OSCILLATION OF A PIPE CONVEYING FLUID WITH A SPRING SUPPORT

Technical Presentation Only. DETC2015-46411

Kiyotaka Yamashita, Kouki Segawa, Fukui University of Technology, Fukui, Japan, Xiaoxin Chen, University of Tsukuba, Ibaraki, Japan

MULTI-PULSE CHAOTIC DYNAMICS OF FOUR-DIMENSIONAL NON-AUTONOMOUS NONLINEAR SYSTEM FOR A TRUSS CORE SANDWICH PLATE

Technical Publication. DETC2015-46284

Qiliang Wu, Wei Zhang, Beijing University of Technology, Beijing, China

MSNDC-10/VIB-10
Vehicle Dynamics

MSNDC-10-1/VIB-10-1
VEHICLE DYNAMICS I

Level 3, Hynes CC, Room 308 8:00am - 9:40am

Session Chair: Rudranarayan Mukherjee, Jet Propulsion Laboratory, Pasadena, CA, United States

Session Co-Chair: Paramsothy Jayakumar, US Army TARDEC, Warren, MI, United States

A SURROGATE DISCRETE ELEMENT METHOD FOR TERRAMECHANICS SIMULATION OF GRANULAR LOCOMOTION

Technical Publication. DETC2015-46104

William Smith, RDECOM-TARDEC, Warren, MI, United States, Huei Peng, University of Michigan, Ann Arbor, MI, United States

HIGH-FIDELITY MULTIBODY DYNAMICS VEHICLE MODEL COUPLED WITH A COHESIVE SOIL DISCRETE ELEMENT MODEL FOR PREDICTING VEHICLE MOBILITY

Technical Publication. DETC2015-47134

Tamer Wasfy, Indiana University Purdue University Indianapolis, Indianapolis, IN, United States, Hatem Wasfy, Jeanne Peters, Advanced Science and Automation Corp., Hampton, VA, United States

CHRONO::VEHICLE: MODELING AND SIMULATION USING TEMPLATES

Technical Presentation Only. DETC2015-47447

Radu Serban, Justin Madsen, Daniel Melanz, University of Wisconsin – Madison, Madison, WI, United States, Alessandro Tasora, Università di Parma, Parma, Italy, Michael Taylor, Dan Negrut, University of Wisconsin – Madison, Madison, WI, United States

MOBILITY OF MULTI-AXLE WHEELED ROBOTS ON SOFT TERRAIN

Technical Presentation Only. DETC2015-47496

Bahareh Ghotbi, McGill University, Montreal, QC, Canada, Francisco Gonzalez, University of La Coruña, Ferrol, Spain, Jozsef Kovecses, Jorge Angeles, McGill University, Montreal, QC, Canada

MODELING GRANULAR TERRAIN - VEHICLE INTERACTION USING CHRONO::VEHICLE

Technical Presentation Only. DETC2015-47886

Daniel Melanz, Hammad Mazhar, Radu Serban, Dan Negrut, University of Wisconsin – Madison, Madison, WI, United States

**MSNDC-15
Computational Methods in Multibody Systems**

**MSNDC-15-1
APPLICATION OF COMPUTATIONAL METHODS**

Level 3, Hynes CC, Room 305 8:00am – 9:40am

Session Chair: Jeremy Laflin, Rensselaer Polytechnic Institute, Troy, NY, United States

Session Co-Chair: Kurt Anderson, Rensselaer Polytechnic Institute, Troy, NY, United States

DYNAMICS OF SPACE DEPLOYABLE STRUCTURES

Technical Publication. DETC2015-46159

Qiang Tian, Beijing Institute of Technology, Beijing, China, Jiang Zhao, Xi'an Institute of Space Radio Technology, Xi'an, Shaanxi, China, Cheng Liu, Chunyan Zhou, Haiyan Hu, Beijing Institute of Technology, Beijing, China

ISSUES IN TESTING ALGORITHMS WITH SYNTHETIC

DATA TO SOLVE FRICTIONAL CONTACT DYNAMICS IN MULTIBODY SYSTEM

Technical Publication. DETC2015-46276

Ying Lu, Jeffrey Trinkle, Rensselaer Polytechnic Institute, Troy, NY, United States

EFFICIENT ANALYSIS OF THE DEEP-SEABED INTEGRATED MINING SYSTEM WITH SUBSYSTEM SYNTHESIS METHOD

Technical Publication. DETC2015-46700

Sung-Soo Kim, Hongseon Yun, Chungnam National University, Daejeon, Republic of Korea, Chang-Ho Lee, Hyung-Woo Kim, Sup Hong, Korea Research Institute of Ships and Ocean Engineering, Daejeon, Republic of Korea

INTEGRATION OF ANCF AND DISCRETE ELEMENT METHOD FOR MULTIBODY VEHICLE APPLICATIONS

Technical Presentation Only. DETC2015-47880

Ulysses Contreras, Brynne Nicolsen, University of Illinois at Chicago, Chicago, IL, United States, Qiang Tian, Beijing Institute of Technology, Beijing, China, Antonio M. Recuero, Ahmed A. Shabana, University of Illinois, Chicago, IL, United States

A QP-BASED APPROACH TO KINEMATIC MOTION PLANNING OF MULTIBODY SYSTEMS

Technical Publication. DETC2015-48096

Junggon Kim, Rudranarayan Mukherjee, Jet Propulsion Laboratory, Pasadena, CA, United States

**PTG-1
Gear Geometry**

**PTG-1-1
GEAR GEOMETRY**

Level 1, Hynes CC, Room 108 8:00am – 9:40am

Session Chair: Qi Fan, Gleason Works, Rochester, NY, United States

Session Co-Chair: Robert Handschuh, NASA Glenn Research Center, Cleveland, OH, United States

STUDY ON INDUCED PRINCIPAL CURVATURE AND INDUCED PRINCIPAL DIRECTION BASED ON NORMAL VECTOR OF INSTANTANEOUS CONTACT LINE

Technical Publication. DETC2015-46256

Yaping Zhao, Chenru Xi, Yimin Zhang, Northeastern University China, Shenyang, Liaoning, China

THE GENERATION PRINCIPLE AND MATHEMATICAL MODELS OF DOUBLE-ENVELOPING INTERNAL GEAR PAIRS

Technical Publication. DETC2015-46675

Xuan Li, Bingkui Chen, Chongqing University, Chongqing, China, Yawen Wang, Guohua Sun, Teik C. Lim, University of Cincinnati, Cincinnati, OH, United States

DESIGN AND STATIC STRESS ANALYSIS OF POINT CONTACT DOUBLE PARABOLIC GEARS

Technical Publication. DETC2015-46745

Yunfei Xiang, Hui Guo, Ning Zhao, Northwestern Polytechnical University, Xi'an, Shannxi, China, Shuyan Zhang, Xi'an University of Architecture & Technology, Xi'an, Shannxi, China

A DESIGN METHOD FOR THE PINION OF A SPIRAL BEVEL GEAR DRIVE ADMITTING FULL CONTROL ON THE CONTACT AREA AND THE TRANSMISSION ERROR

Technical Publication. DETC2015-47182

baozhen lei, Beijing Union University, Beijing, China, Harald Löwe, Technical University of Braunschweig, Braunschweig, Germany, YuQiang Feng, Jimei University, Xiamen, China, XunWei Wang, Beijing Union University, Beijing, China

REVISITING PLANE-GENERATED GEAR TOOTH SURFACES: A NOVEL DESIGN PERSPECTIVE

Technical Publication. DETC2015-47327

Alessio Artoni, Massimo Guiggiani, University of Pisa, Pisa, Italy

RASFP-1

Design Methods and Analyses

RASFP-1-1

RELIABILITY AND FAILURE PREVENTION

Level 1, Hynes CC, Room 109

8:00am - 9:40am

Session Chair: Erol Sancaktar, University of Akron, Akron, OH, United States

A COMPREHENSIVE RELIABILITY ALLOCATION METHOD OF FEED MIXERS BASED ON FUZZY SYNTHETIC ASSESSMENT

Technical Publication. DETC2015-46568

Dong Yang, Yu Sun, Kai Wu, Nanjing University of Science and Technology, Nanjing, China

SEQUENTIAL MULTIDISCIPLINARY DESIGN OPTIMIZATION AND RELIABILITY ANALYSIS USING AN EFFICIENT THIRD-MOMENT SADDLEPOINT APPROXIMATION METHOD

Technical Publication. DETC2015-46664

Debiao Meng, Hong-zhong Huang, Huanwei Xu, Xiaoling Zhang, Yan-Feng Li, University of Electronic Science and Technology of China, Chengdu, Sichuan, China

RESEARCH ON SURROGATE MODEL BASED ON LOCAL RADIAL POINT INTERPOLATION METHOD

Technical Publication. DETC2015-46689

Rongqiao Wang, Jianxing Mao, Dianyin Hu, Beihang University, Beijing, China

SERVICE-LIFE ASSESSMENT OF COMPLEX DYNAMIC SYSTEMS UNDER INTERVAL UNCERTAINTY BASED ON BAYESIAN NETWORKS

Technical Publication. DETC2015-47113

Jinhua Mi, Yan-Feng Li, Weiwen Peng, Yuanjian Yang, Hong-zhong Huang, University of Electronic Science & Technology of China, Chengdu, Sichuan, China

EXTENSIONS OF BAYESIAN RELIABILITY ANALYSIS

BY USING IMPRECISE DIRICHLET MODEL

Technical Publication. DETC2015-47183

Zheng Liu, Yan-Feng Li, Yuanjian Yang, Jinhua Mi, Hong-zhong Huang, University of Electronic Science & Technology of China, Chengdu, Sichuan, China

**MSNDC-2/VIB-2
Structures and Continuous Systems**

**MSNDC-2/VIB-2-1
STRUCTURES AND CONTINUOUS SYSTEMS I**

Level 3, Hynes CC, Room 302 8:00am – 9:40am

Session Chair: Dumitru Caruntu, University of Texas Pan American, Edinburg, TX, United States

Session Co-Chair: Bogdan I. Epureanu, University of Michigan, Ann Arbor, MI, United States, Christopher Cooley, Southern Illinois University-Carbondale, Carbondale, IL, United States

PARAMETRIC RESONANCE OF MEMS CIRCULAR PLATE RESONATORS

Technical Publication. DETC2015-46584

Dumitru Caruntu, Reynaldo Oyervides, University of Texas Pan American, Edinburg, TX, United States

NONLINEAR VIBRATIONS OF CARBON NANOTUBE RESONATORS CONSIDERING HIGHER MODES

Technical Publication. DETC2015-46860

Hassan Askari, Ebrahim Esmailzadeh, University of Ontario Institute of Technology, Oshawa, ON, Canada

PARAMETRIC INSTABILITY OF HIGH-SPEED ROTATING ELASTIC RINGS COUPLED TO SPACE-FIXED, FLUCTUATING DISCRETE STIFFNESSES

Technical Presentation Only. DETC2015-47091

Chunguang Liu, Shanghai Jiao Tong University, Shanghai, Shanghai, China, Christopher G. Cooley, Southern Illinois University Carbondale, Carbondale, IL, United States, Robert Parker, Virginia Tech, Blacksburg, VA, United States

EIGENVALUE SENSITIVITY TO MODEL PARAMETERS AND VEERING IN HIGH-SPEED GYROSCOPIC SYSTEMS

Technical Presentation Only. DETC2015-47543

Christopher G. Cooley, Southern Illinois University Carbondale, Carbondale, IL, United States, Robert Parker, Virginia Tech, Blacksburg, VA, United States

A RELATIVE-COMPONENT MODE SYNTHESIS APPROACH AND MODE ACCELERATION: APPLICATION TO BLISKS WITH LARGE BLENDS AND MISTUNING

Technical Presentation Only. DETC2015-48111

Bogdan I. Epureanu, University of Michigan, Ann Arbor, MI, United States

**MSNDC-6/VIB-6
Dynamics of Jointed Structures**

**MSNDC-6-1/VIB-6-1
JOINTS MODELING AND THEORY**

Level 3, Hynes CC, Room 301 8:00am – 9:40am

Session Chair: Matthew Brake, Sandia National Laboratories, Albuquerque, NM, United States

Session Co-Chair: D. Dane Quinn, The University of Akron, Akron, OH, United States

FULLY PARAMETERIZED REDUCED ORDER MODELS USING HYPER-DUAL NUMBERS AND COMPONENT MODE SYNTHESIS

Student Competition Paper. DETC2015-46029

Matthew Bonney, Daniel Kammer, University of Wisconsin, Madison, WI, United States, Matthew Brake, Sandia National Laboratories, Albuquerque, NM, United States

NUMERICAL SIMULATION OF PARTIAL SLIP CONTACT USING A SEMI-ANALYTICAL METHOD

Technical Publication. DETC2015-46464

Jason Armand, Loic Salles, Imperial College London, London, United Kingdom, Christoph Schwingshackl, Imperial College, London, United Kingdom

BENCHMARKING OF COMPUTATIONAL METHODS FOR JOINTED STRUCTURES UNDER HARMONIC LOAD

Technical Presentation Only. DETC2015-47149

Gael Chevallier, FEMTO-ST, Besancon, France, Anthony Meurderfroid, Nicolas Peyret, Jean-Luc Dion, SUPMECA - LISMMA, Saint Ouen, France

HIERARCHY OF THE SURFACE DEFECTS IN JOINTED STRUCTURES DYNAMICS

Technical Presentation Only. DETC2015-47156

Nicolas Peyret, SUPMECA - LISMMA, Saint Ouen, France, Gael Chevallier, FEMTO-ST, Besancon, France, Jean-Luc Dion, SUPMECA - LISMMA, Saint Ouen, France

CAPTURING RECEDING CONTACT AND SQUEEZE WITHIN SHELL MODELS

Technical Presentation Only. DETC2015-47949

Adam Brink, D. Dane Quinn, The University of Akron, Akron, OH, United States

MSNDC-7/VIB-7 Rotordynamics and Rotating Systems

MSNDC-7-1/VIB-7-1 ROTORDYNAMICS AND ROTATING SYSTEMS I

Level 3, Hynes CC, Room 300 8:00am - 9:40am

Session Chair: C Nataraj, Villanova University, Villanova, PA, United States

Session Co-Chair: I. Y (Steve) Shen, University of Washington, Seattle, WA, United States

A TILTING PAD JOURNAL BEARING MODEL FOR COUPLED FLUID DYNAMICAL - ROTORDYNAMICAL ANALYSES

Technical Publication. DETC2015-46262

Enrico Meli, Andrea Rindi, Roberto Conti, Daniele Nocciolini, Emanuele Galardi, Florence University, Florence, Italy, Stefano Rossin, General Electric, Florence, Italy, Luca Pugi, Amedeo Frilli, Florence University, Florence, Italy

BEHAVIOR OF A TILTING-PAD JOURNAL BEARING WITH DIFFERENT LOAD DIRECTIONS

Technical Publication. DETC2015-46598

Phuoc Vinh Dang, Steven Chatterton, Paolo Pennacchi, Andrea Vania, Filippo Cangioli, Politecnico di Milano, Milan, Italy

AN EXPERIMENTAL STUDY OF NONLINEAR OIL-FILM FORCES IN A TILTING-PAD JOURNAL BEARING

Technical Publication. DETC2015-46601

Phuoc Vinh Dang, Steven Chatterton, Paolo Pennacchi, Andrea Vania, Filippo Cangioli, Politecnico di Milano, Milan, Italy

PREDICTING THE FREQUENCY OF THE ROTOR WHIRL EXCITED BY SEMI-FLOATING RING BEARING

Technical Publication. DETC2015-47062

Feng Liang, Quanyong Xu, Ming Zhou, Tsinghua University, Beijing, China

FUZZY UNCERTAINTY ANALYSIS OF A TILTING-PAD JOURNAL BEARING

Technical Publication. DETC2015-47586

Aldemir Ap Cavalini Jr., Fabian A. Lara Molina, Arinan Dourado, Valder Steffen, Federal University of Uberlandia, Uberlandia, Minas Gerais, Brazil

MSNDC-9/VIB-9 Energy Transfer, Energy Harvesting, and Damping

MSNDC-9-1/VIB-9-1 ENERGY TRANSFER, ENERGY HARVESTING, AND DAMPING I

Level 3, Hynes CC, Room 306 8:00am - 9:40am

Session Chair: Lei Zuo, Virginia Tech, Blacksburg, VA, United States

Session Co-Chair: Aldo Ferri, Georgia Tech, Atlanta, GA, United States

LAYERED SHEET-STEEL DAMPING ESTIMATION USING OPTICAL VIBROMETRY

Technical Publication. DETC2015-46867

Charles Nutakor, R. Scott Semken, Janne Heikkinen, Jussi Sopanen, Finland, Aki Mikkola, LUT, Lappeenranta, Finland

A NEW APPROACH FOR PIEZOELECTRIC SWITCHED SHUNT DAMPING ON INDUCTANCE

Technical Publication. DETC2015-46435

Keisuke Kamiya, Aichi Institute of Technology, Toyota, Aichi, Japan

VIBRATION ISOLATION OF A CANTILEVER BEAM USING FLUIDIC FLEXIBLE MATRIX COMPOSITE TUBES

Technical Publication. DETC2015-47764

Kentaro Miura, Bin Zhu, Christopher Rahn, Edward C. Smith, Charles E. Bakis, Pennsylvania State University, University Park, PA, United States

SHOCK AND VIBRATION ISOLATION USING INTERNALLY ROTATING MASSES

Technical Publication. DETC2015-47758

Eric Smith, Aldo Ferri, Georgia Tech, Atlanta, GA, United States

SHOCK ISOLATION THROUGH TRANSLATIONAL-TO-ROTATIONAL ENERGY TRANSFERENCE

Technical Publication. DETC2015-47766

Eric Smith, Aldo Ferri, Georgia Tech, Atlanta, GA, United States

**AVT-8
Keynote Lectures**

**AVT-8-1
BALANCED COMBAT VEHICLE DESIGN USING NON-LINEAR OPTIMIZATION AND MULTI-ATTRIBUTE UTILITY ANALYSIS (MAUA)**

Level 3, Hynes CC, Room 309

10:00am - 11:40am

**CIE-5
AMS: Inverse Problems in Science and Engineering**

**CIE-5-1
AMS: INVERSE PROBLEMS IN SCIENCE AND ENGINEERING**

Level 3, Hynes CC, Room 310 10:00am - 11:40am

Session Chair: John Michopoulos, Naval Research Laboratory, Washington, DC, United States

Session Co-Chair: Brian Dennis, University of Texas Arlington, Arlington, TX, United States

TOWARDS REAL-TIME COMPOSITE MATERIAL CHARACTERIZATION USING SURROGATE MODELS AND GPGPU COMPUTING

Technical Publication. DETC2015-46476

John Steuben, John Michopoulos, Athanasios Iliopoulos, US Naval Research Laboratory, Washington, DC, United States, Cameron Turner, Colorado School of Mines, Golden, CO, United States

TOWARDS INVERSE ESTIMATION OF PROPERTIES, PROCESS PARAMETERS AND RESIDUAL EFFECTS FOR FRICTION STIR WELDING

Technical Publication. DETC2015-46532

Athanasios Iliopoulos, John Michopoulos, Samuel Lambrakos, U.S. Naval Research Laboratory, Washington, DC, United States

TOWARDS CRACK TRAJECTORY IDENTIFICATION VIA THE DIRECT STRAIN IMAGING METHOD

Technical Publication. DETC2015-46536

Athanasios Iliopoulos, John Michopoulos, Naval Research Laboratory, Washington, DC, United States

TOWARDS IDENTIFICATION OF LOWER SCALE COMPOSITE MATERIAL PROPERTIES FROM HIGHER

SCALE EXPERIMENTAL DATA VIA INVERSE ANALYSIS OF COUPLED MULTISCALE MODELS

Technical Publication. DETC2015-46538

Foteini Komninelli, George Mason University, Washington, DC, United States, Athanasios Iliopoulos, John Michopoulos, Naval Research Laboratory, Washington, DC, United States

**CIE-2
Computer-Aided Product and Process Development (CAPPD General)****CIE-2-2****COMPUTER-AIDED PRODUCT AND PROCESS DEVELOPMENT
(CAPPD GENERAL) - II**

Level 3, Hynes CC, Room 311 10:00am - 11:40am

Session Chair: Caterina Rizzi, Università di Bergamo, Dalmine, Italy

Session Co-Chair: Chi Zhou, University at Buffalo, Buffalo, NY, United States

INTEGRATED FORMING, WELDING AND CRASH SIMULATIONS FOR AN ALUMINUM CRASH MANAGEMENT SYSTEM

Technical Publication. DETC2015-46088

Xinxin Tang, Sintef Raufoss Manufacturing, Raufoss, Oppland, Norway, Hallvard Fjær, Institute for Energy Technology, Oslo, Norway

GRAPH VISUALIZATION STYLES FOR USE IN CONFIGURATION MANAGEMENT: A USER STUDY

Technical Publication. DETC2015-46288

Keith Phelan, Joshua Summers, Mary E. Kurz, Crystal Wilson, Clemson University, Clemson, SC, United States

PLANE RECOGNITION ON THE BASIS OF CLOUD OF POINTS DETERMINED BY PHOTOGRAMMETRY

Technical Publication. DETC2015-46310

Andrzej Gessner, Michal Kowal, Marcin Sobczak, Poznan University of Technology, Poznan, Poland

GEOMETRIC DESCRIPTOR-BASED LOCAL CONTOUR POINT SET MATCHING FOR CROSS-SECTION PROFILE**MEASUREMENT OF AUTOMOTIVE SEALING STRIPS**

Technical Publication. DETC2015-47127

Jianhua Li, East China University of Science and Technology, Shanghai, China, Zhengchun Du, Shanghai Jiaotong University, Shanghai, China, Ying Zhang, East China University of Science and Technology, Shanghai, China, Yan Wang, Georgia Institute of Technology, Atlanta, GA, United States

MACHINE SPECIFIC ENERGY CONSUMPTION ANALYSIS FOR CNC-MILLING TOOLPATHS

Technical Publication. DETC2015-48014

Sushrut Pavanaskar, Sara McMains, University of California Berkeley, Berkeley, CA, United States

**CIE-18
SEIKM: Design Informatics****CIE-18-1****SEIKM: DESIGN INFORMATICS**

Level 3, Hynes CC, Room 313 10:00am - 11:40am

Session Chair: Bryony Dupont, Oregon State University, Corvallis, OR, United States

Session Co-Chair: Conrad Tucker, Pennsylvania State University, State College, PA, United States

MULTI-MODAL KNOWLEDGE BASES TO FACILITATE CONCEPTUAL MECHANICAL DESIGN

Technical Publication. DETC2015-46372

Yong-Seok Park, Sumit Sunil Narsale, Pradeep Kumar Mani, Jami Shah, Arizona State University, Tempe, AZ, United States

A PRODUCT FEATURE INFERENCE MODEL FOR MINING IMPLICIT CUSTOMER PREFERENCES WITHIN LARGE SCALE SOCIAL MEDIA NETWORKS

Technical Publication. DETC2015-47225

Suppawong Tuarob, Conrad Tucker, Pennsylvania State University, State College, PA, United States

TEXT ANALYSIS OF ASSEMBLY WORK INSTRUCTIONS

Technical Publication. DETC2015-47246

Rahul Renu, Gregory Mocko, Clemson University, Clemson, SC, United States

DESIGNING A FAST ADAPTIVE CLUSTERING APPROACH FOR TRAFFIC WAVE SIMULATION

Technical Publication. DETC2015-47873

Lijun Lan, Xian Wu, National University of Singapore, Singapore, Singapore, Ying Liu, Cardiff University, Cardiff, United Kingdom

**CIE-4
Virtual Environments and Systems (VES General)**

**CIE-4-2
VIRTUAL ENVIRONMENTS AND SYSTEMS (VES GENERAL) - II**

Level 3, Hynes CC, Room 312 10:00am - 11:40am

Session Chair: Francesco Ferrise, Politecnico di Milano, Milano, Italy

Session Co-Chair: Andrea Vitali, University degli studi di Bergamo, Bergamo, Italy, Italy

HAPTIC INTERFACE WITH HYBRID ACTUATOR FOR VIRTUAL TISSUE CUTTING

Technical Publication. DETC2015-46846

Berk Gonenc, Johns Hopkins University, Baltimore, MD, United States, Hakan Gurocak, Washington State University Vancouver, Vancouver, WA, United States

AUTOMATIC GENERATION OF SOFTWARE INTERFACES FOR HAND-TRACKING DEVICES

Technical Publication. DETC2015-47360

Andrea Vitali, Caterina Rizzi, Giancarlo Facoetti, University degli studi di Bergamo, Bergamo, Italy, Giorgio Colombo, Politecnico di Milano, Milano, Milano, Italy

VISUALIZATION OF HEADLIGHT ILLUMINATION FOR THE VIRTUAL PROTOTYPING OF LIGHT-BASED DRIVER ASSISTANCE SYSTEMS

Technical Publication. DETC2015-47422

Jan Berssenbruegge, Ansgar Trächtler, Heinz Nixdorf Institute, University of Paderborn, Paderborn, Germany, Christoph Schmidt, Varroc Lighting Systems, Cologne, Germany

A POINT CLOUD-BASED METHOD FOR OBJECT ALIGNMENT VERIFICATION FOR AUGMENTED REALITY APPLICATIONS

Technical Publication. DETC2015-47842

Rafael Radkowski, Iowa State University, Ames, IA, United States

INTEGRATED CREATIVITY AND PLAY ENVIRONMENTS IN DESIGN AND ENGINEERING PROCESSES

Technical Publication. DETC2015-47214

Robert Wendrich, University of Twente, Enschede, Netherlands

**DAC-3
Decision Making in Engineering Design**

**DAC-3-2
DECISION-MAKING IN ENGINEERING DESIGN II**

Level 1, Hynes CC, Room 10110:00am - 11:40am

Session Chair: Jitesh H. Panchal, Purdue University, West Lafayette, IN, United States

Session Co-Chair: Conrad Tucker, Pennsylvania State University, State College, PA, United States

IMPACT OF TECHNOLOGY INFUSION ON SYSTEM COMPLEXITY AND MODULARITY

Technical Publication. DETC2015-46547

GwangKi Min, Eun Suk Suh, Seoul National University, Seoul, Republic of Korea, Katja Holta-Otto, Singapore University of Technology and Design, Singapore

MODELING CONSUMER DECISIONS ON RETURNING END-OF-USE PRODUCTS CONSIDERING DESIGN FEATURES AND CONSUMER INTERACTIONS: AN AGENT BASED SIMULATION APPROACH

Technical Publication. DETC2015-46864

Ardeshir Raihanian Mashhadi, University at Buffalo, Amherst, NY, United States, Behzad Esmaeilian, Northeastern University, Boston,

MA, United States, Sara Behdad, University at Buffalo, Buffalo, NY, United States

PREDICTING THE BENEFITS OF TOPOLOGY OPTIMIZATION

Technical Publication. DETC2015-46349

Shiguang Deng, Krishnan Suresh, University of Wisconsin, Madison, WI, United States

A MATHEMATICAL MODEL FOR PRESSURE COMPENSATING EMITTERS

Technical Publication. DETC2015-47519

Katherine A. Taylor, Pulkit Shamshery, Ruo-Qian Wang, Amos G. Winter V, Massachusetts Institute of Technology, Cambridge, MA, United States

NON PRISMATIC AIR-BREATHING FUEL CELLS: CONCEPT, DESIGN AND MANUFACTURING

Technical Publication. DETC2015-46493

Sriram Praneeth Isanaka, Fuewen Frank Liou, Joseph W. Newkirk, Missouri University of Science and Technology, Rolla, MO, United States

**DAC-17
Simulation-Based Design Under Uncertainty**

**DAC-17-2
SIMULATION-BASED DESIGN UNDER UNCERTAINTY II**

Level 1, Hynes CC, Room 102 10:00am - 11:40am

Session Chair: Ikjin Lee, University of Connecticut, Storrs, CT, United States

Session Co-Chair: Zhimin Xi, University of Michigan - Dearborn, Dearborn, MI, United States

EXTREME VALUE METAMODELING FOR SYSTEM RELIABILITY WITH TIME-DEPENDENT FUNCTIONS

Technical Publication. DETC2015-46162

Zhifu Zhu, Xiaoping Du, Missouri University of Science and Technology, Rolla, MO, United States

FLEXIBLE DESIGN OF SYSTEMS CONSIDERING TIME-DEPENDENT RELIABILITY

Technical Publication. DETC2015-46625

Vijitashwa Pandey, Zissimos Mourelatos, Oakland University, Rochester, MI, United States, Annette Skowronska, US Army TARDEC, Warren, MI, United States

TIME-DEPENDENT RELIABILITY USING METAMODELS WITH TRANSFORMED RANDOM INPUTS

Technical Publication. DETC2015-46823

Dorin Drignei, Zissimos Mourelatos, Ervisa Kosova, Igor Baseski, Oakland University, Rochester, MI, United States

TIME-DEPENDENT RELIABILITY ANALYSIS OF VIBRATORY SYSTEMS WITH RANDOM PARAMETERS

Technical Publication. DETC2015-46847

Zissimos Mourelatos, Monica Majcher, Vasileios Geroulas, Oakland University, Rochester, MI, United States

UNCERTAINTY QUANTIFICATION IN TIME-DEPENDENT RELIABILITY ANALYSIS

Technical Publication. DETC2015-47925

Zhen Hu, Sankaran Mahadevan, Vanderbilt University, Nashville, TN, United States, Xiaoping Du, Missouri University of Science And Technology, Rolla, MO, United States

**DAC-9
Design of Engineering Materials and Structures**

**DAC-9-2
DESIGN OF ENGINEERING MATERIALS AND STRUCTURES II**

Level 1, Hynes CC, Room 103 10:00am - 11:40am

Session Chair: Hae-jin Choi, Chung Ang University, Seoul, Republic of Korea

Session Co-Chair: Carolyn Conner Seepersad, University of Texas at Austin, Austin, TX, United States

NUMERICAL METHODS FOR DESIGN OF ME-SO-STRUCTURES: A COMPARATIVE REVIEW

Technical Publication. DETC2015-46289

Marcus Yoder, Zachary Satterfield, Mohammad Fazelpour, Joshu-Summers, Georges Fadel, Clemson University, Clemson, SC, United States

A GEOMETRY PROJECTION METHOD FOR THE OPTIMAL DISTRIBUTION OF SHORT FIBER REINFORCEMENTS

Technical Publication. DETC2015-47406

Julian Norato, University of Connecticut, Storrs, CT, United States

A STRUCTURAL EQUATION MODELING BASED APPROACH FOR IDENTIFYING KEY DESCRIPTORS IN MICROSTRUCTURAL MATERIALS DESIGN

Technical Publication. DETC2015-47473

Yichi Zhang, Wei Chen, D. Apley, Northwestern University, Evanston, IL, United States

PERFORMANCE COMPARISON BETWEEN A BULK AND HYBRID ARCHITECTURE FOR A THERMOELECTRIC COOLER

Technical Publication. DETC2015-47610

Margaret Antonik, Scott Ferguson, Brendan O'Connor, North Carolina State University, Raleigh, NC, United States

TENSEGRITY FORM-FINDING USING GENERATIVE DESIGN SYNTHESIS APPROACH

Technical Publication. DETC2015-47954

Amir Hooshmand, TU Munich, Garching, Germany, Matt Campbell, Oregon State University, Corvallis, OR, United States

**DEC-2
Methods to Aid Learning**

**DEC-2-1
METHODS TO AID LEARNING**

Level 1, Hynes CC, Room 105

10:00am - 11:40am

Session Chair: Beshoy Morkos, Florida Institute of Technology,

Melbourne, FL, United States

Session Co-Chair: Tahira Reid, Purdue University, West Lafayette, IN, United States

BRIDGING THE GAP: AUGMENTING DESIGN LEARNING THROUGH THE TRANSFORMATION OF COMPUTER-AIDED ANALYTICAL TOOLS

Technical Publication. DETC2015-46978

Anirudh R. Sriram, DeLean Tolbert, Monica Cardella, Karthik Ramani, Purdue University, West Lafayette, IN, United States

TEACHING INTERDISCIPLINARY DESIGN BETWEEN ARCHITECTURE AND ENGINEERING - FINDING COMMON GROUND WHILE RETAINING DISCIPLINARY EXPERTISE

Technical Publication. DETC2015-46873

Timothy Li, Katja Holtta-Otto, Asli Arpak, Suranga Nanayakkara, Singapore University of Technology and Design, Singapore, Singapore, Cassandra Telenko, Georgia Tech, Atlanta, GA, United States

LEARNING DESIGN THROUGH STUDENT-GENERATED LEARNING AIDS

Technical Publication. DETC2015-46617

David Jensen, Dennis Beck, University of Arkansas, Fayetteville, AR, United States

AN INITIAL COMPARISON BETWEEN GEOGRAPHICALLY DISTRIBUTED AND NON-DISTRIBUTED STUDENT TEAMS IN DESIGN PROJECTS.

Technical Publication. DETC2015-46952

José Lugo, University of Puerto Rico - Mayagüez, Mayaguez, PR, United States, Constanza S. Miranda, Pontifical Catholic University of Chile, Santiago, Santiago, Chile

EVALUATION OF A MODEL BASED LEARNING APPROACH FOR ENGINEERING DESIGN

Technical Publication. DETC2015-47276

Kjell Andersson, KTH Royal Institute of Technology, Stockholm,

Sweden

DFMLC-10
Design of Sustainable Energy Systems

DFMLC-10-1
DESIGN OF SUSTAINABLE ENERGY SYSTEMS

Level 1, Hynes CC, Room 107 10:00am – 11:40am

Session Chair: Ashwani Gupta, University of Maryland, College Park, MD, United States

Session Co-Chair: Ryo Amano, University of Wisconsin-Milwaukee, Milwaukee, WI, United States

ECONOMIC AND ENVIRONMENTAL IMPACTS OF ENERGY EFFICIENCY INVESTMENT ON LOCAL MANUFACTURERS

Technical Publication. DETC2015-46180

Jun-Ki Choi, Kevin Hallinan, Kelly Kissock, Robert Brecha, University of Dayton, Dayton, OH, United States

STOCHASTIC OPTIMIZATION OF HYBRID RENEWABLE ENERGY SYSTEMS

Technical Publication. DETC2015-46181

Masoud Sharafi, University of Manitoba, Winnipeg, MB, Canada, Tarek Y. ElMekkawy, Qatar University, Doha, Qatar

A CONCEPTUAL FRAMEWORK FOR ECO-INDUSTRIAL PARKS

Technical Publication. DETC2015-46322

Andreas Hein, Marija Jankovic, Romain Farel, Bernard Yannou, Ecole Centrale Paris, Chatenay Malabry, France

PREDICTIVE MODELING TECHNIQUES TO FORECAST ENERGY DEMAND IN THE UNITED STATES: A FOCUS ON ECONOMIC AND DEMOGRAPHIC FACTORS

Technical Publication. DETC2015-47474

Angshuman Deka, Nima Hamta, University at Buffalo, Amherst, NY, United States, Behzad Esmaeilian, Northeastern University, Boston,

MA, United States, Sara Behdad, University at Buffalo, Buffalo, NY, United States

INTERNAL ENTRAINMENT EFFECTS ON DISTRIBUTED COMBUSTION

Technical Publication. DETC2015-48090

Ahmed Khalil, Ashwani Gupta, University of Maryland, College Park, MD, United States

DTM-13
User Preferences

DTM-13-1
USER PREFERENCES

Level 1, Hynes CC, Room 104 10:00am – 11:40am

Session Chair: Saeema Ahmed-Kristensen, Technical University of Denmark, Kongens Lyngby, Denmark

Session Co-Chair: Seth Orsborn, Bucknell University, Lewisburg, PA, United States

A MULTIDIMENSIONAL NETWORK APPROACH FOR MODELING CUSTOMER-PRODUCT RELATIONS IN ENGINEERING DESIGN

Technical Publication. DETC2015-46764

Mingxian Wang, Wei Chen, Yun Huang, Noshir S. Contractor, Northwestern University, Evanston, IL, United States, Yan Fu, Ford Motor Company, Dearborn, MI, United States

PRODUCTS' SHARED VISUAL FEATURES DO NOT CANCEL IN CONSUMER DECISIONS

Technical Publication. DETC2015-48110

Erin MacDonald, Stanford University, Stanford, CA, United States, Ping Du, Iowa State University, Ames, IA, United States

BALANCING DESIGN FREEDOM AND BRAND RECOGNITION IN THE EVOLUTION OF BRAND CHARACTER

Technical Publication. DETC2015-47908

Alex Burnap, University of Michigan, Ann Arbor, MI, United States,

Jeffrey Hartley, General Motors, Warren, MI, United States, Yanxin Pan, Richard Gonzalez, Panos Papalambros, University of Michigan, Ann Arbor, MI, United States

LARGE SCALE NEEDS-BASED OPEN INNOVATION VIA AUTOMATED SEMANTIC TEXTUAL SIMILARITY ANALYSIS

Technical Publication. DETC2015-47358

Cory Schaffhausen, Timothy Kowalewski, University of Minnesota, Minneapolis, MN, United States

A VALIDATION STUDY OF DISABILITY SIMULATION SUIT USAGE AS A PROXY FOR CUSTOMER NEED STATEMENTS FROM PERSONS WITH DISABILITIES

Technical Publication. DETC2015-47679

Jessica Armstrong, Robert Stone, Sebastian Immel, Katharine Hunter-Zaworski, Oregon State University, Corvallis, OR, United States

**MESA-3
Information Technologies for Robotics and Mechatronic Systems**

**MESA-3-1
INFORMATION TECHNOLOGIES AND MONITORING FOR ROBOTICS AND MECHATRONIC SYSTEMS**

Level 1, Hynes CC, Room 110 10:00am - 11:40am

Session Chair: Yu-Cheng Chou, National Sun Yat-sen University, Kaohsiung, Taiwan

Session Co-Chair: Po Ting Lin, Chung Yuan Christian University, Chungli, Taoyuan, Taiwan

IN-LINE IDENTIFICATION OF TWO-DIMENSIONAL SURFACE PROFILE AND DEFECTS USING A HIGH-PRECISION AUTOMATED OPTICAL INSPECTION SYSTEM WITH A CLOUD-AIDED STATISTICAL ANALYSIS SYSTEM

Technical Publication. DETC2015-46132

Boting Rex Lin, Wei-Hao Lu, Po Ting Lin, Ming Chang, Mark Christian E. Manuel, Chung Yuan Christian University, Chungli, Taoyuan, Taiwan

UNDERWATER VEHICLE SYSTEM IDENTIFICATION USING LASER LIGHT, DECOUPLED DYNAMICS AND EVOLUTIONARY ALGORITHM

Technical Publication. DETC2015-46251

Yu-Cheng Chou, National Sun Yat-sen University, Kaohsiung, Taiwan

WEB-BASED COMPUTING IN C/C++

Student Competition Paper. DETC2015-47838

Nathan Wong, Kevin J. Gucwa, Harry H. Cheng, University of California, Davis, Davis, CA, United States

DEVELOPMENT OF ON-LINE CONDITION MONITORING SYSTEM FOR WIND TURBINES IN PLANT LEVEL

Technical Publication. DETC2015-46244

Chun-Yang Liu, Ji-Shun Li, Yu-Jun Xue, Wei Ma, Xin Sui, Fang Yang, Xi-Qiang Ma, Henan University of Science and Technology, Luoyang, China

CONDITION MONITORING OF AN ELECTRO-HYDRO-STATIC ACTUATOR USING THE DYNAMIC 2ND-ORDER SMOOTH VARIABLE STRUCTURE FILTER

Technical Publication. DETC2015-47436

Hamed Hossein Afshari, McMaster University, Hamilton, ON, Canada, Stephen Andrew Gadsden, University of Maryland, Baltimore County, Baltimore, MD, United States, Saeid Habibi, McMaster University, Hamilton, ON, Canada

**MESA-8
Fractional Derivatives and Their Applications**

**MESA-8-2
FRACTIONAL ORDER ADAPTIVE AND ROBUST CONTROL**

Level 1, Hynes CC, Room 111 10:00am - 11:40am

Session Chair: Chunyang Wang, Changchun University of Science and Technology, Changchun, China

COMPOSITE MODEL REFERENCE ADAPTIVE CONTROL FOR A CLASS OF NONLINEAR FRACTIONAL ORDER SYSTEMS

Technical Publication. DETC2015-46030

Yiheng Wei, Shu Liang, Yangsheng Hu, Yong Wang, University of Science and Technology of China, Hefei, China

FRACTION PHASE LEAD REPETITIVE CONTROL AND ITS APPLICATION IN INVERTER

Technical Publication. DETC2015-46186

Jianhong Wang, Nantong University, Nantong, China, YangQuan Chen, University of California, Merced, Merced, CA, United States, Yongqiang Ye, Nanjing University of Aeronautics and Astronautics, Nanjing, China

ITERATIVE LEARNING AND FRACTIONAL RESET CONTROL

Technical Publication. DETC2015-47061

S. Hassan Hossein Nia, T U Delft, Delft, Netherlands, Ines Tejado, Blas Vinagre, University Of Extremadura, Badajoz, Spain, YangQuan Chen, University of California Merced, Merced, CA, United States

MAXIMUM POWER POINT TRACKING OF PROTON EXCHANGE MEMBRANE FUEL CELL WITH FRACTIONAL ORDER FILTER AND EXTREMUM SEEKING

Technical Publication. DETC2015-46633

Jianxin Liu, Xihua University, Chengdu, Sichuan, China, Tiebiao Zhao, YangQuan Chen, University of California, Merced, Merced, CA, United States

AN ENHANCED ROBUST FRACTIONAL ORDER PID CONTROLLER FOR ELECTRIC MACHINERY SYSTEM: TUNING RULES AND SIMULATIONS

Technical Publication. DETC2015-46714

Chunyang Wang, Meng Wu, Nianchun Cai, Xuelian Liu, Chengjun Tian, Changchun University of Science and Technology, Changchun, Jilin, China

MR-1

Planar Mechanism Analysis and Synthesis

MR-1-2

PLANAR SYNTHESIS AND APPLICATIONS

Level 2, Hynes CC, Room 204

10:00am - 11:40am

Session Chair: Lawrence Funke, University of Notre Dame, Notre Dame, IN, United States

Session Co-Chair: Brandon Tsuge, University of California, Irvine, Torrance, CA, United States

GEOMETRIC DESIGN OF A PASSIVE MECHANICAL KNEE BASED ON FOOT TASK GEOMETRY SCALING

Technical Publication. DETC2015-46499

Shramana Ghosh, University of California, Irvine, Irvine, CA, United States, Nina P. Robson, California State University, Fullerton, Fullerton, CA, United States, J. Michael McCarthy, University Of California, Irvine, Irvine, CA, United States

INCORPORATING FIXED-POINT AND -LINE CONSTRAINTS AND TOLERANCE BASED SYNTHESIS IN 4MDS

Technical Publication. DETC2015-47927

Anurag Purwar, Saurabh Bhapkar, Qiaode Ge, Stony Brook University, Stony Brook, NY, United States

DESIGN OF MULTI-DEGREE-OF-FREEDOM PLANAR MORPHING MECHANISMS WITH SINGLE-DEGREE-OF-FREEDOM SUB-CHAINS

Technical Publication. DETC2015-47277

Lawrence Funke, James Schmiedeler, University of Notre Dame, Notre Dame, IN, United States

SYNTHESIS OF A 10-BAR LINKAGE TO GUIDE THE GAIT CYCLE OF THE HUMAN LEG

Technical Publication. DETC2015-47723

Brandon Tsuge, J. Michael McCarthy, University Of California, Irvine, Irvine, CA, United States

DESIGNING VARIABLE-GEOMETRY EXTRUSION DIES THAT UTILIZE PLANAR SHAPE-CHANGING RIGID-BODY MECHANISMS

Technical Publication. DETC2015-46670

Bingjue Li, Andrew Murray, David Myszka, University of Dayton, Dayton, OH, United States

**MR-2
Spatial/Spherical Mechanism Analysis and Synthesis**

**MR-2-2
TYPE AND COMPLETE SYNTHESIS METHODS**

Level 2, Hynes CC, Room 206 10:00am – 11:40am

Session Chair: Qiaode Ge, Stony Brook University, Stony Brook, NY, United States

Session Co-Chair: Pouya Tavousi, University of Connecticut, Storrs, CT, United States

A NOVEL ALGORITHM FOR SOLVING DESIGN EQUATIONS FOR SYNTHESIZING PLATFORM LINKAGES

Technical Publication. DETC2015-47981

Xin Ge, Qiaode Ge, Stony Brook University, Stony Brook, NY, United States, Feng Gao, Shanghai Jiao Tong University, Shanghai, China

SYNTHESIS OF FUNCTIONAL MECHANISMS FROM A LINK SOUP

Technical Publication. DETC2015-47311

Pouya Tavousi, Kazem Kazerounian, Horea Ilies, University Of Connecticut, Storrs, CT, United States

A DESIGN IMPLEMENTATION PROCESS FOR ROBOTIC HAND SYNTHESIS

Technical Publication. DETC2015-46098

Neda Hassanzadeh, Xiangwei He, Alba Perez-Gracia, Idaho State University, Pocatello, ID, United States

SELECTING KINEMATIC STRUCTURES OF PARALLEL

MANIPULATORS USING SYMMETRY AND CONNECTIVITY

Technical Publication. DETC2015-46019

Roberto Simoni, Daniel Martins, Henrique Simas, Federal University of Santa Catarina, Florianópolis, Santa Catarina, Brazil

TYPE SYNTHESIS OF A FAMILY OF NOVEL 4- 5- AND 6-DOF SEA LION BALL MECHANISMS WITH THREE LIMBS

Technical Publication. DETC2015-46603

Rongfu Lin, Wei-Zhong Guo, Feng Gao, Shanghai Jiao Tong University, Shanghai, China

**MR-6
Compliant Mechanisms and Micro/Nano Mechanisms (A. Midha Symposium)**

**MR-6-2
COMPLIANT MECHANISMS INTERACTIVE I CONTINUED**

Level 2, Hynes CC, Room 210 10:00am – 11:40am

Session Chair: Nima Tolou, Delft University of Technology, Delft, Netherlands

Session Co-Chair: Guimin Chen, Xidian University, Xi'an, Shaanxi, Shaanxi, China

**MR-7
Medical and Rehabilitation Robotics**

**MR-7-2
BIOINSPIRED SOLUTIONS**

Level 2, Hynes CC, Room 202 10:00am – 11:40am

Session Chair: Amos G. Winter V, Massachusetts Institute of Technology, Cambridge, MA, United States

Session Co-Chair: Chin-Hsing Kuo, National Taiwan University of Science and Technology, Taipei, Taiwan

A THEORETICAL INVESTIGATION OF THE CRITICAL TIMESCALES NEEDED FOR DIGGING IN DRY SOIL USING A BIOMIMETIC BURROWING ROBOT

Technical Publication. DETC2015-47852

Monica Isava, Amos G. Winter V, Massachusetts Institute of Technology, Cambridge, MA, United States

DESIGN OF A BIOLOGICALLY INSPIRED UNDERWATER BURROWING ROBOT THAT UTILIZES LOCALIZED FLUIDIZATION

Technical Publication. DETC2015-47459

Daniel Dorsch, Amos G. Winter V, Massachusetts Institute of Technology, Cambridge, MA, United States

DESIGN AND FABRICATION OF A BIOMIMETIC SOFT ROBOTIC DIRECT CARDIAC COMPRESSION DEVICE

Technical Publication. DETC2015-47355

Ellen T Roche, Markus A Horvath, Ali Alazmani, Harvard University, Cambridge, MA, United States, Kevin C Galloway, Wyss Institute, Cambridge, MA, United States, Nikoaly V. Vasilyev, Frank A Pigula, Boston Childrens Hospital, Boston, MA, United States, David J Mooney, Harvard University, Cambridge, MA, United States, Conor Walsh, Harvard University, Cambridge, MA, United States

DEVELOPMENT AND TESTING OF A LOW COST WEARABLE AND PORTABLE HAND EXOSKELETON

Technical Publication. DETC2015-46336

Roberto Conti, Benedetto Allotta, Enrico Meli, Alessandro Ridolfi, Lapo Governi, University of Florence, Florence, Italy

MR-10 Origami-Based Engineering Design

MR-10-3 FLAT FOLDABLE AND RIGIDLY FOLDABLE SYSTEMS

Level 2, Hynes CC, Room 203

10:00am - 11:40am

Session Chair: Tomohiro Tachi, The University of Tokyo, Tokyo, Japan

Session Co-Chair: Erik D. Demaine, Massachusetts Institute of Technology, Cambridge, MA, United States

SINGLE-DEGREE-OF-FREEDOM RIGIDLY FOLDABLE ORIGAMI FLASHERS

Technical Publication. DETC2015-46961

Robert Lang, Robert J. Lang Origami, Alamo, CA, United States, Spencer Magleby, Larry Howell, Brigham Young University, Provo, UT, United States

FOLDING FLAT CREASE PATTERNS WITH THICK MATERIALS

Technical Publication. DETC2015-48039

Jason S. Ku, Erik D. Demaine, Massachusetts Institute of Technology, Cambridge, MA, United States

AXIAL CRUSHING OF THIN-WALLED TUBES WITH KITE-SHAPE PATTERN

Technical Publication. DETC2015-46671

Degao Hou, Tianjin University, Tianjin, China, Jiayao Ma, University of Oxford, Oxford, United Kingdom, Yan Chen, Tianjin University, Tianjin, China, Zhong You, University of Oxford, Oxford, United Kingdom

A METHOD FOR DESIGNING FLAT-FOLDABLE 3D POLYGONAL MODELS

Technical Publication. DETC2015-46566

Yuto Kase, Yoshihiro Kanamori, Jun Mitani, University of Tsukuba, Tsukuba, Ibaraki, Japan

DESIGNING RIGIDLY FOLDABLE HORNS USING BRICARD'S OCTAHEDRON

Technical Publication. DETC2015-46283

Tomohiro Tachi, The University of Tokyo, Tokyo, Tokyo, Japan

MNS-1/MSNDC-1/VIB-1 Dynamics of MEMS and NEMS

MNS-1-2 /MSNDC-1-2/VIB-1-2 DYNAMICS OF MEMS AND NEMS II

Level 3, Hynes CC, Room 307

10:00am - 11:40am

Session Chair: George Flowers, Auburn University, Auburn, AL, United States

Session Co-Chair: Laura Ruzziconi, eCampus University, Novedrate, Italy

TOWARD MEMS DISPLACEMENT SENSOR BASED ON RESONANT FREQUENCY MONITORING OF SLIGHTLY CURVED BEAMS

Technical Publication. DETC2015-46308

Naftaly Krakover, Slava Krylov, Tel Aviv University, Tel Aviv, Israel, Bojan R. Ilic, Cornell University, Ithaca, NY, United States

MULTIMODE DYNAMICS IN AFM

Technical Presentation Only. DETC2015-46834

Laura Ruzziconi, eCampus University, Novedrate, Italy, Mohammad Younis, Binghamton University, Binghamton, NY, United States, Stefano Lenci, Polytechnic University Of Marche, Ancona, Italy

ANGULAR RATE SENSOR PARAMETRICALLY EXCITED THROUGH STIFFNESS MODULATION

Technical Presentation Only. DETC2015-47821

Yuval Gerson, Slava Krylov, Yotam Bar-On, Tel-Aviv University, Tel Aviv, Israel

MITIGATION OF THE EFFECTS OF HIGH LEVELS OF HIGH-FREQUENCY NOISE ON MEMS GYROSCOPES USING MICROFIBROUS CLOTH

Technical Publication. DETC2015-47378

George Flowers, Pregassen Soobramaney, Robert Dean, Auburn University, Auburn, AL, United States

TORSION BASED UNIVERSAL MEMS LOGIC DEVICE

Technical Publication. DETC2015-47409

Saad Ilyas, Arpys Arevalo, Ernesto Byas, King Abdullah University of Science and, Jeddah, Saudi Arabia, Ian Foulds, University of British Columbia, Kelowna, BC, Canada, Mohammad Younis, King Abdullah University of Science & Technology, Thuwal, Saudi Arabia

**MSNDC-5/VIB-5
Nonlinear Dynamical Systems and Phenomena**

**MSNDC-5-2 /VIB-5-2
NONLINEAR NORMAL MODES AND MODE COUPLING**

Level 3, Hynes CC, Room 304

10:00am - 11:40am

Session Chair: Jean-Philippe Noel, University of Liege, Liege, Belgium

Session Co-Chair: Matthew Allen, University of Wisconsin, Madison, Madison, WI, United States

GLOBAL PARAMETRIZATION OF THE INVARIANT MANIFOLD DEFINING NONLINEAR NORMAL MODES USING THE KOOPMAN OPERATOR

Student Competition Paper. DETC2015-46366

Giuseppe I. Cirillo, Alexandre Mauroy, Ludovic Renson, Gaetan Kerschen, University Of Liège, Liege, Belgium, Rodolphe Sepulchre, University of Cambridge, Cambridge, United Kingdom

PREDICTION OF ISOLATED RESONANCE CURVES USING NONLINEAR NORMAL MODES

Technical Publication. DETC2015-46301

Robert Kuether, University of Wisconsin, Madison, WI, United States, Ludovic Renson, University of Bristol, Bristol, United Kingdom, Thibaut Detroux, Chiara Grappasonni, Gaetan Kerschen, University Of Liège, Liege, Belgium, Matthew Allen, University of Wisconsin, Madison, Madison, WI, United States

ISOLATED RESPONSE CURVES IN A BASE-EXCITED, TWO-DEGREE-OF-FREEDOM, NONLINEAR SYSTEM

Technical Publication. DETC2015-46106

Jean-Philippe Noel, Thibaut Detroux, Luc Masset, Gaetan Kerschen, University Of Liège, Liege, Belgium, Lawrence Virgin, Duke University, Durham, NC, United States

ON THE ROLE OF DAMPING ON MODE COMPLEXITY AND MODAL INTERACTIONS OF A TWO-DEGREE-OF-FREEDOM NONLINEAR OSCILLATOR

Technical Presentation Only. DETC2015-47572

Malte Krack, Lawrence Bergman, Alexander Vakakis, University of Illinois, Urbana, IL, United States

MULTI-POINT MULTI-HARMONIC COLLOCATION WITH CONTINUATION TO COMPUTE BRANCHES OF NONLINEAR MODES OF STRUCTURAL SYSTEMS

Technical Publication. DETC2015-47333

Sean J. Kelly, Cummins Emissions Solutions, Madison, WI, United States, Matthew Allen, Hamid Ardeh, University of Wisconsin-Madison, Madison, WI, United States

MSNDC-10/VIB-10 Vehicle Dynamics

MSNDC-10-2 /VIB-10-2 VEHICLE DYNAMICS II

Level 3, Hynes CC, Room 308

10:00am – 11:40am

Session Chair: Werner Schiehlen, University of Stuttgart, Stuttgart, Germany

Session Co-Chair: Aki Mikkola, LUT, Lappeenranta, Finland

ROBUST DESIGN OF ROAD VEHICLE SUSPENSIONS WITH ADAPTIVE DAMPING

Technical Presentation Only. DETC2015-46317

Werner Schiehlen, University of Stuttgart, Stuttgart, Germany

RIDE COMFORT IMPROVEMENT IN POST-BRAKING PHASE USING ACTIVE SUSPENSION

Technical Publication. DETC2015-46878

Shuhao Huo, Liangyao Yu, Liangxu Ma, Lei Zhang, Tsinghua University, Beijing, Beijing, China

SIMULATION ENVIRONMENT FOR THE REAL-TIME DYNAMIC ANALYSIS OF HYBRID MOBILE MACHINES

Technical Publication. DETC2015-47024

Ezral Bin Baharudin, Jarkko Nokka, Henri Montonen, Paula Immonen, Asko Rouvinen, Lasse Laurila, Tuomo Lindh, Aki Mikkola, Jussi Sopanen, Juha Pyrhönen, Lappeenranta University of Technol-

ogy, Lappeenranta, Finland

EFFECT OF SITTING OCCUPANCY ON LATERAL DYNAMICS AND TRAJECTORY OF A PASSENGER CAR

Student Competition Paper. DETC2015-47528

Divyanshu Joshi, Anindya Deb, Indian Institute of Science, Bangalore, Karnataka, India

OPTIMIZATION OF SUSPENSION AND STEERING DESIGN FOR A FORMULA STUDENT VEHICLE

Student Competition Paper. DETC2015-47633

Prahlad Kumar, Vaibhav Ojha, IIT Bombay, Mumbai, India

MSNDC-19/VIB-18 Panel Sessions

MSNDC-19-1//VIB-18-1 PRESENT AND FUTURE CHALLENGES IN NONLINEAR DYNAMICS AND VIBRATIONS: FROM THEORY TO DESIGN

Level 3, Hynes CC, Room 302

10:00am – 11:40am

Session Chair: Walter Lacarbonara, Sapienza University of Rome, Rome, Italy

Session Co-Chair: Jeffrey Rhoads, Purdue University, West Lafayette, IN, United States

PTG-2

Gear Analysis, Materials, Fatigue

PTG-2-1

GEAR ANALYSIS, MATERIALS, FATIGUE (1)

Level 1, Hynes CC, Room 108

10:00am – 11:40am

Session Chair: Robert Parker, Virginia Tech, Blacksburg, VA, United States

Session Co-Chair: Ahmet Kahraman, Ohio State University, Columbus, OH, United States

LOADED TOOTH CONTACT ANALYSIS OF POW-

ER-SPLIT GEAR DRIVES CONSIDERING SHAFT DEFORMATION AND ASSEMBLY ERRORS

Technical Publication. DETC2015-46556

Siang-Yu Ye, Shyi-Jeng Tsai, National Central University, Jhong-Li, Taiwan

INFLUENCE OF DESIGN PARAMETERS ON MECHANICAL POWER LOSSES OF PLANETARY GEAR SETS

Technical Publication. DETC2015-47283

HYUN SIK KWON, Ahmet Kahraman, Ohio State University, Columbus, OH, United States

DEVELOPMENT OF AN ACCURATE ANALYSIS METHOD FOR PREDICTING AXLE HYPOID GEAR SYSTEM DEFLECTION

Technical Publication. DETC2015-47393

Qinglong (Hubert) Ma, Hai Xu, General Motors, Milford, MI, United States

PREDICTION AND EXPERIMENTAL CORRELATION OF TOOTH ROOT STRAINS IN SPUR GEAR PAIRS

Technical Publication. DETC2015-47517

Xiang Dai, Virginia Tech, Blacksburg, VA, United States, Christopher Cooley, Southern Illinois University-Carbondale, Carbondale, IL, United States, Robert Parker, Virginia Tech, Blacksburg, VA, United States

**RASFP-2
Fatigue and Failure Prevention and Analyses**

**RASFP-2-1
FATIGUE CONSIDERATIONS**

Level 1, Hynes CC, Room 109 10:00am - 11:40am

Session Chair: Erol Sancaktar, University of Akron, Akron, OH, United States

A MODIFIED MODEL FOR NON-LINEAR FATIGUE DAMAGE ACCUMULATION WITH LOAD INTERACTION

EFFECTS

Technical Publication. DETC2015-46953

Zhaochun Peng, Hong-zhong Huang, Huiying Gao, Zhiqiang Lv, Shun-Peng Zhu, University of Electronic Science & Technology of China, Chengdu, China

MULTIAXIAL FATIGUE LIFE PREDICTION BASED ON NON-PROPORTIONALITY OF STRAIN PATH

Technical Publication. DETC2015-47067

Bo Zhong, Yanrong Wang, Dasheng Wei, Jialiang Wang, Beihang University, Beijing, China

FATIGUE LIFE ANALYSIS OF AN AUTOMOTIVE TENSIONER THROUGH STRAIN-LIFE APPROACH

Technical Publication. DETC2015-47915

Maryam Talimi, University of Toronto, Toronto, ON, Canada, Jean W. Zu, University Of Toronto, Toronto, ON, Canada

A PRACTICAL METHOD TO PREDICT TOTAL FATIGUE LIFE OF WELDED JOINTS STRUCTURES

Technical Publication. DETC2015-47961

Huiying Gao, Shun-Peng Zhu, Zhiqiang Lv, Fang-Jun Zuo, Hong-zhong Huang, University of Electronic Science & Technology of China, Chengdu, China

THE APPLICATION OF LOAD SPECTRUM COMPILING METHODS IN GEARS IN POWER SPLIT DEVICE

Technical Publication. DETC2015-48076

Hong bin Chen, Yan Li, Yuqian Wu, School of Mechanical Science and Engineering, Jilin University, Changchun, China

**MSNDC-9/VIB-9
Energy Transfer, Energy Harvesting, and Damping**

MSNDC-9-2//VIB-9-2

ENERGY TRANSFER, ENERGY HARVESTING, AND DAMPING II

Level 3, Hynes CC, Room 306 10:00am – 11:40am

Session Chair: D. Dane Quinn, The University of Akron, Akron, OH, United States

Session Co-Chair: Jiong Tang, University of Connecticut, Storrs, CT, United States

ENERGY DISSIPATION CHARACTERISTICS OF A MECHANICAL METASTABLE MODULE EXCITED NEAR RESONANCE

Technical Publication. DETC2015-47289

Narayanan Kidambi, Ryan L. Harne, Kon-Well Wang, University of Michigan, Ann Arbor, MI, United States

ANALYSIS AND OPTIMAL PLACEMENT OF PARTICLE DAMPERS BASED ON DISCRETE ELEMENT SIMULATION

Technical Publication. DETC2015-47700

Shilong Li, Jiong Tang, University of Connecticut, Storrs, CT, United States

EFFECTS OF FABRICATION ERROR IN THE PERFORMANCE OF A SUBORDINATE OSCILLATOR ARRAY

Technical Presentation Only. DETC2015-47395

John Sterling, Joseph Vignola, John Judge, Aldo Glean, Catholic University of America, Washington, DC, United States, Teresa Ryan, East Carolina University, Greenville, NC, United States

PIECEWISE NONLINEAR ENERGY SINK

Technical Publication. DETC2015-47301

Mohammad AL-Shudeifat, Khalifa University, Abu Dhabi, United Arab Emirates

NONLINEAR ENERGY SINK WITH A NON-TRADITIONAL KIND OF NONLINEAR RESTORING FORCE

Technical Publication. DETC2015-47309

Mohammad AL-Shudeifat, Khalifa University, Abu Dhabi, United Arab Emirates

Arab Emirates

**BIOMED-5
Orthopedics and Rehabilitation**

**BIOMED-5-1
ORTHOPEDICS AND REHABILITATION**

Level 2, Hynes CC, Room 209 10:00am – 11:40am

Session Chair: Anton Bowden, Brigham Young University, Provo, UT, United States

Session Co-Chair: Ehsan T Esfahani, State University of New York at Buffalo, Buffalo, NY, United States

MECHANICAL DESIGN AND EVALUATION OF A NOVEL KNEE-ANKLE-FOOT ROBOT FOR REHABILITATION

Technical Publication. DETC2015-46229

Gong Chen, Zhao Guo, Haoyong Yu, National University of Singapore, Singapore, Singapore

A MEDICAL DEVICE FOR PATELLOFEMORAL DISORDERS: DESIGN AND DEVELOPMENT

Technical Publication. DETC2015-46343

Ana Leal, University of Minho, Guimaraes, Portugal, Rogerio Pereira, Helder Pereira, Clínica Espregueira-Mendes, Porto, Portugal, Joao Paulo Flores Fernandes, Filipe Silva, University of Minho, Guimaraes, Portugal, Joao Espregueira-Mendes, Clínica Espregueira-Mendes, Porto, Portugal

DESIGN OF A NON-DESTRUCTIVE COMPLIANT MECHANISM VERTEBRAL ATTACHMENT DEVICE

Technical Presentation Only. DETC2015-47477

Aubrie Taylor, Cassandra Carlson, Anton Bowden, Brigham Young University, Provo, UT, United States

ADAPTATION OF REHABILITATION SYSTEM BASED ON USER'S MENTAL ENGAGEMENT

Technical Publication. DETC2015-47720

Ehsan T Esfahani, Shrey Pareek, Pramod Chembrammal, Mostafa

Ghobadi, State University of New York at Buffalo, Buffalo, NY, United States, Thenkurussi Kesavadas, University of Illinois at Urbana-Champaign, Champaign, IL, United States

**AVT-1
Advances in Ground Vehicles Dynamics and Controls**

**AVT-1-2
ADVANCES IN GROUND VEHICLES DYNAMICS AND CONTROLS -II**

Level 3, Hynes CC, Room 309 2:00pm – 3:40pm

Session Chair: Corina Sandu, Virginia PolyTechnology Institute and State University, Blacksburg, VA, United States

Session Co-Chair: Ram Krishnamachari, General Dynamics, Warren, MI, United States

AN EXPERIMENTAL DEMONSTRATOR OF SEMI-ACTIVE TIRE DAMPING ENHANCEMENT

Technical Publication. DETC2015-46766

Vladimir Vantsevich, Gabriel Judd, University of Alabama at Birmingham, Birmingham, AL, United States

MAGNETO-RHEOLOGICAL (MR) VALVE FOR USE IN HYDRO-PNEUMATIC SUSPENSIONS

Student Competition Paper. DETC2015-47071

Jacob Grobler, Schalk Els, University of Pretoria, Pretoria, South Africa

A COMPARISON OF QUARTER, HALF AND FULL VEHICLE MODELS WITH EXPERIMENTAL RIDE COMFORT DATA

Student Competition Paper. DETC2015-47180

Herman Hamersma, Schalk Els, University of Pretoria, Pretoria, South Africa

EFFECT OF INTERNAL ACTUATION ON THE MOBILITY OF WHEELED ROBOTS ON UNSTRUCTURED TERRAIN

Technical Publication. DETC2015-47614

Bahareh Ghotbi, McGill University, Montreal, QC, Canada, Francisco Gonzalez, Laboratorio de Ingeniería Mecánica, University of La Coruña, Ferrol, Spain, Jozsef Kovacs, Jorge Angeles, McGill University, Montreal, QC, Canada

**CIE-6
AMS: High Performance Computing, with Emphasis on Advanced Computing Architectures and Cloud Computing**

**CIE-6-1
AMS: HIGH PERFORMANCE COMPUTING**

Level 3, Hynes CC, Room 310 2:00pm – 3:40pm

Session Chair: Krishnan Suresh, University of Wisconsin, Madison, WI, United States

Session Co-Chair: Virginia Ross, AFRL/RCMT, Wright Patterson Airforce Base, OH, United States

TOPOLOGY OPTIMIZATION ON THE CLOUD: A CONFLUENCE OF TECHNOLOGIES

Technical Publication. DETC2015-46137

Krishnan Suresh, University of Wisconsin, Madison, WI, United States

ASSEMBLY-FREE BUCKLING ANALYSIS FOR TOPOLOGY OPTIMIZATION

Technical Publication. DETC2015-46351

Praveen Yadav, Xiang Bian, Krishnan Suresh, University of Wisconsin, Madison, WI, United States

PERFORMANCE EVALUATION OF CLOUD-BASED HIGH PERFORMANCE COMPUTING FOR FINITE ELEMENT ANALYSIS

Technical Publication. DETC2015-46381

Dazhong Wu, Iowa State University, Ames, IA, United States, Xi Liu, Georgia Institute of Technology, Atlanta, GA, United States, Steve Hebert, Nimbix, Dallas, TX, United States, Wolfgang Gentzsch, UberCloud, Los Altos, CA, United States, Janis Terpeny, Iowa State University, Ames, IA, United States

FAILURE IDENTIFICATION FOR MISSION ANALYSIS FOR COMPLEX SYSTEMS

Technical Publication. DETC2015-47599

Charlie Destefano, David Jensen, University of Arkansas, Fayetteville, AR, United States

CIE-13 CAPPD: Emotional Engineering

CIE-13-1 CAPPD: EMOTIONAL ENGINEERING I

Level 3, Hynes CC, Room 311 2:00pm - 3:40pm

Session Chair: Shuichi Fukuda, Systems Design and Management, Tokyo, Japan

Session Co-Chair: Hideyoshi Yanagisawa, The University of Tokyo, Tokyo, Japan

EXPECTATION DESIGN BASED ON USER'S COGNITIVE PROCESS

Technical Publication. DETC2015-46973

Kazutaka Ueda, Ayami Nagai, The University of Tokyo, Tokyo, Japan

EMOTIONAL MODULARIZATION

Technical Publication. DETC2015-47325

Shuichi Fukuda, Keio University, Yokohama, Kanagawa, Japan

ARM-COMS FOR ENTRAINMENT EFFECT ENHANCEMENT IN REMOTE COMMUNICATION

Technical Publication. DETC2015-47960

Teruaki Ito, Tokushima University, Tokushima, Japan, Tomio Watanabe, Okayama Prefectural University, Okayama, Japan

THE ROLE OF CONTEXT IN INTERACTION WITH VIRTUAL PROTOTYPES

Technical Publication. DETC2015-48054

Monica Bordegoni, Umberto Cugini, Politecnico di Milano, Milano, Italy

CIE-19 SEIKM: Systems Engineering

CIE-19-1 SEIKM: SYSTEMS ENGINEERING I

Level 3, Hynes CC, Room 313 2:00pm - 3:40pm

Session Chair: Richard Malak, Texas A&M University, College Station, TX, United States

Session Co-Chair: Christopher Hoyle, Oregon State University, Corvallis, OR, United States

A PLANT-WIDE AND FUNCTION-SPECIFIC HIERARCHICAL FUNCTIONAL FAULT DETECTION AND IDENTIFICATION (HFFDI) SYSTEM FOR MULTIPLE FAULT SCENARIOS ON COMPLEX SYSTEMS

Technical Publication. DETC2015-46447

Nikolaos Papakonstantinou, VTT Technical Research Centre of Finland, Espoo, Finland, Scott Proper, Oregon State University, Corvallis, OR, United States, Bryan O'Halloran, Raytheon Missile Systems, Tucson, AZ, United States, Irem Tumer, Oregon State University, Corvallis, OR, United States

ROBUST TOPOLOGY DESIGN OF COMPLEX INFRASTRUCTURE SYSTEMS

Technical Publication. DETC2015-46560

Joseph Piacenza, California State University Fullerton, Fullerton, CA, United States, Mir Abbas Bozorgirad, Scott Proper, Christopher Hoyle, Irem Tumer, Oregon State University, Corvallis, CA, United States

A SYSML-BASED MODELING LANGUAGE FOR MECHATRONIC SYSTEM ARCHITECTURE

Technical Publication. DETC2015-46738

Ruirui Chen, Yusheng Liu, Yue Cao, Jing Xu, Zhejiang University, Hangzhou, China

FINDING BREAKTHROUGH POINTS IN PLATFORMED PRODUCT FAMILY DESIGN

Technical Publication. DETC2015-47238

Kohei Arai, The University of Tokyo, Kazuya Oizumi, Kazuhiro

Aoyama, The University of Tokyo, Tokyo, Japan

CIE-32
VES - PANEL: I, Me, Mine Interfaces & VES

CIE-32-1
I, ME, MINE INTERFACES & VES

Level 3, Hynes CC, Room 312 2:00pm - 3:40pm

DAC-4
Design and Optimization of Sustainable Energy Systems

DAC-4-1
DESIGN AND OPTIMIZATION OF SUSTAINABLE ENERGY SYSTEMS I

Level 1, Hynes CC, Room 101 2:00pm - 3:40pm

Session Chair: Souma Chowdhury, Mississippi State University, Starkville, MS, United States

Session Co-Chair: Amy Bilton, University of Toronto, Toronto, ON, Canada

ADAPTIVE OPERATION DECISIONS IN NET ZERO BUILDING CLUSTERS

Technical Publication. DETC2015-47290

Philip Odonkor, Kemper Lewis, University at Buffalo, Buffalo, NY, United States

A MIXED INTEGER LINEAR PROGRAMMING FORMULATION FOR UNRESTRICTED WIND FARM LAYOUT OPTIMIZATION

Technical Publication. DETC2015-46876

Ning Quan, Harrison Kim, University of Illinois, Urbana, IL, United States

WAVE ENERGY CONVERTER ARRAY OPTIMIZATION: A REVIEW OF CURRENT WORK AND PRELIMINARY RESULTS OF A GENETIC ALGORITHM APPROACH INTRODUCING COST FACTORS

Technical Publication. DETC2015-46553

Chris Sharp, Bryony Dupont, Oregon State University, Corvallis, OR,

United States

SOLAR POWER RAMP EVENTS DETECTION USING AN OPTIMIZED SWINGING DOOR ALGORITHM

Technical Publication. DETC2015-46849

Mingjian Cui, Wuhan University, Wuhan, Hubei, China, Jie Zhang, Anthony Florita, Bri-Mathias Hodge, National Renewable Energy Laboratory, Golden, CO, United States, Deping Ke, Yuanzhang Sun, Wuhan University, Wuhan, Hubei, China

HIGH PENETRATION RESIDENTIAL SOLAR PHOTO-VOLTAICS AND THE EFFECTS OF DUST STORMS ON SYSTEM NET LOAD

Technical Publication. DETC2015-48030

Samantha Janko, Brandon Gorman, Nathan Johnson, Uday P. Singh, Arizona State University, Mesa, AZ, United States

DAC-17
Simulation-Based Design Under Uncertainty

DAC-17-3
SIMULATION-BASED DESIGN UNDER UNCERTAINTY III

Level 1, Hynes CC, Room 102 2:00pm - 3:40pm

Session Chair: Mian Li, UM- SJTU Joint Institute, Shanghai, China

Session Co-Chair: Ehsan T Esfahani, State University of New York at Buffalo, Buffalo, NY, United States

RELIABILITY ANALYSIS FOR MULTIDISCIPLINARY SYSTEMS INVOLVING STATIONARY STOCHASTIC PROCESSES

Technical Publication. DETC2015-46168

Zhifu Zhu, Zhen Hu, Xiaoping Du, Missouri University of Science and Technology, Rolla, MO, United States

MATERIAL CHARACTERIZATION OF ADDITIVELY MANUFACTURED PART VIA MULTI-LEVEL STOCHASTIC UPSCALING TECHNIQUE

Technical Publication. DETC2015-46822

Recep Gorgularslan, Sang-In Park, David Rosen, Seung-Kyum Choi, Georgia Tech, Atlanta, GA, United States

STOCHASTIC MODEL BIAS CORRECTION OF DYNAMIC SYSTEM RESPONSES FOR SIMULATION-BASED RELIABILITY ANALYSIS

Technical Publication. DETC2015-46938

Zhimin Xi, Hao Pan, University of Michigan – Dearborn, Dearborn, MI, United States, Ren-jye Yang, Ford Research & Advanced Engineering, Dearborn, MI, United States

RELIABILITY ANALYSIS AND DESIGN CONSIDERING DISJOINTED ACTIVE FAILURE REGIONS

Technical Publication. DETC2015-47003

Pingfeng Wang, Xiaolong Cui, Zequn Wang, Wichita State University, Wichita, KS, United States

MODIFIED BAYESIAN KRIGING FOR NOISY RESPONSE PROBLEMS FOR RELIABILITY ANALYSIS

Technical Publication. DETC2015-47370

Nicholas Gaul, RAMDO Solutions, LLC, Iowa City, IA, United States, Mary Kathryn Cowles, Kyung Choi, Hyunkyoo Cho, University of Iowa, Iowa City, IA, United States, David Lamb, US Army TARDEC, Warren, MI, United States

DAC-9

Design of Engineering Materials and Structures

DAC-9-3

DESIGN OF ENGINEERING MATERIALS AND STRUCTURES III

Level 1, Hynes CC, Room 103 2:00pm – 3:40pm

Session Chair: Carolyn Conner Seepersad, University of Texas at Austin, Austin, TX, United States

Session Co-Chair: Wei Chen, Northwestern University, Evanston, IL, United States

EXPLORING THE SET POINTS OF REFINING OPERATIONS IN LADLE FOR COST EFFECTIVE DESULFURIZATION AND INCLUSION REMOVAL

Technical Publication. DETC2015-46265

Rishabh Shukla, Ravikiran Anapagaddi, Amarendra Singh, Tata

Consultancy Services, Pune, Maharashtra, India, Jitesh H. Panchal, Purdue University, West Lafayette, IN, United States, Janet Allen, Farrokh Mistree, University of Oklahoma, Norman, OK, United States

ORGANIZING CELLS WITHIN NON-PERIODIC MICROARCHITECTURED MATERIALS THAT ACHIEVE GRADED THERMAL EXPANSIONS

Technical Publication. DETC2015-46638

Jonathan Hopkins, Luke Shaw, University of California Los Angeles, Los Angeles, CA, United States, Todd H. Weisgraber, George Farquar, Christopher Harvey, Chris Spadaccini, Lawrence Livermore National Laboratory, Livermore, CA, United States

POLYTOPE SECTOR-BASED SYNTHESIS AND ANALYSIS OF MICROARCHITECTURED MATERIALS WITH TUNABLE THERMAL CONDUCTIVITY AND EXPANSION

Technical Publication. DETC2015-46645

Jonathan Hopkins, University of California Los Angeles, Los Angeles, CA, United States, Howon Lee, Nicholas Fang, Massachusetts Institute of Technology, Cambridge, MA, United States, Chris Spadaccini, Lawrence Livermore National Laboratory, Livermore, CA, United States

GENERALIZED VISCOELASTIC MATERIAL DESIGN WITH INTEGRO- DIFFERENTIAL EQUATIONS AND DIRECT OPTIMAL CONTROL

Technical Publication. DETC2015-46768

Lakshmi Gururaja Rao, James Allison, University of Illinois at Urbana - Champaign, Champaign, IL, United States

HETEROGENEOUS MATERIAL DESIGN USING A PCA-BASED MICROSTRUCTURE REPRESENTING METHOD

Technical Publication. DETC2015-46955

Chao Xu, Shuming Gao, Ming Li, Zhejiang University, Hangzhou, China

DEC-3

Building in Design & Advanced Manufacturing

**DEC-3-1
BUILDING IN DESIGN & ADVANCED MANUFACTURING**

Level 1, Hynes CC, Room 105 2:00pm – 3:40pm

Session Chair: Robert Nagel, James Madison University, Harrisonburg, VA, United States

Session Co-Chair: Scarlett Miller, Pennsylvania State University, University Park, PA, United States

THE CAN CRUSHER PROJECT: A MULTI-SEMESTER DESIGN PROJECT TO ENHANCE RETENTION OF ENGINEERING SKILL SETS

Technical Publication. DETC2015-47417

Gerald Sullivan, Jon Michael Hardin, Virginia Military Institute, Lexington, VA, United States

A 3D PRINTING VENDING MACHINE AND ITS IMPACT ON THE DEMOCRATIZATION OF 3D PRINTING ON A COLLEGE CAMPUS

Technical Publication. DETC2015-46470

Sanjai Bashyam, Joshua Kuhn, Carolyn Conner Seepersad, University of Texas at Austin, Austin, TX, United States

ASSESSMENT OF DESIGN AND BUILD PROJECTS IN SOPHOMORE DESIGN

Technical Publication. DETC2015-46651

Richard Bannerot, University Of Houston, Houston, TX, United States

ADVANCING THE ADDITIVE MANUFACTURING WORKFORCE: SUMMARY AND RECOMMENDATIONS FROM A NSF WORKSHOP

Technical Publication. DETC2015-47274

Christopher Williams, Virginia Tech, Blacksburg, VA, United States, Timothy Simpson, Pennsylvania State University, University Park, PA, United States, Michael Hripko, America Makes, Youngstown, OH, United States

INVESTIGATING THE IMPACT OF INTERACTIVE IMMERSIVE VIRTUAL REALITY ENVIRONMENTS IN ENHANCING TASK PERFORMANCE IN ONLINE ENGINEERING

DESIGN ACTIVITIES

Technical Publication. DETC2015-47388

Ajay Karthic Gopinath Bharathi, Conrad Tucker, Pennsylvania State University, State College, PA, United States

**DFMLC-10
Design of Sustainable Energy Systems**

**DFMLC-10-2
DESIGN OF SUSTAINABLE ENERGY SYSTEMS**

Level 1, Hynes CC, Room 107 2:00pm – 3:40pm

Session Chair: Ryo Amano, University of Wisconsin-Milwaukee, Milwaukee, WI, United States

Session Co-Chair: Ashwani Gupta, University of Maryland, College Park, MD, United States

MODULAR MODELING METHOD FOR ENERGY ANALYSIS OF THE MECHANICAL SERVO PRESS

Technical Publication. DETC2015-46613

Jing Tao, Lu Li, Suiran Yu, Shanghai Jiao Tong University, Shanghai, China, Qingjin Peng, University of Manitoba, Winnipeg, MB, Canada

ENERGY VALUE STREAM MAPPING, DEVELOPMENT AND APPLICATION OF A TOOL TO REDUCE ENERGY INEFFICIENCIES OF THE PRODUCTION PROCESSES

Technical Publication. DETC2015-46616

Andrea Luzi, Michele Germani, Università Politecnica delle Marche, Ancona, Italy, Fabio Camorani, Electrolux, Forlì, Italy, Daniele Del Duca, Università Politecnica delle Marche, Ancona, Italy

FLOW AND HEAT TRANSFER CHARACTERISTICS IN A GAS TURBINE CAN COMBUSTOR

Technical Publication. DETC2015-48091

Essam Khalil, Hatem Kayed, Saad Mohamed, Cairo University, Cairo, Egypt

DESIGN OF SOLID ROCKET ENGINE

Technical Publication. DETC2015-48092

Ryo Amano, Yi Hsin Yen, University of Wisconsin-Milwaukee,
Milwaukee, WI, United States

NUMERICAL SIMULATION OF HEAVY FUEL OIL COMBUSTION CHARACTERISTICS AND NOX EMISSIONS IN CALCINER IN CEMENT INDUSTRY

Technical Publication. DETC2015-48093

Essam Khalil, Hisham Abou ElSoad, Cairo University, Cairo, Egypt

DTM-4 Design Computing

DTM-4-1 DESIGN COMPUTING

Level 1, Hynes CC, Room 104

2:00pm – 3:40pm

Session Chair: Matt Campbell, Oregon State University, Corvallis,
OR, United States

Session Co-Chair: Andy Dong, The University of Sydney, Sydney
NSW, Australia

AGENT-BASED APPROACH TO SYNTHESIZING STRUCTURES

Technical Publication. DETC2015-46049

Robin Kiff, Matt Campbell, Oregon State University, Corvallis, OR,
United States

DESIGN INNOVATION THROUGH TRANSFORMATION

Technical Publication. DETC2015-46032

Andy Dong, The University of Sydney, Sydney, Australia

FUNCTIONAL DECOMPOSITION METHODS IN ORIGINAL DESIGN TASKS

Technical Publication. DETC2015-47865

Joran Booth, Abhinav K. Bhasin, Tahira Reid, Karthik Ramani,
Purdue University, West Lafayette, IN, United States

A SIMULATION-BASED COMPUTATIONAL DESIGN SYNTHESIS APPROACH: AUTOMATED GENERATION OF SIMULATION MODELS FROM GENERATED CONCEPT MODEL GRAPHS

Technical Publication. DETC2015-47353

Clemens Muenzer, Kristina Shea, ETH Zurich, Zurich, Switzerland

A SIMULATION-DRIVEN GRAPH GRAMMAR METHOD FOR THE AUTOMATED SYNTHESIS OF PASSIVE DYNAMIC BRACHIATING ROBOTS

Technical Publication. DETC2015-47641

Fritz Stöckli, Kristina Shea, ETH Zurich, Zurich, Switzerland

MESA-2 Bio-Mechatronics

MESA-2-1 BIO-MECHATRONICS FOR ROBOT-ASSISTED SYSTEMS

Level 1, Hynes CC, Room 110

2:00pm – 3:40pm

Session Chair: Bahram Ravani, University Of California, Davis, Davis,
CA, United States

Session Co-Chair: Taha Elarif, Ainshams University, Cairo, Egypt

NON-CONTACT MONITORING OF PRETERM INFANTS USING RGB-D CAMERA

Technical Publication. DETC2015-46309

Annalisa Cenci, Daniele Liciotti, Emanuele Frontoni, Adriano Mancini,
Primo Zingaretti, Università Politecnica delle Marche, Ancona, Italy

DEVELOPMENT OF A CONTROL THEORETIC MODEL OF HUMAN HAND MOVEMENT SUITABLE FOR USE WITH TOUCH SCREEN DEVICES

Technical Publication. DETC2015-46341

Chao Wang, Bahram Ravani, University Of California, Davis, Davis,
CA, United States

NAVIGATION AND COOPERATIVE CONTROL FOR NANOROBOTS IN THE BLOODSTREAM ENVIRONMENT BASED ON SWARM INTELLIGENCE

Technical Publication. DETC2015-46506

Sara Ahmed, Safaa Amin, Taha Elarif, Ainshams University, Cairo, Egypt

ROBOT-ASSISTED ANKLE REHABILITATION TRAINING ON AN ADULT WITH CEREBRAL PALSY: A CASE REPORT

Technical Publication. DETC2015-47005

Wei Meng, The University of Auckland, Auckland, New Zealand, Quan Liu, Wuhan University of Technology, Wuhan, China, Ming Zhang, Bo Sheng, The University of Auckland, Auckland, New Zealand, Zude Zhou, Qingsong Ai, Wuhan University of Technology, Wuhan, China, Sheng Quan Xie, University of Auckland, Auckland, New Zealand

MESA-8
Fractional Derivatives and Their Applications

MESA-8-4
FRACTIONAL ORDER MODELING AND IDENTIFICATION

Level 1, Hynes CC, Room 111 2:00pm – 3:40pm

Session Chair: Dingyu Xue, Northeastern University, Shenyang, China

Session Co-Chair: Tounsia Djamah, University M. Mammeri of Tizi Ouzou, Tizi Ouzou, Algeria

FRACTIONAL ORDER MODEL OF BROADBAND PIEZO-ELECTRIC ENERGY HARVESTERS

Technical Publication. DETC2015-46192

Dan Li, Junyi Cao, Shengxi Zhou, Xi'an Jiaotong University, Mechanical Engineering, Xi'an, China, YangQuan Chen, University of California, Merced, Merced, CA, United States

NON-LINEAR FRACTIONAL SYSTEM IDENTIFICATION USING POLYNOMIAL NON-LINEAR STATE SPACE MODEL

Technical Publication. DETC2015-46660

Karima Hammar, Tounsia Djamah, University M. Mammeri of Tizi Ouzou, Tizi Ouzou, Algeria, Maamar Bettayeb, University of Sharjah, Sharjah, United Arab Emirates

MATHEMATICAL MODEL OF HUMAN OPERATOR USING FRACTIONAL CALCULUS FOR HUMAN-IN-THE-LOOP CONTROL

Technical Publication. DETC2015-47464

Jiacai Huang, Nanjing Institute of Technology, Nanjing, China, YangQuan Chen, Zhuo Li, University of California Merced, Merced, CA, United States

FRACTAL DERIVATIVE MODELING OF CREEP AND RELAXATION OF VISCOELASTIC MEDIA

Technical Publication. DETC2015-48029

Wenxiang Xu, Wen Chen, Wei Cai, Hohai University, Nanjing, China

MAXIMUM POWER POINT TRACKING IN PHOTOVOLTAIC SYSTEM THROUGH EXTREMUM SEEKING CONTROL WITH FO SWITCHING TECHNIQUE

Technical Publication. DETC2015-47296

Chun Yin, UESTC, Chengdu, China, United States, YangQuan Chen, University of California Merced, Merced, CA, United States, Yuhua Cheng, Shou-Ming Zhong, Lulu Tian, UESTC, Chengdu, China

MR-1
Planar Mechanism Analysis and Synthesis

MR-1-3
PLANAR SYNTHESIS II

Level 2, Hynes CC, Room 204 2:00pm – 3:40pm

Session Chair: Pierre Laroche, Florida Institute of Technology, Melbourne, FL, United States

Session Co-Chair: John Mirth, Rose-Hulman Institute of Technology, Terre Haute, IN, United States

SYNTHESIS OF WATT II MECHANISMS FOR FOUR SIMULTANEOUS POSITIONS

Technical Publication. DETC2015-46045

Pierre Larochelle, Jugesh Sundram, Florida Institute of Technology, Melbourne, FL, United States, Ronald Zimmerman, MAGNA Seating of America, White Lake, MI, United States

USING OPTIMIZATION FOR THE MIXED EXACT-APPROXIMATE SYNTHESIS OF PLANAR MECHANISMS

Technical Publication. DETC2015-47394

Jugesh Sundram, Pierre Larochelle, Florida Institute of Technology, Melbourne, FL, United States

AUTOMATED SYNTHESIS OF PLANAR MECHANISMS WITH REVOLUTE, PRISMATIC AND PIN-IN-SLOT JOINTS

Technical Publication. DETC2015-46073

Weifeng Huang, Matt Campbell, Oregon State University, Corvallis, OR, United States

MIXED EXACT AND APPROXIMATE POSITION DESIGN OF PLANAR LINKAGES VIA GEOMETRIC CONSTRAINT PROGRAMMING (GCP) TECHNIQUES

Technical Publication. DETC2015-46116

John Mirth, Rose-Hulman Institute of Technology, Terre Haute, IN, United States

AN AUTOMATIC METHOD FOR SKETCHING OF PLANAR SIMPLE AND MULTIPLE JOINT KINEMATIC CHAINS

Technical Publication. DETC2015-47216

Huafeng Ding, Peng Huang, Zhen Huang, Yanshan University, Qinhuangdao, Hebei, China, Andres Kecskemethy, University of Duisburg-Essen, Duisburg, Germany

MR-2 Spatial/Spherical Mechanism Analysis and Synthesis

MR-2-3

DIMENSIONAL SYNTHESIS AND NOVEL APPLICATIONS

Level 2, Hynes CC, Room 206

2:00pm – 3:40pm

Session Chair: Dimiter Zlatanov, University of Genoa, Genoa, Italy

Session Co-Chair: Kassim Abdul-Sater, Technische Universität München, Garching, Germany

CONTROLLING THE MOVEMENT OF A TRR SPATIAL CHAIN WITH COUPLED SIX-BAR FUNCTION GENERATORS FOR BIOMIMETIC MOTION

Technical Publication. DETC2015-47876

Mark Plecnik, J. Michael McCarthy, University of California, Irvine, Irvine, CA, United States

NETWORKS OF TYPE III BRICARD LINKAGES

Technical Publication. DETC2015-47139

Shengnan Lu, Dimiter Zlatanov, University of Genoa, Genoa, Italy, Simon Guest, University of Cambridge, Cambridge, United Kingdom, Xilun Ding, Beijing University of Aeronautics and Astronautics, Beijing, China, Matteo Zoppi, University of Genoa, Genoa, Italy

THREE-POSITION SYNTHESIS OF SPHERICALLY CONSTRAINED PLANAR 3R CHAINS

Technical Publication. DETC2015-47365

Kassim Abdul-Sater, Franz Irlinger, Tim Lueth, Technische Universität München, Garching, Germany

THE KINEMATIC DESIGN OF THE PARALLEL MOTION SIMULATOR WITH SPHERICAL-TRANSLATION MOVEMENT

Technical Publication. DETC2015-46835

Yufeng Qu, Jingjun Yu, Guanghua Zong, Shusheng Bi, Beihang University, Beijing, China

KINEMATICS OF A NOVEL TYPE POSITIONING TABLE FOR CAST ALIGNMENT ON MACHINE TOOL

Technical Publication. DETC2015-46067

Adam Myszkowski, Tomasz Bartkowiak, Andrzej Gessner, Poznan University of Technology, Poznan, Poland

MR-7
Medical and Rehabilitation Robotics

MR-7-4
NOVEL COMPONENTS

Level 2, Hynes CC, Room 202 2:00pm – 3:40pm

Session Chair: Andreas Mueller, Johannes Kepler University, Linz, Austria

Session Co-Chair: Milton Aguirre, Delft University of Technology, Delft, Netherlands

ROBOTIC NEUROMUSCULAR FACILITATION FOR REGAINING NEURAL ACTIVATION IN HEMIPARETIC LIMBS

Technical Publication. DETC2015-48085

Jun Ueda, Lauren Lacey, Melih Turkseven, Minoru Shinohara, Ilya Kovalenko, Euisun Kim, Fatiesa Sulejmani, Georgia Institute of Technology, Atlanta, GA, United States

DESIGN AND DEVELOPMENT OF A NOVEL SOFT-AND-RIGID HYBRID ACTUATOR SYSTEM FOR ROBOTIC APPLICATIONS

Technical Publication. DETC2015-47761

Mahdi Haghshenas-Jaryani, Wei Carrigan, Muthu B.J. Wijesundara, UTA Research Institute, Fort Worth, TX, United States

A 4-DOF ROBOT FOR POSITIONING ULTRASOUND IMAGING CATHETERS

Technical Publication. DETC2015-47693

Paul M. Loschak, Yaroslav Tenzer, Alperen Degirmenci, Robert D. Howe, Harvard University, Cambridge, MA, United States

THE USE OF ADDITIVE MANUFACTURING TO FABRICATE STRUCTURAL COMPONENTS FOR WEARABLE ROBOTIC DEVICES

Technical Publication. DETC2015-47448

Raymond Churchwell, Kevin Hollander, SpringActive, Tempe, AZ,

United States, Connor Theisen, Paradise Valley High School, Phoenix, AZ, United States

DESIGN, KINEMATICS AND PROTOTYPE OF A FLEXIBLE ROBOT ARM WITH PLANAR SPRINGS

Technical Publication. DETC2015-46503

Peng Qi, Hongbin Liu, King's College London, London, United Kingdom, Lakmal Seneviratne, Khalifa University, Abu Dhabi, United Arab Emirates, Kaspar Althoefer, King's College London, London, United Kingdom

MR-10
Origami-Based Engineering Design

MR-10-4
ORIGAMI MECHANISMS AND ROBOTICS

Level 2, Hynes CC, Room 203 2:00pm – 3:40pm

Session Chair: Robert Lang, Robert J. Lang Origami, Alamo, CA, United States

Session Co-Chair: Yves Klett, Universität Stuttgart, Stuttgart, Germany

PSEUDO-RIGID-BODY MODELS OF COMPLIANT DNA ORIGAMI MECHANISMS

Technical Publication. DETC2015-46838

Lifeng Zhou, Alexander Marras, Carlos Castro, Hai-Jun Su, The Ohio State University, Columbus, OH, United States

AN ORIGAMI-PARALLEL STRUCTURE INTEGRATED DEPLOYABLE CONTINUUM ROBOT

Technical Publication. DETC2015-46504

Ketao Zhang, Chen Qiu, Jian Dai, Kings College London, London, United Kingdom

KINEMATIC ANALYSIS OF CONGRUENT MULTILAYER TESSELLATIONS

Technical Publication. DETC2015-47340

Yves Klett, Universität Stuttgart, Stuttgart, Germany, Peter Midden-

dorf, Institute of Aircraft Design, Stuttgart, Germany

FOLDING ORIGAMI BY 2 ROBOTIC FINGERS

Technical Publication. DETC2015-47041

Phuong Thao Thai, Luis Diago, Hoan Thai Tat Nguyen, Junichi Shinoda, Ichiro Hagiwara, Meiji University, Kanagawa, Japan

EVALUATION OF BRAIN MODELS TO CONTROL A ROBOTIC ARM USING HOLOGRAPHIC NEURAL NETWORKS.

Technical Publication. DETC2015-48074

Luis Diago, Julian Romero, Junichi Shinoda, Ichiro Hagiwara, Meiji University, Kanagawa, Japan

**MR-12
Student Mechanism and Robot Design Competition**

**MR-12-1
UNDERGRADUATE DIVISION**

Level 2, Hynes CC, Room 210 2:00pm – 3:40pm

Session Chair: Girish Krishnan, University of Michigan, Ann Arbor, MI, United States

**MNS-1/MSNDC-1/VIB-1
Dynamics of MEMS and NEMS**

**MNS-1-3/MSNDC-1-3/VIB-1-3
DYNAMICS OF MEMS AND NEMS III**

Level 3, Hynes CC, Room 307 2:00pm – 3:40pm

Session Chair: Brian Mann, Duke University, Durham, NC, United States

Session Co-Chair: D. Dane Quinn, The University of Akron, Akron, OH, United States, Andrew Dick, Rice University, Houston, TX, United States

INVESTIGATION OF WAVE PROPAGATION BEHAVIOR IN MAGNETICALLY COUPLED MEMS OSCILLATORS

Technical Publication. DETC2015-47465

Jared A. Little, Duke University, Durham, NC, United States, Robin Carroll, University of Florida, Gainesville, FL, United States, Michael J. Mazzoleni, Duke University, Durham, NC, United States, Nicolas Garraud, David P. Arnold, University of Florida, Gainesville, FL, United States, Brian Mann, Duke University, Durham, NC, United States

THE DYNAMICS OF LARGE-SCALE ARRAYS OF COUPLED RESONATORS

Technical Presentation Only. DETC2015-47945

Chaitanya Borra, The University of Akron, Akron, OH, United States, Jeffrey Rhoads, Blake Wetherton, Purdue University, West Lafayette, IN, United States, D. Dane Quinn, The University of Akron, Akron, OH, United States

A TUNABLE, DUFFING-LIKE ELECTROMECHANICAL RESONATOR REALIZED VIA NONLINEAR FEEDBACK FOR SENSING APPLICATIONS

Technical Presentation Only. DETC2015-47901

Nikhil Bajaj, Andrew Sabater, Jeffrey N. Hickey, George Chiu, Jeffrey Rhoads, Purdue University, West Lafayette, IN, United States

NONLINEAR DYNAMICS OF SLACKED CARBON NANOTUBES UNDER LARGE ELECTROSTATIC FORCE

Technical Publication. DETC2015-47995

Tiantian Xu, Mohammad Younis, Binghamton University, Binghamton, NY, United States

MULTI-MODE Q CONTROL IN MULTIFREQUENCY ATOMIC FORCE MICROSCOPY

Student Competition Paper. DETC2015-46989

Michael G. Ruppert, S.O. Reza Moheimani, The University of Newcastle, Callaghan, Australia

**MSNDC-5/VIB-5
Nonlinear Dynamical Systems and Phenomena**

MSNDC-5-3/VIB-5-3

APPLICATIONS OF PARAMETRIC AND NONLINEAR RESONANCES

Level 3, Hynes CC, Room 304 2:00pm – 3:40pm

Session Chair: J.M. Balthazar, Sao Paulo State University, Sao Paulo, Brazil

Session Co-Chair: Izhak Bucher, Technion, Haifa, Israel

A PARAMETRIC AMPLIFIER FOR WEAK, LOW-FREQUENCY FORCES

Technical Publication. DETC2015-46273

Amit Dolev, Izhak Bucher, Technion, Haifa, Israel

NONLINEAR VIBRATION ABSORBER DESIGN: AN ASYMPTOTIC APPROACH

Technical Publication. DETC2015-46463

Arnaldo Casalotti, Walter Lacarbonara, Sapienza University of Rome, Rome, Italy

UTILIZATION OF NONLINEAR RESONANCE OF VESSELS FOR OCEAN WAVE POWER GENERATION

Technical Publication. DETC2015-47706

Karthik Yerrapragada, M. Amin Karami, University at Buffalo, Buffalo, NY, United States

NONLINEAR VIBRATION OF A ROTOR-ACTIVE MAGNETIC BEARING SYSTEM WITH 16-POLE LEGS

Technical Publication. DETC2015-46716

Ruiqin Wu, Wei Zhang, Minghui Yao, Beijing University of Technology, Beijing, China

ENERGY HARVESTING IN A TWO DEGREE OF FREEDOM PORTAL FRAME MODEL AND THE APPEARANCE OF THE SATURATION PHENOMENON

Technical Presentation Only. DETC2015-47121

Rodrigo Tumolin Rocha, J.M. Balthazar, Sao Paulo State University, Sao Paulo, Brazil, Angelo Marcelo Tusset, Vinicius Piccirillo, Ponta Grossa, Paraná, Brazil, Jorge Luiz Palacios Felix, Alegrete, Rio Grande do Sul, Brazil, Reyolando M.L.R.F.L Brasil, Santo André, São

Paulo, Brazil, Brazil

MSNDC-10/VIB-10 Vehicle Dynamics

MSNDC-10-3/VIB-10-3 VEHICLE DYNAMICS III

Level 3, Hynes CC, Room 308 2:00pm – 3:40pm

Session Chair: Radu Serban, University of Wisconsin – Madison, Madison, WI, United States

Session Co-Chair: Jozsef Kovecses, McGill University, Montreal, QC, Canada

DEVELOPMENT OF SHEAR DEFORMABLE LAMINATED SHELL ELEMENT AND ITS APPLICATION TO ANCF TIRE MODEL

Technical Publication. DETC2015-46173

Hiroki Yamashita, The University of Iowa, Iowa City, IA, United States, Paramsothy Jayakumar, US Army TARDEC, Warren, MI, United States, Hiroyuki Sugiyama, The University of Iowa, Iowa City, IA, United States

COUPLED MULTIBODY DYNAMICS AND DISCRETE ELEMENT MODELING OF A BULLDOZER'S COHESIVE SOIL MOVING OPERATION

Technical Publication. DETC2015-47133

Akshay Sane, Tamer Wasfy, Indiana University Purdue University Indianapolis, Indianapolis, IN, United States, Hatem Wasfy, Jeanne Peters, Advanced Science and Automation Corp., Hampton, VA, United States

COUPLED MULTIBODY DYNAMICS AND SMOOTHED PARTICLE HYDRODYNAMICS FOR MODELING VEHICLE WATER FORDING

Technical Publication. DETC2015-47142

Tamer Wasfy, Indiana University Purdue University Indianapolis, Indianapolis, IN, United States, Hatem Wasfy, Jeanne Peters, Advanced Science and Automation Corp., Hampton, VA, United States

SELF-EXCITED LATERAL VIBRATIONS OF ROLLING TIRES

Technical Publication. DETC2015-47266

Denes Takacs, MTA-BME Budapest, Hungary, Gabor Stepan, Budapest University of Technology and Economics, Budapest, Hungary

MSNDC-15
Computational Methods in Multibody Systems
MSNDC-15-2
COMPUTATIONAL METHODS FOR COMPLEX PROBLEMS

Level 3, Hynes CC, Room 305 2:00pm - 3:40pm

Session Chair: Mohammad Poursina, University of Arizona, Tucson, AZ, United States

Session Co-Chair: Pierangelo Masarati, Politecnico di Milano, Milan, Italy

LARGE MOTION VISUALIZATION AND ESTIMATION FOR FLUID-STRUCTURE SIMULATIONS

Technical Publication. DETC2015-46239

Tzu-Sheng Hsu, Timothy Fitzgerald, Vincent Nguyen, Balakumar Balachandran, University Of Maryland, College Park, MD, United States

NUMERICAL INTEGRATION OF A NEW SET OF EQUATIONS OF MOTION FOR MECHANICAL SYSTEMS WITH SCLERONOMIC CONSTRAINTS

Technical Publication. DETC2015-46619

Nikolaos Potosakis, Elias Paraskevopoulos, Sotirios Natsiavas, Aristotle University, Thessaloniki, Greece

A FLUID-MULTIBODY DYNAMICS FRAMEWORK FOR THE INVESTIGATION OF THE SUBSEA PROBLEMS

Technical Presentation Only. DETC2015-46666

Arman Pazouki, Dan Negrut, University of Wisconsin-Madison, Madison, WI, United States

MEMBRANE SHAPE AND TRANSVERSE LOAD RECONSTRUCTION USING INVERSE FEM

Technical Publication. DETC2015-46753

Mattia Alioli, Marco Morandini, Pierangelo Masarati, Politecnico di Milano, Milan, Italy, Trenton Carpenter, N. Brent Osterberg, Roberto Albertani, Oregon State University, Corvallis, OR, United States

DYNAMICS AND CONTROL OF MULTI-FLEXIBLE-BODY SYSTEMS IN A DIVIDE-AND-CONQUER SCHEME

Technical Publication. DETC2015-47264

Imad Khan, Kalyan Addepalli, Ford Motor Company, Dearborn, MI, United States, Mohammad Poursina, University of Arizona, Tucson, AZ, United States

PTG-2
Gear Analysis, Materials, Fatigue
PTG-2-2
GEAR ANALYSIS, MATERIALS, FATIGUE (2)

Level 1, Hynes CC, Room 108 2:00pm - 3:40pm

Session Chair: Víctor Roda-Casanova, Jaume I University, Castellón de la Plana, Spain

Session Co-Chair: Daniel Kadach, TU München, Garching, Germany, Germany

INFLUENCES OF THE FACING EDGE CONDITION ON THE FLANK LOAD CARRYING CAPACITY OF HELICAL GEARS

Technical Publication. DETC2015-46253

Daniel Kadach, Peter Matt, Thomas Tobie, Karsten Stahl, TU München, Garching, Germany

GEAR TOOTH ROOT STRESSES OF A VERY HEAVILY LOADED GEAR PAIR - CASE STUDY: ORBITER BODY FLAP ACTUATOR PINION AND RING GEAR

Technical Publication. DETC2015-46274

Timothy Krantz, Robert Handschuh, NASA Glenn Research Center,

Cleveland, OH, United States

CORRELATION OF RELEVANT CASE PROPERTIES AND THE FLANK LOAD CARRYING CAPACITY OF CASE-HARDENED GEARS

Technical Publication. DETC2015-46299

Johannes Koenig, Peter Koller, Thomas Tobie, Karsten Stahl, TU München, Garching, Germany

INFLUENCE OF LOW TEMPERATURE TREATMENTS ON MATERIAL PROPERTIES AND TOOTH ROOT BENDING STRENGTH OF CASE-HARDENED GEARS

Technical Publication. DETC2015-46325

Florian Dobler, Thomas Tobie, Karsten Stahl, TU München, Garching, Germany

AN APPROACH FOR SOLVING THE CONTACT PROBLEM IN SPUR GEAR TRANSMISSIONS CONSIDERING GEAR MISALIGNMENTS

Technical Publication. DETC2015-46488

Víctor Roda-Casanova, F. Sanchez-Marin, J. L. Iserte, Jaume I University, Castellón de la Plana, Spain

**RASFP-4
Material Considerations for Design and Failure Prevention**

**RASFP-4-1
STRESS ANALYSES AND MATERIAL CONSIDERATIONS**

Level 1, Hynes CC, Room 109 2:00pm – 3:40pm

Session Chair: Erol Sancaktar, University of Akron, Akron, OH, United States

THEORETICAL AND NUMERICAL ANALYSES OF 3D DOME-SHAPED STRUCTURED USING THIN-SHELL APPROACH

Technical Publication. DETC2015-46497

Zhong Liancheng, Peitao Liangfu, South China University of

Technology, Tianhe, China

TEMPERATURE AND STRESS EXAMINATIONS ON PISTONS FOR DAMAGE PREVENTION AND EFFICIENCY ENHANCEMENT: CARBON/CARBON COMPOSITE PISTON VS. CONVENTIONAL ALUMINUM PISTONS

Technical Publication. DETC2015-46042

Murat Kaan, Mehmet Halidun Kelestemur, Meliksah University, Kayseri, Turkey

PHYSICAL PROPERTIES OF LLDPE AND PP FILLED WITH WOOD FLOURS

Technical Publication. DETC2015-48059

Gamze S. Bas, University of Akron, Akron, OH, United States, Erdal Karadurmus, Hitit University, Corum, Turkey, Erol Sancaktar, University of Akron, Akron, OH, United States

RELIABILITY ANALYSIS AND PERFORMANCE PREDICTIONS OF AGED PIPELINES SUBJECTED TO INTERNAL CORROSION - A MARKOV MODELLING TECHNIQUE

Technical Publication. DETC2015-46248

Chinedu Ossai, Brian Boswell, Ian Davies, Curtin University, Perth, Australia

**MSNDC-2/VIB-2
Structures and Continuous Systems**

**VIB-2-2
STRUCTURES AND CONTINUOUS SYSTEMS II**

Level 3, Hynes CC, Room 302 2:00pm – 3:40pm

Session Chair: Marco Amabili, McGill University, Montreal, QC, Canada

Session Co-Chair: Dumitru Caruntu, University of Texas Pan American, Edinburg, TX, United States, Ebrahim Esmailzadeh, University of Ontario Institute of Technology, Oshawa, ON, Canada

NONLINEAR FREE VIBRATION OF PIEZOELECTRIC FUNCTIONALLY GRADED BEAMS IN THERMAL ENVIRONMENT

Technical Publication. DETC2015-46163

Ali Fallah, Mohammad Taghi Ahmadian, Sharif University of Technology, Tehran, Tehran, Iran, Ahmad Barari, University of Ontario Institute of Technology, Oshawa, ON, Canada

COMPLEX MODAL ANALYSIS OF NON-MODALLY DAMPED WIND TURBINE BLADE

Technical Publication. DETC2015-46620

Xing Xing, Brian F. Feeny, Michigan State University, East Lansing, MI, United States

ELASTODYNAMIC MODELING AND SIMULATION OF AN AXIALLY ACCELERATING BEAM

Technical Publication. DETC2015-46644

Fadi Ghaith, Ahmad Ayub, Heriot-Watt University, Dubai, United Arab Emirates

NONLINEAR FORCED VIBRATION ANALYSIS OF A NON-LOCAL CARBON NANOTUBE CARRYING INTERMEDIATE MASS

Technical Publication. DETC2015-46855

Zia Saadatnia, Ebrahim Esmailzadeh, University of Ontario Institute of Technology, Oshawa, ON, Canada

DYNAMIC FREQUENCY AND NONLINEAR DYNAMICS INVESTIGATION OF THERMAL BARRIER COATING BLADE

Technical Publication. DETC2015-46943

Bingyi Liu, Dongxing Cao, Minghui Yao, Wei Zhang, Beijing University of Technology, Beijing, China

MSNDC-6/VIB-6 Dynamics of Jointed Structures

MSNDC-6-2/VIB-6-2 JOINTS MEASUREMENT AND IDENTIFICATION

Level 3, Hynes CC, Room 301

2:00pm – 3:40pm

Session Chair: Matthew Brake, Sandia National Laboratories, Albuquerque, NM, United States

Session Co-Chair: Daniel Segalman, University of Wisconsin, Madison, Madison, WI, United States

DAMPING IN A COMPOSITE BEAM WITH A JOINTED INTERFACE.

Technical Publication. DETC2015-46843

Hugh Goyder, Cranfield University, Shrivenham, United Kingdom, Philip Ind, Daniel Brown, AWE, Reading, United Kingdom

SIGNAL PROCESSING METHODS FOR DETERMINING THE PROPERTIES OF BOLTED JOINTS

Technical Publication. DETC2015-46856

Hugh Goyder, Cranfield University, Shrivenham, United Kingdom

BENCHMARKS FOR NUMERICAL AND EXPERIMENTAL STUDIES OF BUILT-UP STRUCTURES VIBRATIONS

Technical Presentation Only. DETC2015-47162

Gael Chevallier, FEMTO-ST, Besancon, France, Nicolas Peyret, Jean-Luc Dion, SUPMECA – LISMMMA, Saint Ouen, France

EXPERIMENTAL ASSESSMENT OF JOINT-LIKE MODAL MODELS FOR STRUCTURES

Technical Publication. DETC2015-47946

Daniel Segalman, Matthew Allen, Melih Eriten, Kurt Hoppmann, University of Wisconsin, Madison, Madison, WI, United States

TUNED STOP SINE TECHNIQUES FOR NONLINEAR IDENTIFICATIONS

Technical Presentation Only. DETC2015-48112

Jean-Luc Dion, SUPMECA – LISMMMA, Saint Ouen, France, Gaël Chevallier, CNRS-UFC-ENSMM-UTBM, Besançon, France, Nicolas Peyret, France, Franck Renaud, SUPMECA, Saint Ouen, France

MSNDC-7/VIB-7

Rotordynamics and Rotating Systems

**MSNDC-7-2/VIB-7-2
ROTORDYNAMICS AND ROTATING SYSTEMS II**

Level 3, Hynes CC, Room 300 2:00pm – 3:40pm

Session Chair: Paolo Pennacchi, Politecnico di Milano, Milan, Italy

Session Co-Chair: Didier Remond, INSA de Lyon, Villeurbanne, France

FAULT FEATURE EXTRACTION FOR ROLLING BEARING BASED ON DUAL IMPULSE MORLET WAVELET

Technical Publication. DETC2015-46422

Yi Feng, Baochun Lu, Deng-feng Zhang, Wei Zhang, Nanjing University of Science and Technology, Nanjing, China

DIAGNOSTICS OF ROLLING ELEMENT BEARINGS BY MEANS OF THE HIGUCHY FRACTAL DIMENSION

Technical Publication. DETC2015-46609

Steven Chatterton, Paolo Pennacchi, Andrea Vania, Phuoc Vinh Dang, Filippo Cangioli, Politecnico di Milano, Milan, Italy

ON THE EFFECT OF A ROLLER BEARING LOCALIZED DEFECT ON THE INSTANTANEOUS ANGULAR SPEED VARIATIONS

Technical Presentation Only. DETC2015-47480

Jose L. Gomez, Adeline Bourdon, INSA Lyon, Lyon, Rhone, France, Hugo André, Maia Eolis, Villeurbanne, France, Didier Remond, INSA de LYON, Villeurbanne, France

**MSNDC-9/VIB-9
Energy Transfer, Energy Harvesting, and Damping**

**MSNDC-9-3/VIB-9-3
ENERGY TRANSFER, ENERGY HARVESTING, AND DAMPING III**

Level 3, Hynes CC, Room 306 2:00pm – 3:40pm

Session Chair: Jiong Tang, University of Connecticut, Storrs, CT, United States

Session Co-Chair: M. Amin Karami, University At Buffalo, Buffalo,

NY, United States

BISTABLE ENERGY HARVESTING FROM HUMAN MOTION

Technical Publication. DETC2015-46217

Wei Wang, Junyi Cao, Shengxi Zhou, Jing Lin, Xi'an Jiaotong University, Xi'an, China

HEART BEAT ENERGY HARVESTING USING THE FAN-FOLDED PIEZOELECTRIC BEAM GEOMETRY

Technical Publication. DETC2015-47698

M.H. Ansari, M. Amin Karami, University at Buffalo, Buffalo, NY, United States

HIGH-DIMENSIONAL CHAOS CONTROL ALGORITHMS FOR IMPROVED PIEZOELECTRIC ENERGY HARVESTING USING A BISTABLE STRUCTURE

Technical Publication. DETC2015-46654

Daniel Geiyer, Jeffrey L. Kauffman, University of Central Florida, Orlando, FL, United States

EXPERIMENTAL STUDY ON BISTABLE CANTILEVERED PIEZOELECTRIC VIBRATION ENERGY HARVESTERS

Technical Publication. DETC2015-46707

Minghui Yao, Yinbo Li, Wei Zhang, Dongxing Cao, Beijing University of Technology, Beijing, China

**BIOMED-2
Computational Modeling and Simulation**

**BIOMED-2-1
COMPUTATIONAL MODELING AND SIMULATION**

Level 2, Hynes CC, Room 209 2:00pm – 3:40pm

Session Chair: Shijia Zhao, University of Nebraska-Lincoln, Lincoln, NE, United States

Session Co-Chair: Masoud Nasiri Sarvi, University of Manitoba, Winnipeg, MB, Canada

MICROMECHANICAL MODELING OF CONNECTIVE SOFT TISSUES

Technical Publication. DETC2015-46165

Ali Fallah, Mohammad Taghi Ahmadian, Keikhosrow Firoozbakhsh, Sharif University, Tehran, Iran

REGIONAL RESPONSES OF RAT BRAIN TO IMPACTOR PARAMETERS

Technical Publication. DETC2015-47373

Yi Hua, Praveen Akula, University of Nebraska-Lincoln, Lincoln, NE, United States, Matthew Kelso, University of Nebraska Medical Center, Omaha, NE, United States, Linxia Gu, University of Nebraska-Lincoln, Lincoln, NE, United States

DEVELOPMENT OF AN IMAGE-BASED BIOMECHANICAL MODEL FOR ASSESSMENT OF HIP FRACTURE RISK

Student Competition Paper. DETC2015-47878

Masoud Nasiri Sarvi, Yunhua Luo, University of Manitoba, Winnipeg, MB, Canada

TOPOLOGICAL OPTIMIZATION OF CORONARY STENTS

Technical Publication. DETC2015-47958

Shijia Zhao, Linxia Gu, University of Nebraska-Lincoln, Lincoln, NE, United States

A COMPOUND RISK INDICATOR FOR SUBJECT-SPECIFIC PREDICTION OF HIP FRACTURE IN SIDEWAYS FALLS

Technical Publication. DETC2015-48052

Masoud Nasiri Sarvi, Yunhua Luo, University of Manitoba, Winnipeg, MB, Canada

AVT-1**Advances in Ground Vehicles Dynamics and Controls****AVT-1-3****ADVANCES IN GROUND VEHICLES DYNAMICS AND CONTROLS -III**

Level 3, Hynes CC, Room 309

4:10pm - 5:50pm

Session Chair: Beshah Ayalew, Clemson University, Greenville, SC, United States

Session Co-Chair: Jose Luis Olazagoitia, Nebrija University, Madrid, Madrid, Spain

FORMULATION OF PATH- AND SURFACE-FOLLOWING JOINT FOR MULTIBODY DYNAMICS

Student Competition Paper. DETC2015-47314

Andrew Hall, University of Waterloo, Waterloo, ON, Canada, Chad Schmitke, MapleSoft, Waterloo, ON, Canada, John McPhee, University Of Waterloo, Waterloo, ON, Canada

ROAD-VEHICLES CONTROL LOGIC INTEGRATING REAL TIME MULTIBODY MODEL FOLLOWER

Technical Publication. DETC2015-47322

Isabel Ramirez Ruiz, Federico Cheli, Edoardo Sabbioni, Francesco Braghin, Politecnico di Milano, Milano, Italy

DAMPING CHARACTERISTICS OF A HYDRAULIC ELECTRIC RECTIFIER SHOCK ABSORBER AND ITS EFFECT ON VEHICLE DYNAMICS

Technical Publication. DETC2015-46916

Lin Xu, Wuhan University of Technology, Wuhan, China, Yilun Liu, Virginia Tech, Blacksburg, VA, United States, Sijing Guo, Xuexun Guo, Wuhan University of Technology, Wuhan, China, Lei Zuo, Virginia Tech, Blacksburg, VA, United States

CIE-24**VES: Interaction and Interfaces****CIE-24-1****VES: INTERACTION AND INTERFACES I**

Level 3, Hynes CC, Room 310 4:10pm - 5:50pm

Session Chair: Jan Berssenbruegge, University of Paderborn, Paderborn, Germany

Session Co-Chair: Samira Sadeghi, Arts et Métiers ParisTech, Aix En Provence, France

AN ADD-ON DEVICE TO PERFORM DEXTEROUS GRASPING TASKS WITH A HAPTIC FEEDBACK SYSTEM

Technical Publication. DETC2015-46204

Jean-Claude Leon, Grenoble University / INRIA, Saint-Ismier, France, Thomas Dupeux, Lyon University, Villeurbanne, France, Jean-Remy Chardonnet, Arts et Métiers Paris Tech, Chalon sur Saône, France, Jérôme Perret, Haption, Soulgé Sur Ouette, France

TACTILE DISPLAY FOR VIRTUAL SHAPE RENDERING BASED ON SERVO ACTUATED MODULES

Technical Publication. DETC2015-47212

Alessandro Mansutti, Mario Covarrubias, Monica Bordegoni, Umberto Cugini, Politecnico di Milano, Milano, Italy

HUMAN FACTOR STUDY IN GESTURE BASED CAD ENVIRONMENT

Technical Publication. DETC2015-47707

Shrey Pareek, Vaibhav Sharma, Ehsan T Esfahani, State University of New York at Buffalo, Buffalo, NY, United States

THE POTENTIAL USAGES OF INTERACTIVE TABLE-TOPS AND SURFACES IN PRODUCT DESIGN

Technical Publication. DETC2015-48046

Samira Sadeghi, Arts et Métiers ParisTech, Aix En Provence, France, Caroline Hayes, Iowa State University, Ames, IA, United States

A MULTIMODAL VIRTUAL ENVIRONMENT BASED ON HAPTIC INTERFACES FOR UPPER-LIMB REHABILITATION

Technical Publication. DETC2015-46269

Caterina Romagnoli, Monica Bordegoni, Francesco Ferrise, Politecnico di Milano, Milano, Italy

**CIE-13
CAPPD: Emotional Engineering**

**CIE-13-2
CAPPD: EMOTIONAL ENGINEERING II**

Level 3, Hynes CC, Room 311 4:10pm – 5:50pm

Session Chair: Monica Bordegoni, Politecnico di Milano, Milano, Italy

Session Co-Chair: Teruaki Ito, Tokushima University, Tokushima, Japan

A COMPUTATIONAL MODEL OF HUMAN PERCEPTION WITH PRIOR EXPECTATION: BAYESIAN INTEGRATION AND EFFICIENT CODING

Technical Publication. DETC2015-46669

Hideyoshi Yanagisawa, The University of Tokyo, Tokyo, Japan

DIGITAL DESIGN OF CRACK PATTERNS WITH NATURAL IMPRESSIONS ON POTTERY

Technical Publication. DETC2015-46986

Kaoru Shimizu, Hideki Aoyama, Keio University, Yokohama, Japan

ENGINEERING DESIGN FOR ROBOT AESTHETICS

Technical Publication. DETC2015-47218

Yiming Rong, Worcester Polytechnic Institute, Worcester, MA, United States, Annan Dai, Wenchang Zhang, Tsinghua University, Beijing, China

TOWARDS A COMPREHENSIVE THEORY OF MULTI-ASPECT INTERACTION WITH CYBER PHYSICAL SYSTEMS

Technical Publication. DETC2015-47243

Imre Horvath, Netherlands, Junfeng Wang, Delft University of Technology, Delft, The Netherlands

**CIE-19
SEIKM: Systems Engineering**

**CIE-19-2
SEIKM: SYSTEMS ENGINEERING II**

Level 3, Hynes CC, Room 313 4:10pm – 5:50pm

Session Chair: Chiradeep Sen, Florida Institute Of Technology, Melbourne, FL, United States

Session Co-Chair: Farhad Ameri, Texas State University, San Marcos, TX, United States

SCIENTIFIC FOUNDATIONS FOR SYSTEMS ENGINEERING: CHALLENGES AND STRATEGIES

Technical Publication. DETC2015-47315

Navindran Davendralingam, Zhenghui Sha, Kushal Moolchandani, Apoorv Maheshwari, Jitesh H. Panchal, Daniel DeLaurentis, Purdue University, West Lafayette, IN, United States

A SYSTEM OF SYSTEM APPROACH FOR SMART COMPLEX ENERGY SYSTEM OPERATION DECISION

Technical Publication. DETC2015-47415

Ruholla Jafari Marandi, Mengqi Hu, Souma Chowdhury, Mississippi State University, Starkville, MS, United States

DESIGNING A SELF-REPLICATING ROBOTIC MANUFACTURING FACTORY

Technical Publication. DETC2015-47628

Charles Manion, Nicolas Soria, Kagan Tumer, Christopher Hoyle, Irem Tumer, Oregon State University, Corvallis, OR, United States

USING A PRINCIPAL-AGENT MODEL TO INVESTIGATE DELEGATION IN SYSTEMS ENGINEERING

Technical Publication. DETC2015-47778

Sean Vermillion, Richard Malak, Texas A&M University, College Station, TX, United States

CIE-30**AMS PANEL: Advanced Manufacturing****CIE-30-1****ADVANCED MANUFACTURING**

Level 3, Hynes CC, Room 312

4:10pm – 5:50pm

DAC-4**Design and Optimization of Sustainable Energy Systems****DAC-4-2****DESIGN AND OPTIMIZATION OF SUSTAINABLE ENERGY SYSTEMS II**

Level 1, Hynes CC, Room 101 4:10pm -5:50pm

Session Chair: Bryony Dupont, Oregon State University, Corvallis, OR, United States

Session Co-Chair: Sayed Metwalli, Cairo University, Giza, Egypt

THE IMPORTANCE OF CONTEXTUAL FACTORS IN DETERMINING THE GREENHOUSE GAS EMISSION IMPACTS OF SOLAR PHOTOVOLTAIC SYSTEMS

Technical Publication. DETC2015-46471

Julia O'Rourke, Carolyn Conner Seepersad, University of Texas at Austin, Austin, TX, United States

COST OPTIMIZATION OF A SOLAR HUMIDIFICATION-DEHUMIDIFICATION DESALINATION SYSTEM AUGMENTED BY THERMAL ENERGY STORAGE

Technical Publication. DETC2015-46785

Khalid M. Abd El-Aziz, Cairo University, Giza, Egypt, Jihun Kim, Karim Hamza, University of Michigan, Ann Arbor, MI, United States, Mohamed El-Morsi, Ashraf Nassef, American University In Cairo, Cairo, Egypt, Sayed Metwalli, Cairo University, Cairo, Egypt, Kazuhiro Saitou, University of Michigan, Ann Arbor, MI, United States

MULTI-OBJECTIVE OPTIMIZATION OF RENEWABLE POWER SYSTEMS FOR REMOTE COMMUNITIES

Technical Publication. DETC2015-47509

Marina Freire-Gormaly, Amy Bilton, University of Toronto, Toronto, ON, Canada

CONSTRAINED MULTI-OBJECTIVE WIND FARM LAYOUT OPTIMIZATION: INTRODUCING A NOVEL CONSTRAINT HANDLING APPROACH BASED ON CONSTRAINT PROGRAMMING

Technical Publication. DETC2015-47535

Sami Yamanidouzisorkhabi, David Romero, J. Christopher Beck, Cristina H. Amon, University of Toronto, Toronto, ON, Canada

WIND FARM LAYOUT OPTIMIZATION IN COMPLEX

TERRAINS USING COMPUTATIONAL FLUID DYNAMICS

Technical Publication. DETC2015-47651

Jim Y. J. Kuo, I. Amy Wong, David Romero, J. Christopher Beck, Cristina H. Amon, University of Toronto, Toronto, ON, Canada

DAC-16 (Joint with DFLMC) Product-Service System Design

DAC-16-1

JOINT DAC/DFMLC SESSION ON PRODUCT-SERVICE SYSTEMS DESIGN

Level 1, Hynes CC, Room 102 4:10pm – 5:50pm

Session Chair: Seung Ki Moon, Nanyang Technological University, Singapore, Singapore

Session Co-Chair: Romain Farel, PS2E, Jouy-en-Josas, France

IN VIVO IN SITU EXPERIMENTATION PROJECTS BY INNOVATIVE CLEANTECHNOLOGY START-UPS IN PARIS

Technical Publication. DETC2015-47631

Alborz Bekhradi, Bernard Yannou, Francois Cluzel, Ecole Centrale Paris, Châtenay-Malabry, France, Frédérique Chabbert, Direction du Développement Economique de la Ville de Paris, Paris, France, Romain Farel, PS2E, Jouy-en-Josas, France

COMPONENT LIFING DECISIONS AND MAINTENANCE STRATEGIES IN AEROENGINE PRODUCT-SERVICE SYSTEMS DESIGN

Technical Publication. DETC2015-46967

Benjamin Thomsen, Michael Kokkolaras, McGill University, Montreal, QC, Canada, Tomas Mansson, Ola Isaksson, GKN Aerospace Engine Systems, Sweden, Trollhättan, Sweden

STUDY OF CURRENT TRADE-IN PROGRAMS AVAILABLE FOR USED CONSUMER ELECTRONICS: INVESTIGATION OF CELLPHONES DESIGN FEATURES

Technical Publication. DETC2015-47608

Sunayana Jayaram, Harshit Goyal, Sara Behdad, University at Buffalo, Buffalo, NY, United States

IMPACT OF GASOLINE AND NATURAL GAS PRICES ON CAPACITY PLANNING FOR AUTOMAKERS AND ELECTRICITY GENERATORS UNDER GHG EMISSION CONSTRAINTS

Technical Publication. DETC2015-46610

Boxiao Chen, Xiuli Chao, University of Michigan, Ann Arbor, MI, United States, Yan Fu, Margaret Strumolo, Michael Tamor, Ford Motor Company, Dearborn, MI, United States

VALUE-DRIVEN MODELING OF TACTICAL AND OPERATIONAL DECISIONS IN SUPPORT OF AEROSPACE PRODUCT-SERVICE SYSTEMS DESIGN

Technical Publication. DETC2015-46965

Cassio Goncalves, Michael Kokkolaras, McGill University, Montreal, QC, Canada

DAC-18 Human-Centered Design

DAC-18-1 HUMAN-CENTERED DESIGN

Level 1, Hynes CC, Room 103 4:10pm – 5:50pm

Session Chair: Matthew Parkinson, Pennsylvania State University, University Park, PA, United States

Session Co-Chair: Charlotte de Vries, The Pennsylvania State University, Erie, PA, United States

COMBINING ANTHROPOMETRIC DATA AND CONSUMER REVIEW CONTENT TO INFORM DESIGN FOR HUMAN VARIABILITY

Technical Publication. DETC2015-47640

Taylor Ferguson, Melissa Greene, Frank Repetti, Sara Behdad, University at Buffalo – SUNY, Buffalo, NY, United States, Kemper Lewis, University at Buffalo, Buffalo, NY, United States

USING MULTIVARIATE ANALYSIS TO SELECT ACCOMMODATION BOUNDARY MANIKINS FROM A POPULATION DATABASE

Technical Publication. DETC2015-47504

Devon Boyd, Matthew Parkinson, Pennsylvania State University, University Park, PA, United States

INVESTIGATING THE HETEROGENEITY OF PRODUCT FEATURE PREFERENCES MINED USING ONLINE PRODUCT DATA STREAMS

Technical Publication. DETC2015-47439

Abhinav Singh, Conrad Tucker, Pennsylvania State University, State College, PA, United States

DYNAMIC DESIGN USING THE KALMAN FILTER IN RECONFIGURABLE SYSTEMS WITH EPISTEMIC UNCERTAINTY

Technical Publication. DETC2015-46378

Elham Keshavarzi, Matthew G McIntire, Christopher Hoyle, Oregon State University, Corvallis, OR, United States

**DEC-4
Designing for the Future**

**DEC-4-1
DESIGNING FOR THE FUTURE STUDENT COMPETITION**

Level 1, Hynes CC, Room 105 4:10pm – 5:50pm

Session Chair: Jitesh H. Panchal, Purdue University, West Lafayette, IN, United States

Session Co-Chair: Zahed Siddique, University of Oklahoma, Norman, OK, United States

**DFMLC-3
Life Cycle Decision Making**

**DFMLC-3-1
LIFE CYCLE DECISION MAKING**

Level 1, Hynes CC, Room 107 4:10pm – 5:50pm

Session Chair: Jun-Ki Choi, University of Dayton, Dayton, OH, United States

Session Co-Chair: Jitesh H. Panchal, Purdue University, West Lafayette, IN, United States

ESTIMATION OF CO2 EMISSIONS CONSIDERING THE DECISIONS OF MULTIPLE DRIVERS WITHIN CAR-FOLLOWING MODELS

Technical Publication. DETC2015-46215

Siva Chaduvula, Tyler J. Kriegel, Jitesh H. Panchal, Purdue University, West Lafayette, IN, United States

FEATURE-BASED APPROACH FOR INTEGRATION OF LIFE CYCLE ASSESSMENT WITH PRODUCT DEVELOPMENT

Technical Publication. DETC2015-46612

Jing Tao, Suiran Yu, Shanghai Jiao Tong University, Shanghai, China, Qingjin Peng, University of Manitoba, Winnipeg, MB, Canada

PROBABILISTIC PARETO DECISION MAKING FRAMEWORK FOR SUSTAINABLE PACKAGING LIFE CYCLE ASSESSMENT

Technical Publication. DETC2015-46885

Huihui Qi, Grand Valley State University, Grand Rapids, MI, United States, Euihark Lee, Hae Chang Gea, Rutgers University, Piscataway, NJ, United States, Bin Zheng, University of Electronic Science and Technology of China, Chengdu, China

SAMPLING METHODS FOR UNCERTAINTY IN LIFE CYCLE COST ANALYSIS IN PRODUCT DESIGN

Technical Publication. DETC2015-47116

Lorena Cunha, Qing Wang, Durham University, Durham, United Kingdom

FACILITATING MULTIPLE-OBJECTIVE DECISION MAKING FOR ADVANCED MANUFACTURING: A KNOWLEDGE REPRESENTATION AND COMPUTATIONAL ACTIVE LEARNING BASED SIMULATION FRAMEWORK

Technical Publication. DETC2015-47579

Shuhui Qu, Jie Wang, Weiwen Jian, Tianshu Chu, Stanford University, Stanford, CA, United States

DFMLC-12
Sustainability of Industrial Systems (Special Session)

DFMLC-12-2
SUSTAINABILITY OF INDUSTRIAL SYSTEMS (SPECIAL SESSION)

Level 2, Hynes CC, Room 209 4:10pm - 5:50pm

Session Chair: Qing Wang, Durham University, Durham, United Kingdom

Session Co-Chair: Mostafa Sabbaghi, University at Buffalo, SUNY, Buffalo, NY, United States

UNIT MANUFACTURING PROCESS MODELS FOR FERROMAGNETIC AND NON-FERROMAGNETIC ALLOY SURFACE INSPECTION METHODS

Technical Publication. DETC2015-46765

Ian Garretson, Oregon State University, Corvallis, OR, United States, Kevin Lyons, Mahesh Mani, Swee Leong, National Institute of Standards and Technology, Gaithersburg, MD, United States, Matthew D. Carter, Ann E. Simmons, Boeing, Gresham, OR, United States, Karl R. Haapala, Oregon State University, Corvallis, OR, United States

DESIGN DECISION TRADEOFFS FOR ENVIRONMENTAL IMPACT AND END OF LIFE RECOVERY OF CELL-PHONES

Technical Publication. DETC2015-46769

Aaron Joseph, James Schreiner, Deborah Thurston, University of Illinois - Urbana-Champaign, Champaign, IL, United States

ECOLOGICAL ROBUSTNESS AS A DESIGN PRINCIPLE FOR SUSTAINABLE INDUSTRIAL SYSTEMS

Technical Publication. DETC2015-47560

Astrid Layton, Georgia Institute Of Technology-Lorraine, Metz, France, Bert Bras, Marc Weissburg, Georgia Tech, Atlanta, GA, United States

ENVIRONMENTAL IMPACT ASSESSMENT DURING PRODUCT DEVELOPMENT: A FUNCTIONAL ANALYSIS BASED APPROACH TO LIFE CYCLE ASSESSMENTS

Technical Publication. DETC2015-47561

Alissa Santucci, Marcos Esterman, Rochester Institute of Technology, Rochester, NY, United States

EXPLORING DECISION TRADEOFFS IN SUSTAINABLE DESIGN

Technical Publication. DETC2015-47295

Christopher Mattson, Brigham Young University, Provo, UT, United States, Vicky Lofthouse, Tracy Bhamra, Loughborough University, Loughborough, United Kingdom

DAC-16
Product-Service System Design

DAC-16-1

JOINT DAC/DFMLC SESSION ON PRODUCT-SERVICE SYSTEMS DESIGN

Level 1, Hynes CC, Room 102 4:10pm - 5:50pm

Session Chair: Seung Ki Moon, Nanyang Technological University, Singapore, Singapore

Session Co-Chair: Romain Farel, PS2E, Jouy-en-Josas, France

IN VIVO IN SITU EXPERIMENTATION PROJECTS BY INNOVATIVE CLEANTECHNOLOGY START-UPS IN PARIS

Technical Publication. DETC2015-47631

Alborz Bekhradi, Ecole Centrale Paris, Chatenay-Malabry, France, Bernard Yannou, Ecole Centrale Paris, Chatenay Malabry, France, Francois Cluzel, Ecole Centrale Paris, Châtenay-Malabry, France, Frédérique Chabbert, Direction du développement économique de la Ville de Paris, Paris, France, Romain Farel, PS2E, Jouy-en-Josas, France

COMPONENT LIFING DECISIONS AND MAINTENANCE STRATEGIES IN AEROENGINE PRODUCT-SERVICE SYSTEMS DESIGN

Technical Publication. DETC2015-46967

Benjamin Thomsen, Michael Kokkolaras, McGill University, Montreal, QC, Canada, Tomas Mansson, GKN Aerospace Sweden, Trollhättan, Sweden, Ola Isaksson, GKN Aerospace Engine Systems, Sweden, Trollhättan, Sweden

STUDY OF CURRENT TRADE-IN PROGRAMS AVAILABLE FOR USED CONSUMER ELECTRONICS: INVESTIGATION OF CELLPHONES DESIGN FEATURES

Technical Publication. DETC2015-47608

Sunayana Jayaram, Harshit Goyal, University at Buffalo, SUNY, Amherst, NY, United States, Sara Behdad, University at Buffalo – SUNY, Buffalo, NY, United States

IMPACT OF GASOLINE AND NATURAL GAS PRICES ON CAPACITY PLANNING FOR AUTOMAKERS AND ELECTRICITY GENERATORS UNDER GHG EMISSION CONSTRAINTS

Technical Publication. DETC2015-46610

Boxiao Chen, Xiuli Chao, University of Michigan, Ann Arbor, MI, United States, Yan Fu, Margaret Strumolo, Michael Tamor, Ford Motor Company, Dearborn, MI, United States

VALUE-DRIVEN MODELING OF TACTICAL AND OPERATIONAL DECISIONS IN SUPPORT OF AEROSPACE PRODUCT-SERVICE SYSTEMS DESIGN

Technical Publication. DETC2015-46965

Cassio Goncalves, Michael Kokkolaras, McGill University, Montreal, QC, Canada

DTM-12

Trends and Technologies Impacting the Design Process

DTM-12-1

TRENDS AND TECHNOLOGIES IMPACTING THE DESIGN PROCESS

Level 1, Hynes CC, Room 104

4:10pm – 5:50pm

Session Chair: Spencer Magleby, Brigham Young University, Provo, UT, United States

Session Co-Chair: David Jensen, University of Arkansas, Fayetteville, AR, United States

THE DESIGN OF CROWD-FUNDED PRODUCTS

Technical Publication. DETC2015-46917

Chaoyang Song, Jianxi Luo, Katja Holtta-Otto, Kevin Otto, Singapore University of Technology & Design, Singapore, Singapore, Warren Seering, Massachusetts Institute of Technology, Cambridge, MA, United States

INFORMING EARLY DESIGN VIA CROWD-BASED CO-PROTOTYPING

Student Competition Paper. DETC2015-47826

Devarajan Ramanujan, Vinayak Vinayak, Yash Nawal, Tahira Reid, Karthik Ramani, Purdue University, West Lafayette, IN, United States

EXPLORING THE RELATIONSHIP BETWEEN EXCESS AND SYSTEM EVOLUTIONS USING A STRESS-TEST

Technical Publication. DETC2015-47603

Ethan Cansler, Scott Ferguson, North Carolina State University, Raleigh, NC, United States, Christopher Mattson, Brigham Young University, Provo, UT, United States

AN INVESTIGATION OF DESIGN REQUIREMENT VOLATILITY, RISK AND PRIORITY IN EARLY STAGE DESIGN PROJECTS

Technical Publication. DETC2015-47661

Qifang Bao, Francisco Morocz, Massachusetts Institute of Technology, Cambridge, MA, United States, Sami E. Ferik, M. Mobeen Shaukat, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia, Maria Yang, Massachusetts Institute of Technology, Cambridge, MA, United States

INTEGRATING DESIGN METHODOLOGY, THERMAL SCIENCES, AND CUSTOMER NEEDS TO ADDRESS CHALLENGES IN THE HAIR CARE INDUSTRY

Technical Publication. DETC2015-46551

Jaesik Hahn, Tikyna Dandridge, Priya Seshadri, Amy Marconnet, Tahira Reid, Purdue University, West Lafayette, IN, United States

MESA-2

Bio-Mechatronics

**MESA-2-2
CONTROL OF BIO-MECHATRONICS SYSTEM**

Level 1, Hynes CC, Room 110 4:10pm – 5:50pm

Session Chair: Yong Zhu, Wilkes University, Wilkes-Barre, PA, United States

Session Co-Chair: Mahmood Karimi, University of California, San Diego, La Jolla, CA, United States

SMART DEVICE AND NETWORK BASED CONTROL OF A COMPLIANT ANKLE-FOOT-ORTHOSES

Technical Publication. DETC2015-46195

Yong Zhu, Wilkes University, Wilkes-Barre, PA, United States

SLIDING MODE CONTROL OF AN EXOSKELETON GAIT REHABILITATION ROBOT DRIVEN BY PNEUMATIC MUSCLE ACTUATORS

Student Competition Paper. DETC2015-46281

Jinghui Cao, Sheng Quan Xie, Andrew McDaid, Raj Das, The University of Auckland, Auckland, New Zealand

OPTIMAL MANUAL CONTROL FOR HEART RATE TRACKING DURING TREADMILL EXERCISES

Technical Publication. DETC2015-47895

Mahmood Karimi, Ramesh R. Rao, University of California San Diego, La Jolla, CA, United States

**MESA-8
Fractional Derivatives and Their Applications**

**MESA-8-5
FRACTIONAL CALCULUS AND ITS APPLICATIONS**

Level 1, Hynes CC, Room 111 4:10pm – 5:50pm

Session Chair: Changpin Li, Shanghai University, Shanghai, China

Session Co-Chair: Hadi Malek, Utah State University, Logan, UT, United States

THE ADJOINT SYSTEMS OF TIME-FRACTIONAL DIFFUSION EQUATIONS AND THEIR APPLICATIONS IN

CONTROLLABILITY ANALYSIS

Student Competition Paper. DETC2015-46696

Fudong Ge, Donghua University, Shanghai, China, YangQuan Chen, University of California Merced, Merced, CA, United States, Chunhai Kou, Donghua University, Shanghai, China

REGIONAL CONTROLLABILITY OF ANOMALOUS DIFFUSION GENERATED BY THE TIME FRACTIONAL DIFFUSION EQUATIONS

Student Competition Paper. DETC2015-46697

Fudong Ge, Donghua University, Shanghai, China, YangQuan Chen, University of California Merced, Merced, CA, United States, Chunhai Kou, Donghua University, Shanghai, China

FRACTIONAL STURM-LIOUVILLE PROBLEM AND 1D SPACE-TIME FRACTIONAL DIFFUSION WITH MIXED BOUNDARY CONDITIONS

Technical Publication. DETC2015-46808

Malgorzata Klimek, Czestochowa University of Technology, Czestochowa, Poland

RESEARCH ON IMAGE MATCHING COMBINING ON FRACTIONAL DIFFERENTIAL WITH SCALE INVARIANT FEATURE TRANSFORM

Technical Publication. DETC2015-47015

Guimei Zhang, Binbin Chen, Nanchang Hangkong University, Jiangxi, China, YangQuan Chen, University of California, Merced, Merced, CA, United States

RADIAL BASIS FUNCTION METHODS FOR FRACTIONAL DERIVATIVE APPLICATIONS

Technical Publication. DETC2015-48016

Zhuojia Fu, Hohai University, Nanjing, China

**MR-1
Planar Mechanism Analysis and Synthesis**

MR-1-4**PLANAR FORCES AND DYNAMICS**

Level 2, Hynes CC, Room 204

4:10pm – 5:50pm

Session Chair: Mario Acevedo, Universidad Panamericana, Mexico City, Mexico

Session Co-Chair: Bruno Belzile, Polytechnique Montreal, Montreal, QC, Canada

KINETO-ELASTIC ANALYSIS OF A COMPOUND BOW

Technical Publication. DETC2015-46818

Yuyi Lin, Ming Yang, University of Missouri-Columbia, Columbia, MO, United States, Xiaoyi Jin, Shanghai University of Engineering Science, Shanghai, China

AN EFFICIENT METHOD TO FIND THE DYNAMIC BALANCING CONDITIONS OF MECHANISMS: PLANAR SYSTEMS

Technical Publication. DETC2015-46419

Mario Acevedo, Universidad Panamericana, Mexico City, Mexico

INSTANTANEOUS-STIFFNESS PLANE ANALYSIS OF UNDERACTUATED FINGERS

Technical Publication. DETC2015-47310

Bruno Belzile, Lionel Birglen, Polytechnique Montreal, Montreal, QC, Canada

DESIGN OF SCOTCH YOKE MECHANISMS WITH BALANCED INPUT TORQUE

Technical Publication. DETC2015-46709

Vigen Arakelyan, INSA de Rennes, Rennes, France, Manuk Mkrtchyan, IRCCyN, Nantes, France

TYPE SYNTHESIS OF TMDS AS ANTI-GALLOPING DEVICES FOR OVERHEAD TRANSMISSION LINES

Technical Publication. DETC2015-46396

hong xu, North China electric power university, beijing, China, kuanjun zhu, jialun yang, bin liu, China Electric Power Research Institute, Beijing, China

MR-2**Spatial/Spherical Mechanism Analysis and Synthesis****MR-2-4****PARALLEL MECHANISMS: MOTION AND FORCE ANALYSIS**

Level 2, Hynes CC, Room 206

4:10pm – 5:50pm

Session Chair: Dongming Gan, Khalifa University of Sci Technology & Research, Abu Dhabi, United Arab Emirates

Session Co-Chair: Jingjun Yu, Beihang University, Beijing, China

ANALYTIC DETERMINATION OF WRENCH CLOSURE WORKSPACE OF SPATIAL CABLE DRIVEN PARALLEL MECHANISMS

Technical Publication. DETC2015-47976

Joon-Hyuk Park, Zhiyu Sheng, Paul Stegall, Sunil Agrawal, Columbia University, New York, NY, United States

CONSTRAINT STIFFNESS CONSTRUCTION AND DECOMPOSITION OF A SPS ORTHOGONAL PARALLEL MECHANISM

Technical Publication. DETC2015-46811

Chen Qiu, King's College London, London, Jian Dai, Kings College-University of London, London, United Kingdom

VARIABLE MOTION/FORCE TRANSMISSIBILITY OF A METAMORPHIC PARALLEL MECHANISM WITH RECONFIGURABLE 3T AND 3R MOTION

Technical Publication. DETC2015-46685

Dongming Gan, Khalifa University of Science Technology & Research, Abu Dhabi, United Arab Emirates, Jian Dai, Kings College-University Of London, London, United Kingdom, Jorge Dias, Lakmal Seneviratne, Khalifa University, Abu Dhabi, United Arab Emirates

AXODE CHARACTERISTIC OF 4-4R PARALLEL POINTING MECHANISM

Technical Publication. DETC2015-46839

Zhixiang Duan, Jingjun Yu, Beihang University, Beijing, China,
Xianwen Kong, Heriot-watt University, Edinburgh, Scotland

KINEMATICS AND SINGULARITY ANALYSIS OF A 2R2T PARALLEL MECHANISM

Technical Publication. DETC2015-46394

Wei Ye, Yuefa Fang, Sheng Guo, Beijing Jiaotong University, Beijing, China

**MR-7
Medical and Rehabilitation Robotics**

**MR-7-5
ROBOTS AND MECHANISMS**

Level 2, Hynes CC, Room 202 4:10pm – 5:50pm

Session Chair: Evagoras Xydias, University of Cyprus, Nicosia, Cyprus

Session Co-Chair: Dinesh Rabindran, Intuitive Surgical, Sunnyvale, CA, United States

DESIGN AND QUALITATIVE TESTING OF A PROSTHETIC FOOT WITH ROTATIONAL ANKLE AND METATARSAL JOINTS TO MIMIC PHYSIOLOGICAL ROLL-OVER SHAPE

Technical Publication. DETC2015-46518

Kathryn Olesnavage, Amos G. Winter V, Massachusetts Institute of Technology, Cambridge, MA, United States

SENSING AND FORCE-FEEDBACK EXOSKELETON ROBOTIC (SAFER) GLOVE MECHANISM FOR HAND REHABILITATION

Technical Publication. DETC2015-46661

Zhou Ma, Pinhas Ben-Tzvi, Jerome Danoff, The George Washington University, Washington, DC, United States

DESIGN OF MECHANISM AND PRELIMINARY FIELD VALIDATION OF LOW-COST, PASSIVE PROSTHETIC KNEE FOR USERS WITH TRANSFEMORAL AMPUTATION IN INDIA

Technical Publication. DETC2015-47385

V. N. Murthy Arelekatti, Amos G. Winter V, Massachusetts Institute of Technology, Cambridge, MA, United States

PARALLEL ARTICULATED-CABLE EXERCISE ROBOT (PACER): NOVEL HOME-BASED CABLE-DRIVEN PARALLEL PLATFORM ROBOT FOR UPPER LIMB NEURO-REHABILITATION

Technical Publication. DETC2015-46389

Aliakbar Alamdari, Venkat Krovi, University at Buffalo, Buffalo, NY, United States

DESIGN AND EXPERIMENTAL EVALUATION OF A RECONFIGURABLE GRAVITY-FREE MUSCLE TRAINING ASSISTIVE DEVICE FOR LOWER-LIMB PARALYSIS PATIENTS

Technical Publication. DETC2015-46706

Tzu-Yu Tseng, Wei-Chun Hsu, National Taiwan University of Science and Technology, Taipei, Taiwan, Li-Fong Lin, Shuang Ho Hospital, Taipei Medical University, New Taipei City, Taiwan, Chin-Hsing Kuo, National Taiwan University of Science and Technology, Taipei, Taiwan

**MR-10
Origami-Based Engineering Design**

**MR-10-5
ORIGAMI STRUCTURES**

Level 2, Hynes CC, Room 203 4:10pm – 5:50pm

Session Chair: Zhong You, University of Oxford, Oxford, United Kingdom

Session Co-Chair: Ashley P. Thrall, University of Notre Dame, Notre Dame, IN, United States

PARAMETRIC STUDY OF THE EFFECT OF HINGED CONNECTORS ON THE BEHAVIOR OF ORIGAMI-INSPIRED STRUCTURES COMPRISED OF SANDWICH PANELS

Technical Publication. DETC2015-46205

Zach C. Ballard, Ashley P. Thrall, Brian J. Smith, University of Notre Dame, Notre Dame, IN, United States

THE GRADED ORIGAMI STRUCTURES

Technical Publication. DETC2015-46081

Ruikang Xie, Jianmin Li, Yan Chen, Tianjin University, Tianjin, China

ANALYSIS OF MIURA-TYPE FOLDED AND MORPHING SANDWICH BEAMS

Technical Publication. DETC2015-46380

Tamsin N. Cash, Hayden S. Warren, Joseph Gattas, University of Queensland, Brisbane, Australia

SYNTHESIS OF FOLDED FRAME STRUCTURES FROM CUBE-TYPE AND EGGBOX-TYPE KIRIGAMI GEOMETRY

Technical Publication. DETC2015-46433

Joseph Gattas, University of Queensland, Brisbane, Australia, Yan Chen, School of Mechanical Engineering, Tianjin, China

EXPERIMENTAL STUDY OF MANUFACTURE AND MECHANICAL BEHAVIOR OF SANDWICH STRUCTURE WITH COMPOSITE FOLDCORES

Technical Publication. DETC2015-47022

Kaiyu Jiang, Keqian Cai, Minjie Wang, Danyang Zhao, Dalian University of Technology, Dalian, China, Zhong You, University of Oxford, Oxford, United Kingdom

MR-12 Student Mechanism and Robot Design Competition

MR-12-2 GRADUATE DIVISION

Level 2, Hynes CC, Room 210

4:10pm – 5:50pm

Session Chair: Girish Krishnan, University of Michigan, Ann Arbor, MI, United States

MNS-1/MSNDC-1/VIB-1 Dynamics of MEMS and NEMS

MNS-1-4/MSNDC-1-4/VIB-1-4 DYNAMICS OF MEMS AND NEMS IV

Level 3, Hynes CC, Room 307

4:10pm – 5:50pm

Session Chair: Oded Gottlieb, Technion – Israel Institute of Technology, Haifa, Israel

Session Co-Chair: Hanna Cho, Texas Technology University, Lubbock, TX, United States

PARAMETRIC EXCITATION OF A MICRO-BEAM-STRING WITH ASYMMETRIC ELECTRODES: MULTIMODE DYNAMICS AND THE EFFECT OF NONLINEAR DAMPING

Technical Publication. DETC2015-46783

Karin Mora, Oded Gottlieb, Technion – Israel Institute of Technology, Haifa, Israel

ANALYTICAL APPROXIMATIONS TO NONLINEAR VIBRATION OF AN ELECTROSTATICALLY MICROBEAMS BY OPTIMAL HOMOTOPY ANALYSIS METHOD

Technical Publication. DETC2015-46397

Wankai Liu, Youhua Qian, Shengmin Chen, Zhejiang Normal University, Jinhua, Zhejiang, China

THE DYNAMICS OF A DOUBLY CLAMPED MICROBEAM NEAR THE PRIMARY RESONANCE: EXPERIMENTAL AND ANALYTICAL INVESTIGATION

Technical Publication. DETC2015-47141

Karim Masri, State University of New York Binghamton, NY, United States, Nizar Jaber, Mohammad Younis, King Abdullah University of Science & Technology, Thuwal, Saudi Arabia

MULTIFREQUENCY EXCITATION OF A CLAMPED-CLAMPED MICROBEAM

Technical Publication. DETC2015-47150

Nizar Jaber, Abdallah Ramini, Mohammad Younis, King Abdullah University of Science & Technology, Thuwal, Saudi Arabia

INVESTIGATING THE SIZE-DEPENDENT STATIC AND DYNAMIC BEHAVIOR OF CIRCULAR MICRO-PLATES SUBJECTED TO CAPILLARY FORCE USING MODIFIED COUPLE STRESS THEORY

Technical Publication. DETC2015-46487

Mohammad Hussein Kahrobaiyan, Simon Henein, Ilan Vardi, École polytechnique fédérale de Lausanne (EPFL), Neuchatel, Switzerland, Mohammad Taghi Ahmadian, Sharif University of Technology, Tehran, Iran

MSNDC-5/VIB-5
Nonlinear Dynamical Systems and Phenomena

MSNDC-5-4/VIB-5-4
INSTABILITY PHENOMENA

Level 3, Hynes CC, Room 304 4:10pm – 5:50pm

Session Chair: M. Amin Karami, University at Buffalo, Buffalo, NY, United States

Session Co-Chair: Oded Gottlieb, Technion – Israel Institute of Technology, Haifa, Israel

NONLINEAR VIBRATIONS AND INSTABILITY OF SHALLOW PYRAMIDAL TRUSSES

Technical Publication. DETC2015-46039

Carlos L. Castro, Paulo B. Goncalves, Diego Orlando, Pontifical Catholic University, Rio de Janeiro, Brazil

SELF-EXCITED DYNAMICS OF AN ELASTICALLY RESTRAINED SLENDER RIGID-BODY IN COMPRESSIBLE UNIFORM FLOW

Technical Publication. DETC2015-47196

Alex Kleiman, Oded Gottlieb, Technion – Israel Institute of Technology, Haifa, Israel

THE SKATEBOARD SPEED WOBBLE

Technical Publication. DETC2015-47326

Marco Rosatello, Jean-Luc Dion, Franck Renaud, SUPMECA, Saint Ouen, France, Luigi Garibaldi, Politecnico di Torino, Torino, Italy

THE EFFECTS OF FUSELAGE STIFFNESS ASYMMETRY IN THE POST-CRITICAL DYNAMIC BEHAVIOR OF HELICOPTERS

Technical Presentation Only. DETC2015-47966

Etienne Gourc, Leonardo Sanches, Federal University of Uberlândia, Uberlandia, Brazil, Guilhem Michon, ISAE, Toulouse, France, Valder Steffen, Federal University Of Uberlandia, Uberlandia, Brazil

ENERGY HARVESTING USING THE RATTLEBACK: THEORETICAL ANALYSIS AND SIMULATIONS OF SPIN RESONANCE

Technical Publication. DETC2015-48094

Aditya Nanda, Puneet Singla, M. Amin Karami, University at Buffalo, Buffalo, NY, United States

MSNDC-10/VIB-10
Vehicle Dynamics

MSNDC-10-4/VIB-10-4
VEHICLE DYNAMICS IV

Level 3, Hynes CC, Room 308 4:10pm – 5:50pm

Session Chair: Hiroyuki Sugiyama, The University of Iowa, Iowa City, IA, United States

Session Co-Chair: Enrico Meli, Florence University, Florence, Italy

AN INNOVATIVE PROCEDURE FOR HIGH SPEED WEIGHING IN MOTION OF RAILWAY VEHICLES

Technical Publication. DETC2015-46315

Enrico Meli, Andrea Rindi, Pierluca D'Adamio, Alice Innocenti, Luca Pugi, Florence University, Florence, Italy

THREE-POINT CONTACT STUDY OF A WHEELSET AND RAILS

Technical Publication. DETC2015-46362

Behrooz Fallahi, Chao Pan, Northern Illinois University, DeKalb, IL, United States

ANALYSIS OF TANK CAR DEFORMATIONS USING MULTIBODY SYSTEMS AND FINITE ELEMENT ALGORITHMS

Technical Publication. DETC2015-46368

Liang Wang, Huailong Shi, Ahmed A. Shabana, University Of Illinois, Chicago, IL, United States

MODELING WHEEL-RAIL CONTACT WITH PRE-CALCULATED LOOK-UP TABLES IN ARBITRARY-GEOMETRY TRACKS WITH IRREGULARITIES

Technical Publication. DETC2015-47306

Jose Escalona, Javier F. Aceituno, Universidad De Sevilla, Sevilla, Spain

VARIANCE-BASED WHEEL/RAIL CONTACT SENSITIVITY ANALYSIS IN RESPECT OF WHEELSET DYNAMICS

Technical Publication. DETC2015-47342

Seyed Milad Mousavi Bideleh, Viktor Berbyuk, Chalmers University of Technology, Gothenburg, Sweden

MSNDC-15 Computational Methods in Multibody Systems

MSNDC-15-3 COMPUTATIONAL METHODS AND ALGORITHMS

Level 3, Hynes CC, Room 305

4:10pm – 5:50pm

Session Chair: Pierangelo Masarati, Politecnico di Milano, Milan, Italy

Session Co-Chair: Imad Khan, Ford Motor Company, Dearborn, MI, United States

A REDUCTION METHODOLOGY USING FREE-FREE COMPONENT EIGENMODES AND ARNOLDI ENRICHMENT

Technical Publication. DETC2015-46777

Hadrien Tournaire, IRT SystemX, Palaiseau, France, Franck Renaud, Jean-Luc Dion, SUPMECA – LISMMA, Saint Ouen, France

FORWARD KINEMATIC ANALYSIS OF NON-DETERMIN-

ISTIC ARTICULATED MULTIBODY SYSTEMS WITH KINEMATICALLY CLOSED-LOOPS IN POLYNOMIAL CHAOS EXPANSION SCHEME

Student Competition Paper. DETC2015-46848

Sahand Sabet, Mohammad Poursina, University of Arizona, Tucson, AZ, United States

INVESTIGATION OF GPU USE IN CONJUNCTION WITH DCA-BASED ARTICULATED MULTIBODY SYSTEMS SIMULATION

Technical Publication. DETC2015-47207

Jeremy Laflin, Kurt Anderson, Michael Hans, Rensselaer Polytechnic Institute, Troy, NY, United States

PTG-3 Gear Dynamics and Noise

PTG-3-1 GEAR DYNAMICS & NOISE (1)

Level 1, Hynes CC, Room 108

4:10pm – 5:50pm

Session Chair: Philippe Velex, INSA, Villeurbanne, France

Session Co-Chair: Leonidas Paouris, Loughborough University, Loughborough, United Kingdom

HARMONIC BALANCE METHOD FOR NONLINEAR VIBRATION OF COMPOUND PLANETARY GEAR SETS

Technical Publication. DETC2015-46040

Weilin Zhu, Shijing Wu, Xiaosun Wang, Wuhan University, Wuhan, China

FAULT DETECTION OF GEARS WITH DIFFERENT ROOT CRACK SIZE USING WAVELET

Technical Publication. DETC2015-47263

Xinpeng Hu, Jilin University, Changchun, China, Xi Wu, California Polytechnic State University, San Luis Obispo, CA, United States, Jixin Wang, Jilin University, Changchun, China, James Meagher, California Polytechnic State, San Luis Obispo, CA, United States

NONLINEAR DYNAMICS OF AN AUTOMOTIVE DIFFERENTIAL HYPOID GEAR PAIR

Technical Publication. DETC2015-47324

Leonidas Paouris, Stephanos Theodossiades, Homer Rahnejat, Loughborough University, Loughborough, United Kingdom, Adam Kidson, Gregory Hunt, William Barton, Lubrizol Ltd., Hazelwood, United Kingdom

OPTIMIZATION OF PROFILE MODIFICATIONS WITH REGARD TO DYNAMIC TOOTH LOADS IN PLANETARY GEARS WITH FLEXIBLE RING-GEARS

Technical Publication. DETC2015-46062

Matthieu Chapron, Jerome Bruyere, INSA, Lyon, Villeurbanne, France, Samuel Becquerelle, Hispano-Suiza, Colombes, France, Philippe Velex, INSA, Villeurbanne, France

A MODEL FOR THE ESTIMATION OF PRESSURE RIPPLE IN TANDEM GEAR PUMPS

Technical Publication. DETC2015-46338

Mattia Battarra, Emiliano Mucchi, Giorgio Dalpiaz, University Of Ferrara, Ferrara, Italy

**MSNDC-2/VIB-2
Structures and Continuous Systems**

**MSNDC-2-3/VIB-2-3
STRUCTURES AND CONTINUOUS SYSTEMS III**

Level 3, Hynes CC, Room 302 4:10pm – 5:50pm

Session Chair: D. Dane Quinn, The University of Akron, Akron, OH, United States

Session Co-Chair: John Judge, Catholic University of America, Washington, DC, United States, Dumitru Caruntu, University of Texas Pan American, Edinburg, TX, United States

A COUPLED DETERMINISTIC-STOCHASTIC APPROACH FOR THE EFFECTS OF NON STRUCTURAL COMPONENTS IN CABIN VIBRATIONS OF LARGE AIRCRAFT

Technical Presentation Only. DETC2015-46448

Juan Loukota, Airbus Operations, Toulouse, France, Jean-Charles

Passieux, Université de Toulouse, Institut Clément Ader, Toulouse, France, Albert Lucchetti, Airbus Operations, Toulouse, France, Guilhem Michon, ISAE, Toulouse, France

GENERATION AND OPTIMIZATION OF TRAVELING VIBRATING WAVES IN SELF-ASSEMBLING SWIMMING SMART BOXES

Technical Publication. DETC2015-47681

Muath Bani-Hani, Iman Borazjani, Ehsan T Esfahani, Venkat Krovi, M. Amin Karami, University at Buffalo, Buffalo, NY, United States

CONFORMAL LASER DOPPLER VIBROMETRY VALIDATION OF FOURIER WAVENUMBER DECOMPOSITION

Technical Presentation Only. DETC2015-47755

Katherine M. Thomas, John Judge, Joseph Vignola, Catholic University of America, Washington, DC, United States

DYNAMICS AND VIBRATION OF SWITCHED RELUCTANCE MOTORS

Student Competition Paper. DETC2015-47947

Allen Mathis, D. Dane Quinn, The University of Akron, Akron, OH, United States

CALIBRATION OF MEASURED FRFS BASED ON MASS IDENTIFICATION METHOD

Technical Publication. DETC2015-48061

Jun Ren, Jun Wang, Hubei University of Technology, Wuhan, China, Kwun-Lon Ting, Tennessee Technological University, Cookeville, TN, United States, Quan Wang, Qiong Wei, Jinfeng Sun, Hubei University of Technology, Wuhan, China

**MSNDC-3/VIB-3
Design and Optimization of Dynamical Systems**

**MSNDC-3-1/VIB-3-1
DESIGN AND OPTIMIZATION OF DYNAMICAL SYSTEMS I**

Level 3, Hynes CC, Room 301 4:10pm – 5:50pm

Session Chair: Jiong Tang, University of Connecticut, Storrs, CT,

United States

Session Co-Chair: Aki Mikkola, LUT, Lappeenranta, Finland

A NEW METHOD FOR SIMULTANEOUS OPTIMIZATION OF A STRUCTURE WITH ACTIVE AND PASSIVE CONTROL VARIABLES

Technical Publication. DETC2015-46084

Ui-Jin Jung, Gyung-jin Park, Hanyang University, Ansan City, Republic of Korea

DESIGN OPTIMIZATION OF BEAMS WITH MULTI-LAYERS OF CORRUGATIONS

Technical Publication. DETC2015-46197

Wen-Nan Cheng, National Chungcheng University, Chia-yi, Taiwan

DAMPING OPTIMIZATION OF HARD-COATING THIN PLATE BY THE MODIFIED MODAL STRAIN ENERGY METHOD

Technical Publication. DETC2015-46212

Wei Sun, Mingwei Zhu, Northeastern University, Shen Yang, China

GENETIC OPTIMIZATION OF GEOMETRICAL PARAMETERS OF HIGH SPEED ROTOR

Technical Publication. DETC2015-47291

Behnam Ghalamchi, Adam Klodowski, Jussi Sopanen, Aki Mikkola, LUT, Lappeenranta, Finland

OPTIMAL DESIGN OF INTENTIONAL MISTUNING FOR A BLADED DISK WITH INTERVAL UNCERTAINTY

Technical Publication. DETC2015-47690

David Yoo, Jiong Tang, University of Connecticut, Storrs, CT, United States

MSNDC-7/VIB-7

Rotordynamics and Rotating Systems

MSNDC-7-3/ VIB-7-3

ROTORDYNAMICS AND ROTATING SYSTEMS III

Level 3, Hynes CC, Room 300

4:10pm – 5:50pm

Session Chair: Gordon Kirk, Virginia Polytechnic Institute, Blacksburg, VA, United States

Session Co-Chair: Kshitij Gupta, Indian Institute of Technology, Delhi, Delhi, India

VIBRATION DYNAMICS OF A WIND TURBINE DRIVE TRAIN HIGH SPEED SUBSYSTEM: MODELING AND VALIDATION

Technical Publication. DETC2015-46016

Saeed Asadi, Viktor Berbyuk, Håkan Johansson, Chalmers University of Technology, Goteborg, Sweden

ROTATING MACHINERY LONG COUPLING SPACER RELATED VIBRATION

Technical Publication. DETC2015-46718

Gordon Kirk, Virginia Polytechnic Institute, Blacksburg, VA, United States

MODELING ROTOR-STATOR RUB USING ROUGH SURFACE CONTACT

Technical Publication. DETC2015-47245

Phil Varney, Itzhak Green, Georgia Institute of Technology, Atlanta, GA, United States

INTEGRATED APPROACH FOR VIBRATION-BASED CONDITION MONITORING OF ROTATING MACHINES

Technical Publication. DETC2015-47122

Jyoti Sinha, The University of Manchester, Manchester, United Kingdom

DEVELOPMENT OF RECURRENCE ANALYSIS FOR FAULT DISCRIMINATION IN GEARS

Technical Publication. DETC2015-48107

Cedrick Aurelien Kitio Kwuimy, Villanova University, Villanova, PA, United States, Zaffir Chaudhry, Yan Chen, United Technologies

Research Center, East Hartford, CT, United States, C Nataraj, Villanova University, Villanova, PA, United States, Pavan Kumar Kankar, PDPM Indian Institute of Information Technology Design and Manufacturing, Jabalpur, India

MSNDC-9/VIB-9
Energy Transfer, Energy Harvesting, and Damping

MSNDC-9-4/VIB-9-4
ENERGY TRANSFER, ENERGY HARVESTING, AND DAMPING IV

Level 3, Hynes CC, Room 306 4:10pm - 5:50pm

Session Chair: Ryan L. Harne, University of Michigan, Ann Arbor, MI, United States

Session Co-Chair: Nader Jalili, Northeastern University, Boston, MA, United States

ANALYSIS OF ENERGY HARVESTING FROM IMPULSIVE FORCING

Technical Presentation Only. DETC2015-46528

Kevin Remick, University of Illinois at Urbana-Champaign, Urbana, IL, United States, D. Dane Quinn, The University of Akron, Akron, OH, United States, D. Michael McFarland, Alexander Vakakis, Lawrence Bergman, University of Illinois Urbana-Champaign, Champaign

HIGH-FREQUENCY VIBRATION ENERGY HARVESTING SUBJECT TO REPEATED IMPULSES WITH ELECTRO-MAGNETIC COUPLING

Technical Presentation Only. DETC2015-46529

Kevin Remick, University of Illinois at Urbana-Champaign, Urbana, IL, United States, D. Dane Quinn, The University of Akron, Akron, OH, United States, Alexander Vakakis, Lawrence Bergman, D. Michael McFarland, University Of Illinois Urbana-Champaign, Champaign, IL, United States

ON ENERGY HARVESTING OF A FLEXIBLE PORTAL FRAME SUPPORT EXPLOITING THE SATURATION PHENOMENON

Technical Presentation Only. DETC2015-46854

Rodrigo Tumolin Rocha, J.M. Balthazar, Sao Paulo State University, Sao Paulo, Brazil, Angelo Marcelo Tuset, Ponta Grossa, Paraná, Brazil, Vinicius Piccirillo, Ponta Grossa, Paraná, Brazil, Jorge

Luiz Palacios Felix, Alegrete, Rio Grande do Sul, Brazil, Reyolando M.L.R.F Brasil, Sto André, Brazil

OPTIMAL ATTACHMENT OF A BENDER-TYPE PIEZO-ELECTRIC ENERGY HARVESTER TO A FLEXIBLE BASE STRUCTURE

Technical Publication. DETC2015-47442

Troy Lundstrom, Nader Jalili, Northeastern University, Boston, MA, United States

Tuesday, August, 04**AVT-8****Keynote Lectures****AVT-8-2****RECENT ADVANCES IN AUTOMOTIVE ACTIVE SAFETY SYSTEMS**

Level 3, Hynes CC, Room 309

9:30am - 11:10am

CAPPD: Human-Centric Design**CIE-14-1****CAPPD: HUMAN-CENTRIC DESIGN**

Level 3, Hynes CC, Room 310 9:30am - 11:10am

Session Chair: Chih-Hsing Chu, National Tsing Hua University, Hsinchu, Taiwan

Session Co-Chair: Charlie C.L. Wang, The Chinese University of Hong Kong, Hong Kong, Hong Kong

COMPUTER AIDED ERGONOMICS THROUGH PARAMETRIC BIOMECHANICAL SIMULATION

Technical Publication. DETC2015-46064

Jörg Miehling, Jürgen Schuhhardt, Florian Paulus-Rohmer, Sandro Wartzack, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany

PRODUCT PERSONALIZATION USING 3D PARAMETRIC FACE MODELS: AN EXAMPLE OF THE EYEGLASS FRAME DESIGN

Technical Publication. DETC2015-47065

Chih-Hsing Chu, I-Jan Wang, Chun-Yang Tseng, National Tsing Hua University, Hsinchu, Taiwan

ANALYSIS OF USERS AND DESIGNERS' COGNITIVE PROCESSES IN INTERACTION DESIGN ACTIVITIES

Technical Publication. DETC2015-47166

Stefano Filippi, Daniela Barattin, University of Udine, Udine, Italy

HUMAN CENTRIC LED LIGHTING SYSTEM USING UBIQUITOUS PHYSIOLOGICAL MONITORING

Technical Publication. DETC2015-47530

Ye Sun, Zhen Liu, Michigan Technological University, Houghton, MI, United States

USER STUDY OF HAND GESTURES FOR GESTURE BASED 3D CAD MODELING

Technical Publication. DETC2015-46086

Aditya Thakur, Rahul Rai, University at Buffalo, Buffalo, NY, United State

CIE-11**AMS/SEIKM/CAPPD: Design, Simulation and Optimization for Additive Manufacturing****CIE-11-1****OPTIMIZATION FOR AM - I**

Level 3, Hynes CC, Room 313 9:30am - 11:10am

Session Chair: Seung Ki Moon, Nanyang Technological University, Singapore, Singapore

Session Co-Chair: Seung-Kyum Choi, Georgia Tech, Atlanta, GA, United States

TOWARDS ASSEMBLY-FREE METHODS FOR ADDITIVE MANUFACTURING SIMULATION

Technical Publication. DETC2015-46356

Anirudh Krishnakumar, Aaditya Chandrasekhar, Krishnan Suresh, University of Wisconsin, Madison, WI, United States

LEARNING ALGORITHM BASED MODELING AND PROCESS PARAMETERS RECOMMENDATION SYSTEM FOR BINDER JETTING ADDITIVE MANUFACTURING PROCESS

Technical Publication. DETC2015-47627

Han Chen, Yaoyao Fiona Zhao, McGill University, Montreal, QC, Canada

AN EFFICIENT DESIGN OPTIMIZATION METHOD FOR FUNCTIONAL GRADIENT MATERIAL OBJECTS BASED ON FINITE ELEMENT ANALYSIS

Technical Publication. DETC2015-47772

Feng Zhang, Chi Zhou, Sonjoy Das, University at Buffalo, Buffalo, NY, United States

SOLID MECHANICS BASED DESIGN AND OPTIMIZATION FOR SUPPORT STRUCTURE GENERATION IN STEREOLITHOGRAPHY BASED ADDITIVE MANUFACTURING

Technical Publication. DETC2015-47902

Guanglei Zhao, Chi Zhou, Sonjoy Das, University at Buffalo, Buffalo, NY, United States

A DESIGN AND FABRICATION FRAMEWORK FOR PERIODIC LATTICE- BASED CELLULAR STRUCTURES IN ADDITIVE MANUFACTURING

Technical Publication. DETC2015-46830

Recep Gorguluarslan, Georgia Institute of Technology, Atlanta, GA, United States, Umesh Gandhi, Toyota, Ann Arbor, MI, United States, Raghuram Mandapati, Toyota Research Institute North America, Ann Arbor, MI, United States, Seung-Kyum Choi, Georgia Tech, Atlanta, GA, United States

**CIE-29
CAPPD - PANEL: Divergent Engineering**

**CIE-29-1
DIVERGENT ENGINEERING**

Level 3, Hynes CC, Room 310 9:30am - 11:10am

**DAC-19
Keynote Lecture**

**DAC-19-1
ENGINEERING FOR GLOBAL DEVELOPMENT**

Level 1, Hynes CC, Room 102 9:30am - 11:10am

DFMLC-11

NSF Workshop

**DFMLC-11-1
NSF PROPOSAL WRITING WORKSHOP**

Level 1, Hynes CC, Room 107 9:30am - 11:10am

Session Chair: Gul Kremer, Pennsylvania State University, State College, PA, United States

Session Co-Chair: Linda Schmidt, University Of Maryland, College Park, MD, United States

**DTM-2
Creativity and Ideation**

**DTM-2-2
CREATIVITY AND IDEATION II**

Level 1, Hynes CC, Room 104 9:30am - 11:10am

Session Chair: Li Shu, Toronto University, Toronto, Canada

Session Co-Chair: Daniel Jensen, United States Air Force Academy, Colorado Springs, CO, United States

THE EFFECT OF ELABORATION IN CREATIVITY TESTS AS IT PERTAINS TO OVERALL CREATIVITY SCORES AND HOW IT MIGHT PREVENT A PERSON FROM THINKING OF CREATIVE IDEAS DURING THE EARLY STAGES OF BRAINSTORMING AND IDEA GENERATION

Technical Publication. DETC2015-46789

Caitlin Dippo, Barry Kudrowitz, University of Minnesota Twin Cities, Minneapolis, MN, United States

REDUCING SKETCH INHIBITION DURING CONCEPT GENERATION: PSYCHOPHYSIOLOGICAL EVIDENCE OF THE EFFECT OF INTERVENTIONS

Technical Publication. DETC2015-47669

Wan-Lin Hu, Joran Booth, Tahira Reid, Purdue University, West Lafayette, IN, United States

IN SEARCH OF EFFECTIVE DESIGN PROBLEMS FOR DESIGN RESEARCH

Technical Publication. DETC2015-47701

Fabien Durand, Michael Helms, Georgia Institute of Technology, Atlanta, GA, United States, Joanna Tsenn, Daniel McAdams, Texas A&M University, College Station, TX, United States, Julie Linsey, Georgia Institute of Technology, Atlanta, GA, United States

INVESTIGATING SPONTANEOUS FLEXIBILITY IN CONCEPT GENERATION

Technical Publication. DETC2015-47725

Tyler A. Johnson, Benjamin W. Caldwell, Matthew G. Green, LeTourneau University, Longview, TX, United States

A SCALPEL NOT A SWORD: ON THE ROLE OF STATISTICAL TESTS IN DESIGN COGNITION

Technical Publication. DETC2015-46840

Mark Fuge, University of Maryland, College Park, MD, United States

MESA-8 **Fractional Derivatives and Their Applications**

MESA-8-6 **STABILITY OF FRACTIONAL ORDER EQUILIBRIA**

Level 1, Hynes CC, Room 111 9:30am – 11:10am

Session Chair: Tom Hartley, University of Akron, Columbus, OH, United States

Session Co-Chair: Yan Li, Shandong University, Jinan, Shandong, China

COMPARISON PRINCIPLE AND SOLUTION BOUND OF FRACTIONAL DIFFERENTIAL EQUATIONS

Technical Publication. DETC2015-46223

Yufeng Xu, Central South University, Changsha, Hunan, China

INITIALIZATION ENERGY IN FRACTIONAL-ORDER SYSTEMS

Technical Publication. DETC2015-46290

Tom Hartley, University of Akron, Akron, OH, United States, Jean-Claude Trigeassou, University of Bordeaux, Talence, France, Carl F. Lorenzo, NASA Glenn Research Center, Cleveland, OH, United States, Nezha Maamri, University of Poitiers, Poitiers, France

REALIZATIONS FOR DETERMINING THE ENERGY STORED IN FRACTIONAL-ORDER OPERATORS

Technical Publication. DETC2015-46291

Tom Hartley, University of Akron, Columbus, OH, United States, Carl F. Lorenzo, NASA Glenn Research Center, Cleveland, OH, United States

IMPROVEMENT OF STRICT LMI ADMISSIBILITY CRITERIA OF SINGULAR SYSTEMS: CONTINUOUS AND DISCRETE

Technical Publication. DETC2015-46690

Xuefeng Zhang, Northeastern University, Shenyang, Liaoning, China, YangQuan Chen, University of California Merced, Merced, CA, United States

D-STABILITY BASED LMI CRITERIA OF STABILITY AND STABILIZATION FOR FRACTIONAL ORDER SYSTEMS

Technical Publication. DETC2015-46692

Xuefeng Zhang, Northeastern University, Shenyang, China, YangQuan Chen, University of California Merced, Merced, CA, United States

MESA-18 **Small Unmanned Aerial Vehicle Technologies and Applications**

MESA-18-1 **SMALL UNMANNED AERIAL AND ELECTRICAL VEHICLE TECHNOLOGIES AND APPLICATIONS**

Level 1, Hynes CC, Room 110 9:30 am-11:10am

Session Chair: Haibin Duan, Beihang University, Beijing, China

Session Co-Chair: Ignacio Mas, Instituto Tecnológico de Buenos Aires, Buenos Aires, Argentina

CHAOTIC CHEMICAL REACTION OPTIMIZATION AP-

PROACH TO RECEDING HORIZON CONTROL FOR MULTIPLE UAVS FORMATION

Technical Publication. DETC2015-46335

Zenghu Zhang, Haibin Duan, Beihang University, Beijing, China

ACTIVE DISTURBANCE COMPENSATING TRACKING CONTROL OF AN UNMANNED QUADROTOR HELICOPTER

Student Competition Paper. DETC2015-46998

Zhixiang Liu, Xiang Yu, Chi Yuan, Youmin Zhang, Concordia University, Montreal, QC, Canada, Jun Luo, Shanghai University, Shanghai, China

VISUAL TARGET-TRACKING USING A FORMATION OF UNMANNED AERIAL VEHICLES

Technical Publication. DETC2015-47789

Ignacio Mas, Sebastian Curi, Instituto Tecnológico de Buenos Aires, Buenos Aires, Argentina, Christopher Kitts, Santa Clara University, Burlingame, CA, United States, Juan I. Giribet, Universidad de Buenos Aires, Buenos Aires, Argentina

APPLICATION OF MODEL PREDICTIVE CONTROL TO POSITION AND HEIGHT LIMITATION OF A QUADROTOR UNMANNED AERIAL VEHICLE

Technical Publication. DETC2015-47790

Yiqun Dong, Fudan University, Shanghai, China, Zhixiang Liu, Concordia University, Montreal, QC, Canada, Bin Yu, Concordia University, Quebec, QC, Canada, Youmin Zhang, Concordia University, Montreal, QC, Canada

IMPROVED VOLTAGE SAG DETECTION METHOD AND OPTIMAL DESIGN FOR THE DIGITAL LOW-PASS FILTER IN SMALL UAVS

Technical Publication. DETC2015-46401

Shuiqiang Pei, Xiaoguang Hu, Guofeng Zhang, Li Fu, Beihang University, Beijing, China

MR-1

Planar Mechanism Analysis and Synthesis

MR-1-5 GEARING AND TRANSMISSION

Level 2, Hynes CC, Room 204

9:30am – 11:10am

Session Chair: Huafeng Ding, Yanshan University, Qinhuangdao, China

Session Co-Chair: Joseph Piacenza, California State University Fullerton, Fullerton, CA, United States

NOVEL CONFIGURATIONS HYBRID TRANSMISSIONS WITH A SIMPLE PLANETARY GEAR TRAIN

Technical Publication. DETC2015-46224

Huu-Tich Ngo, Hong-Sen Yan, National Cheng Kung University, Tainan, Taiwan

EFFECT OF VARIATION OF LINK LENGTHS AND STIFFNESS ON THE GEARING RATIO OF A FOUR BAR MECHANISM WITH APPLICATION TO AIRCRAFT TRIM TABS

Technical Publication. DETC2015-46054

Abey Dessalegn, Hamid Lankarani, Yimesker Yihun, Wichita State University, Wichita, KS, United States, Joao Paulo Flores Fernandes, University of Minho, Guimaraes, Portugal

DESIGN A NEW ANGULAR TRANSMISSION DEVICE BASED ON A FOUR-BAR LINKAGE MECHANISM

Technical Publication. DETC2015-46146

Jong-Won Kim, Jeongae Bak, Jongwon Kim, Seoul National University, Seoul, Republic of Korea, TaeWon Seo, Yeungnam University, Gyeongsan, Republic of Korea

AUTOMATIC STRUCTURAL SYNTHESIS OF EPICYCLIC GEAR TRAINS WITH ONE MAIN SHAFT

Technical Publication. DETC2015-47101

Huafeng Ding, Shuai Liu, Peng Huang, Changwang Cai, Zhen Huang, Yanshan University, Qinhuangdao, China

MR-3

Robot Kinematics and Motion Planning

MR-3-1 ROBOT KINEMATICS

Level 2, Hynes CC, Room 206 9:30am – 11:10am

Session Chair: Dimiter Zlatanov, University of Genoa, Genoa, Italy

Session Co-Chair: Damien Chablat, CNRS, Nantes, France

AN ALGEBRAIC METHOD TO CHECK THE SINGULARITY FREE PATHS FOR PARALLEL ROBOTS

Technical Publication. DETC2015-46230

Ranjan Jha, IRCCyN, Nantes, France, Damien Chablat, CNRS, Nantes, France, Fabrice Rouillier, Guillaume Moroz, INRIA, Paris, France

KINEMATIC ANALYSIS AND TRAJECTORY PLANNING OF THE ORTHOGLIDE 5-AXIS

Technical Publication. DETC2015-46292

Stephane Caro, Damien Chablat, CNRS, Nantes, France, Philippe Lemoine, Ecole Centrale de Nantes, Nantes, France, Philippe Wenger, IRCCYN, Nantes, France

REPRESENTATION OF 3D ANGULAR MOTION BY PROJECTIVE ANGLES

Technical Publication. DETC2015-46242

Giovanni Legnani, University of Brescia, Brescia, Italy, Irene Fassi, Institute of Industrial Technologies and Automation, Milano, Italy

OPERATION MODES AND SINGULARITIES OF 3-PRS PARALLEL MANIPULATORS WITH DIFFERENT ARRANGEMENTS OF P-JOINTS

Technical Publication. DETC2015-47935

Latifah Nurahmi, IRCCyN – Ecole Centrale de Nantes, France, France, Stephane Caro, CNRS – IRCCYN, Nantes, France, Philippe Wenger, IRCCYN, Nantes, France

A GEOMETRICAL APPROACH TO THE INVERSE KINEMATICS OF 6R SERIAL ROBOTS WITH OFFSET WRISTS

Technical Publication. DETC2015-47950

Cuong Trinh, Matteo Zoppi, Dimiter Zlatanov, Rezia Molfino, University of Genova, Genova, Italy

MR-8 Novel Mechanisms, Robots and Applications

MR-8-1 COMPLIANCE

Level 2, Hynes CC, Room 202 9:30am – 11:10am

Session Chair: Hai-Jun Su, The Ohio State University, Columbus, OH, United States

Session Co-Chair: Jian Dai, Kings College-University of London, London, United Kingdom

SHAPE OPTIMIZATION OF 2D COMPLIANT LINKS FOR DESIGN OF INHERENTLY SAFE ROBOTS

Technical Publication. DETC2015-46622

Yu She, Hai-Jun Su, Carter J. Hurd, The Ohio State University, Columbus, OH, United States

ANALYSIS AND DESIGN OF A REMOTE CENTER COMPLIANCE UNIVERSAL JOINT

Technical Publication. DETC2015-47749

Pierre-Olivier Dubois, Lionel Birglen, Polytechnique Montreal, Montreal, QC, Canada

STIFFNESS ANALYSIS, DESIGN AND VALIDATION OF A PARALLEL-MECHANISM EQUIVALENT SUSPENSION SYSTEM

Technical Publication. DETC2015-46641

Chen Qiu, Ketao Zhang, King's College London, London, United Kingdom, Jing-Shan Zhao, Tsinghua University, Beijing, China, Jian Dai, Kings College-London, London, United Kingdom

DESIGN OF A NOVEL FLEXIBLE ENDOSCOPE: CARDIOSCOPE

Technical Publication. DETC2015-46123

Zheng Li, The Chinese University of Hong Kong, Hong Kong, Hong Kong, Min Zin Oo, Varun Nalam, Duc Thang Vu, Haoyong Yu, Hongliang Ren, Theodoros Kofidis, National University of Singapore, Singapore, Singapore

DESIGN OF A MULTI-STABLE COMPLIANT JOINT FOR HYPER-REDUNDANT ROBOTIC MANIPULATORS

Technical Publication. DETC2015-47993

Hao Pan, Hao Wang, Yong Zhao, Genliang Chen, Samuel Guerche, Lingyu Kong, Shanghai Jiao Tong University, Shanghai, China

**MR-10
Origami-Based Engineering Design**

**MR-10-6
ORIGAMI-BASED DEPLOYMENT AND ACTUATION**

Level 2, Hynes CC, Room 203 9:30am – 11:10am

Session Chair: Mary Frecker, Pennsylvania State University, University Park, PA, United States

Session Co-Chair: Richard Malak, Texas A&M University, College Station, TX, United States

SOFT ORIGAMI: CLASSIFICATION, CONSTRAINT, AND ACTUATION OF HIGHLY COMPLIANT ORIGAMI STRUCTURES

Technical Publication. DETC2015-46877

Charles M. Wheeler, United States, Martin L. Culpepper, Massachusetts Institute of Technology, Cambridge, MA, United States

REINFORCEMENT LEARNING FOR CONTROL OF A SHAPE MEMORY ALLOY BASED SELF-FOLDING SHEET

Technical Publication. DETC2015-46980

Peyman Moghadas, Richard Malak, Darren J. Hartl, Texas A&M University, College Station, TX, United States

CONSIDERING MECHANICAL ADVANTAGE IN THE DESIGN AND ACTUATION OF AN ORIGAMI-BASED MECHANISM

Technical Publication. DETC2015-47708

Eric W. Wilcox, Brigham Young University, Provo, UT, United States, Adam Shrager, Landen Bowen, Mary Frecker, Paris von Lockette, Timothy Simpson, Pennsylvania State University, University Park, PA, United States, Spencer Magleby, Brigham Young University, Provo, UT, United States, Robert Lang, Robert J. Lang Origami, Alamo, CA, United States, Larry Howell, Brigham Young University, Provo, UT, United States

LARGE-CURVATURE DEPLOYABLE DEVELOPABLE STRUCTURES VIA LAMINA EMERGENT ARRAYS

Technical Publication. DETC2015-46636

Todd Nelson, Brigham Young University, Provo, UT, United States, Robert Lang, Robert J. Lang Origami, Alamo, CA, United States, Spencer Magleby, Larry Howell, Brigham Young University, Provo, UT, United States

ELASTIC WING DEPLOYMENTS IN BEETLES AND THEIR FOLDING MECHANISMS

Technical Publication. DETC2015-46559

Kazuya Saito, Yoji Okabe, The University of Tokyo, Tokyo, Japan

**MR-11
Software and Education in Mechanisms and Robots**

**MR-11-1
SOFTWARE AND EDUCATION IN MECHANISMS AND ROBOTICS**

Level 2, Hynes CC, Room 210 9:30am – 11:10am

Session Chair: David Myszka, University of Dayton, Dayton, OH, United States

Session Co-Chair: Ilie Talpasanu, Wentworth Institute of Technology, Cambridge, MA, United States

EVALUATION OF HAPTIC MODULES FOR TRAINING IN UNDERGRADUATE MECHANICS

Technical Publication. DETC2015-46060

Ernur Karadogan, University of Texas - Pan-American, Edinburg, TX, United States, Robert Williams, Figen Karadogan, Ohio University,

Athens, OH, United States

A SOFTWARE TOOL FOR ANALYZING MOTIONS AND LOADING IN SPATIAL TENSEGRITY STRUCTURES

Technical Publication. DETC2015-46339

Carl Nelson, University of Nebraska – Lincoln, Lincoln, NE, United States

EVALUATING THE USE OF DIGITIZED, ONLINE, AUTOMATED HOMEWORK IN A DYNAMICS OF MACHINERY COURSE

Technical Publication. DETC2015-47558

Stephen Canfield, Scott Hill, Tristan Hill, Stephen Zuccaro, Tennessee Technological University, Cookeville, TN, United States

A SOFTWARE FOR KINETOSTATIC SYNTHESIS OF COMPLIANT MECHANISMS

Technical Publication. DETC2015-47578

Omer Anil Turkkan, Hai-Jun Su, The Ohio State University, Columbus, OH, United States

KINEMATIC ANALYSIS OF 3D PRINTING MECHANISMS

Technical Publication. DETC2015-48071

Ilie Talpasanu, Stephen Chomyszak, Wentworth Institute of Technology, Boston, MA, United States

MNS-10 Keynote Lecture

MNS-10-1 NOVEL APPROACHES TO CHARACTERIZING NANOSCALE FRICTION AND WORK OF ADHESION OF CNTS USING MEASUREMENTS FOLLOWED BY MODELING

Level 3, Hynes CC, Room 307

9:30am – 11:10am

MSNDC-5/VIB-5

Nonlinear Dynamical Systems and Phenomena

MSNDC-5-5/VIB-5-5

NONLINEAR DYNAMICS AND CONTROL IN MEMS

Level 3, Hynes CC, Room 304

9:30am – 11:10am

Session Chair: Atsushi Yao, Kyoto University, Kyoto, Japan

Session Co-Chair: Hiroshi Yabuno, University of Tsukuba, Tsukuba-City, Japan

A STUDY ON REPROGRAMMABLE LOGIC-MEMORY DEVICE IN A NONLINEAR MICROELECTROMECHANICAL RESONATOR

Technical Presentation Only. DETC2015-46404

Atsushi Yao, Takashi Hikiyama, Kyoto University, Kyoto, Japan

GLOBAL DYNAMICS EFFECTS OF A FEEDBACK CONTROL OF NONCONTACT ATOMIC FORCE MICROSCOPY

Technical Presentation Only. DETC2015-46461

Valeria Settini, Giuseppe Rega, Sapienza University of Rome, Rome, Italy

NONLINEAR HARMONIC VIBRATION ANALYSIS OF A FULLY CLAMPED MICRO-BEAM

Technical Publication. DETC2015-46862

Mehran Sadri, Iran University of Science and Technology, Teheran, Iran, Davood Younesian, Ebrahim Esmailzadeh, University Of Ontario Institute Of Technology, Oshawa, ON, Canada

UTILIZATION OF SELF-EXCITED OSCILLATION IN COUPLED CANTILEVERS FOR MASS SENSING

Technical Presentation Only. DETC2015-46408

Daichi Endo, University of Tsukuba, Tsukuba-City, Japan, Keiichi Higashino, University of Keio, Yokohama-City, Japan, Hiroshi Yabuno, University of Tsukuba, Tsukuba-City, Japan, Yasuyuki Yamamoto, National Institute of Advanced Industrial Science and Technology, Tsukuba-City, Japan, Sohei Matsumoto, National Institute for Advanced Industrial Science and Technology, Tsukuba, Japan

ON PERMANENT ROTATIONS OF A SYSTEM OF TWO COUPLED GYROSTATS IN A CENTRAL NEWTONIAN FORCE FIELD

Technical Publication. DETC2015-47434

Dmitriy Chebanov, Jose A. Salas, City University of New York, Long Island City, NY, United States

PTG-3
Gear Dynamics and Noise

PTG-3-2
GEAR DYNAMICS & NOISE (2)

Level 1, Hynes CC, Room 108 9:30am – 11:10am

Session Chair: Tommaso Tamarozzi, KU Leuven, Leuven, Belgium

Session Co-Chair: Murat Inalpolat, University of Massachusetts Lowell, Lowell, MA, United States

EFFICIENT TRANSIENT ANALYSIS OF THE HIGH-SPEED STAGE OF A WIND TURBINE GEARBOX BY ADVANCED MODEL REDUCTION TECHNIQUES AND MEMORY-EFFECTIVE DISCRETIZATION

Technical Publication. DETC2015-47093

Tommaso Tamarozzi, Bart Blockmans, Wim Desmet, KU Leuven, Leuven, Belgium

ANALYTICAL INVESTIGATIONS ON THE MESH STIFFNESS FUNCTION OF SOLID NARROW-FACED SPUR AND HELICAL GEARS

Technical Publication. DETC2015-46061

Xiaoyu Gu, Philippe Velex, Philippe Sainsot, Jerome Bruyere, INSA Lyon, Villeurbanne, France

DEVELOPMENT OF PAIRING PERFORMANCE TESTER FOR VEHICLES CYLINDRICAL GEARS

Technical Publication. DETC2015-46751

Zanhui Shu, Zhaoyao Shi, Xiaoyi Wang, Fayang He, Hongfang Chen, Beijing University of Technology, Beijing, China

MODELING AND BIFURCATION CHARACTERISTICS OF DOUBLE STAGE PLANETARY GEAR TRAIN WITH MULTIPLE CLEARANCES

Technical Publication. DETC2015-46105

Rupeng Zhu, Dongping Sheng, Fengxia Lu, Miaomiao Li, Heyun Bao, Nanjing University of Aeronautics and Astronautics, Nanjing, China

A DYNAMIC MODEL FOR DOUBLE-PLANET PLANETARY GEARSETS

Technical Publication. DETC2015-47426

Dylan C. Fyler, Murat Inalpolat, University of Massachusetts Lowell, Lowell, MA, United States

PTG-9
Transmission Systems Including Novel Concepts

PTG-9-1
TRANSMISSION SYSTEMS INCLUDING NOVEL CONCEPTS (1)

Level 1, Hynes CC, Room 109 9:30am – 11:10am

Session Chair: Viktor Berbyuk, Chalmers University of Technology, Gothenburg, Sweden

Session Co-Chair: Kazuhiro Sato, Kawasaki Heavy Industries, Ltd., Akashi, Japan

DESIGN, ANALYSIS, AND TESTS OF DIFFERENTIAL PLANETARY GEAR SYSTEM FOR OPEN ROTOR POWER GEARBOX

Technical Publication. DETC2015-46414

Kazuhiro Sato, Hidenori Arisawa, Kawasaki Heavy Industries, Ltd., Akashi, Japan, Tatsuhiko Goi, Tetsuya Matsuoka, Toshiaki Taguchi, Hideyuki Imai, Akashi, Japan, Tooru Nishida, Takahiko Banno, Kawasaki Heavy Industries, Ltd., Akashi, Japan

ANALYSIS OF THE NOVEL TWO-SPEED UNINTERRUPTED TRANSMISSION WITH CENTRIFUGAL CLUTCH FOR ELECTRIC VEHICLE

Technical Publication. DETC2015-46739

Haijun Song, Jian Song, Shengnan Fang, Yuzhuo Tai, Fei Li, Truong Sinh Nguyen, Tsinghua University, Beijing, China

TOWARDS PARETO OPTIMIZATION OF PERFORMANCE OF A GENERIC SYNCHRONIZER OF TRANSMISSION SYSTEMS

Technical Publication. DETC2015-46773

Viktor Berbyuk, Chalmers University of Technology, Gothenburg, Sweden

MSNDC-2/VIB-2 Structures and Continuous Systems

MSNDC-2-4/VIB-2-4 STRUCTURES AND CONTINUOUS SYSTEMS IV

Level 3, Hynes CC, Room 302

9:30am – 11:10am

Session Chair: Balakumar Balachandran, University Of Maryland, College Park, MD, United States

Session Co-Chair: Andrea Arena, Sapienza University of Rome, Rome, Italy, Tianjun Yu, Beijing University of Technology, Beijing, China

THERMALLY INDUCED DEFORMATION OF ULTRA-LARGE TRUSS SUPPORT MEMBRANE STRUCTURE

Technical Publication. DETC2015-46147

Jie Wang, Jianping Jiang, Dongxu Li, National University of Defense Technology, Changsha, China

FREE VIBRATION OF FLEXIBLE CABLES

Technical Publication. DETC2015-46364

Andrea Arena, Sapienza University of Rome, Rome, Italy

NONLINEAR DYNAMICS OF FLEXIBLE MULTI-BEAM STRUCTURES CONSIDERING MODAL INTERACTIONS

Technical Publication. DETC2015-46597

Tianjun Yu, Wei Zhang, Xiaodong Yang, Beijing University of

Technology, Beijing, China

DYNAMIC MODELING OF A ROLLING FLEXIBLE SPHERE

Student Competition Paper. DETC2015-46787

Francois R. Hogan, McGill University, Montreal, QC, Canada, James R. Forbes, Alex Walsh, University of Michigan, Ann Arbor, MI, United States

VIBRATION ANALYSIS OF SIDE CRACKED MINDLIN PLATES WITH DIFFERENT BOUNDARY CONDITIONS

Technical Publication. DETC2015-46900

Lihua Chen, Jian Xue, Wei Zhang, Beijing University of Technology, Beijing, China

MSNDC-3/VIB-3 Design and Optimization of Dynamical Systems

MSNDC-3-2/VIB-3-2 DESIGN AND OPTIMIZATION OF DYNAMICAL SYSTEMS II

Level 3, Hynes CC, Room 301

9:30am – 11:10am

Session Chair: Guang Dong, Tesla Motors, Fremont, CA, United States

Session Co-Chair: Amit Shukla, Miami University, Oxford, OH, United States

OPTIMAL SENSOR PLACEMENT USING CHAOTIC MONKEY SEARCH ALGORITHM

Technical Publication. DETC2015-46863

Fuli Zhang, University of Iowa, Iowa, IA, United States, Olga Brezhneva, Amit Shukla, Miami University, Oxford, OH, United States

MULTI-OBJECTIVE OPTIMAL DESIGN AND VALIDATION OF SLIDING MODE CONTROL

Technical Publication. DETC2015-46908

Zhi-Chang Qin, Fu-Rui Xiong, Qian Ding, Tianjin University, Tianjin, China, Carlos Hernandez, Jes'us Fernandez, Oliver Schuetz, CINVESTAV-IPN, Mexico City, Mexico, Jian-Qiao Sun, Universi-

ty Of California, Merced, Merced, CA, United States

GRADIENT-BASED OPTIMIZATION OF PARAMETERIZED CAD GEOMETRIES

Technical Presentation Only. DETC2015-47224

Timothée Leblond, Pierre Froment, Paul de Nazelle, IRT SystemX, Palaiseau, France, Reda Sellakh, Philippe Serré, SUPMECA, Saint-Ouen, France, Gaël Chevallier, CNRS-UFC-ENSMM-UTBM, Besançon, France

CONCURRENT CONTACT PLANNING AND TRAJECTORY OPTIMIZATION IN ONE STEP WALKING MOTION

Technical Publication. DETC2015-47745

Carlotta Mummolo, New York University, Brooklyn, NY, United States, Luigi Mangialardi, Politechnic of Bari, Bari, Italy, Joo H. Kim, New York University, Brooklyn, NY, United States

TOPOLOGY OPTIMIZATION FOR THE NATURAL FREQUENCY OF MULTIBODY DYNAMICS SYSTEMS WITH MULTI-FUNCTIONAL COMPONENTS

Technical Publication. DETC2015-47891

Guang Dong, Tesla Motors, Fremont, CA, United States

**MSNDC-7/VIB-7
Rotordynamics and Rotating Systems**

**MSNDC-7-4/VIB-7-4
ROTORDYNAMICS AND ROTATING SYSTEMS IV**

Level 3, Hynes CC, Room 300 9:30am – 11:10am

Session Chair: José M. Balthazar, São Paulo State University, Bauru, Brazil

Session Co-Chair: Sebastien Baguet, INSA de Lyon, Villeurbanne Cedex, France

DAMPING CHARACTERISTICS OF NON-SYNCHROUS TURBINE BLADE VIBRATION

Technical Publication. DETC2015-46416

Ryou Akiyama, Mitsubishi Hitachi Power Systems, Ltd, Hitachi-shi,

Japan, Koki Shiohata, Ibaraki University, Ibaraki-ken, Japan, Tomomi Nakajima, Yutaka Yamashita, MHPS Ltd., Ibaraki-ken, Japan

EXPERIMENTAL AND ANALYTICAL STUDY OF CORIOLIS EFFECTS IN BLADED DISK

Technical Publication. DETC2015-46621

Valentina Ruffini, Christoph Schwingshackl, Imperial College, London, United Kingdom, Jeffrey S. Green, Rolls-Royce PLC, Derby, United Kingdom

PARAMETRIC ANALYSIS OF THE NONLINEAR BEHAVIOR OF ROTATING STRUCTURES

Student Competition Paper. DETC2015-46816

LihanXie, Sebastien Baguet, LaMCoS Insa de Lyon, Villeurbanne, France, Benoit Prabel, CEA Saclay, Gif Sur Yvette, France, Regis Dufour, INSA Lyon, Villeurbanne, France

DETECTION OF ROTATING BLADE FAULTS FROM LATERAL VIBRATIONS OF A ROTOR-DISK-BLADE SYSTEM

Technical Publication. DETC2015-46567

Surajudeen Adewusi, Royal Commission for Jubail & Yanbu, Jubail, Saudi Arabia

GEOMETRIC MODELING AND ROBUST CONTROL OF A GYROSCOPIC SYSTEM

Technical Publication. DETC2015-46477

Diego Colón, Bruno A. Angelico, Fabio Y. Toriumi, Paulo U. M. Liduário, The University of São Paulo, São Paulo, Brazil, José M. Balthazar, São Paulo State University, Bauru, Brazil

**MSNDC-9/VIB-9
Energy Transfer, Energy Harvesting, and Damping**

**MSNDC-9-5/VIB-9-5
ENERGY TRANSFER, ENERGY HARVESTING, AND DAMPING V**

Level 3, Hynes CC, Room 306 9:30am – 11:10am

Session Chair: Alper Erturk, Georgia Institute of Technology, Atlanta, GA, United States

Session Co-Chair: Christopher Rahn, The Pennsylvania State University, University Park, PA, United States

A TWO-STAGE FORCE AMPLIFICATION FOR VIBRATION ENERGY HARVESTER USING MULTI-LAYER PIEZOELECTRIC STACK

Technical Presentation Only. DETC2015-47634

Lirong Wang, Shubin Chen, Wanlu Zhou, State University of New York at Stony Brook, Stony Brook, NY, United States, Patrick Musgrave, Virginia Tech, Blacksburg, VA, United States, Tian-Bing Xu, National Institute Of Aerospace, Hampton, VA, United States, Lei Zuo, Virginia Tech, Blacksburg, VA, United States

EFFICIENT AND SENSITIVE ENERGY HARVESTING USING PIEZOELECTRIC MEMS COMPLIANT MECHANISMS

Technical Publication. DETC2015-47539

Xiaokun Ma, Hong Goo Yeo, Christopher Rahn, Susan Trolier McKinstry, The Pennsylvania State University, University Park, PA, United States

PIEZOELECTRIC ENERGY HARVESTING FROM TORSIONAL VIBRATION

Technical Publication. DETC2015-47574

Patrick Musgrave, Virginia Tech, Blacksburg, VA, United States, Wanlu Zhou, State University of New York at Stony Brook, Stony Brook, NY, United States, Lei Zuo, Virginia Tech, Blacksburg, VA, United States

A NOVEL MULTI-DIRECTIONAL NONLINEAR PIEZOELECTRIC ENERGY HARVESTER COUPLED WITH NONLINEAR CONDITIONING CIRCUITS

Student Competition Paper. DETC2015-47334

Zhengbao Yang, Jean W. Zu, University Of Toronto, Toronto, ON, Canada

HARMONIC BALANCE ANALYSIS AND EXPERIMENTAL VALIDATION OF A NONLINEAR BROADBAND PIEZOELECTRIC ENERGY HARVESTER FOR LOW AMBIENT

VIBRATIONS

Student Competition Paper. DETC2015-47775

Stephen Leadenham, Alper Erturk, Georgia Institute of Technology, Atlanta, GA, United States

MSNDC-13/VIB-13

Industrial Applications of Dynamics, Vibration, and Acoustics

MSNDC-13-1/VIB-13-1

INDUSTRIAL APPLICATIONS I

Level 3, Hynes CC, Room 305

9:30am – 11:10am

Session Chair: Bruce Geist, Fiat Chrysler Automobiles, Auburn Hills, MI, United States

Session Co-Chair: Brian Olson, The Johns Hopkins University Applied Physics Lab, Laurel, MD, United States

BETTER FUEL ECONOMY THROUGH VIBRATION CONTROL

Technical Presentation Only. DETC2015-46350

Bruce Geist, Fiat Chrysler Automobiles, Auburn Hills, MI, United States, Steven Shaw, Michigan State University, East Lansing, MI, United States

VIBRO-ACOUSTIC MODELING AND RADIATED NOISE PREDICTION FOR AN I4 ENGINE FRONT COVER

Technical Presentation Only. DETC2015-46359

Kevin Hu, Jaspal Sandhu, Fiat Chrysler Automobiles, Auburn Hills, MI, United States

TWO-SCALE COMMAND SHAPING FOR REDUCING HYBRID VEHICLE POWERTRAIN VIBRATION DURING ENGINE RESTART

Technical Presentation Only. DETC2015-46483

J. Justin Wilbanks, Georgia Institute of Technology, Atlanta, GA, United States, Michael J. Leamy, Georgia Tech, Atlanta, GA, United States

BIOMED-7
General Biomedical Devices

BIOMED-7-1
IMAGING AND OPTICAL TECHNIQUES

Level 2, Hynes CC, Room 209 9:30am – 11:10am

Session Chair: Nader Jalili, Northeastern University, Boston, MA, United States

Session Co-Chair: Reza Fotouhi, University Of Saskatchewan, Saskatoon, SK, Canada

AN AUTOMATIC SYSTEM FOR ANALYZING PHANTOM IMAGES TO DETERMINE THE RELIABILITY OF PET/SPECT CAMERAS

Technical Publication. DETC2015-46254

Miri Weiss Cohen, Braude College of Engineering, Karmiel, Israel, John A. Kennedy, Rambam Health Care Campus, Haifa, Israel, Archil Pirmisashvili, Gleb Orlikov, Braude College of Engineering, Karmiel, Israel

LOW-COST AND LABEL-FREE BIO-SENSING PLATFORM EMPLOYING DOUBLE-SIDED GRATING WAVEGUIDE COUPLERS

Technical Publication. DETC2015-46296

Guo-En Chang, Yi-Fan Ku, Hsun-Yuan Li, Yu-Chung Lin, Wen-hsin Hsieh, National Chung Cheng University, Chia-yi, Taiwan

DEVELOPMENT OF A REMOTE ULTRASOUND IMAGING SYSTEM

Technical Publication. DETC2015-46826

Reza Fotouhi, Rahim Orajji, Carlos Mondragon, Brennan Berryman, University Of Saskatchewan, Saskatoon, SK, Canada

STATIC AND DYNAMIC DEFORMATIONS MEASUREMENTS OF THIN BIO-TISSUES WITH DIGITAL HOLOGRAPHIC INTERFEROMETRY

Technical Publication. DETC2015-46971

Peitao Liangfu, Zhong Liancheng, South China University of Technology, Tianhe, China

AUTOMATED CELL SEGMENTATION METHOD FOR EXTRACTING CELL INFORMATION FROM PHASE CONTRAST MICROSCOPY OF A MICROFLUIDIC DEVICE

Technical Publication. DETC2015-47451

Masoud Khabiry, Nader Jalili, Northeastern University, Boston, MA, United States

CIE-35
Keynote Lecture

CIE-35-1
THERE'S NO "INTERNET OF THINGS" WITHOUT THE "THINGS." THE IMPACT OF THE IOT ON PRODUCT DEVELOPMENT

Level 3, Hynes CC, Room 311 11:40am – 12:40pm

DAC-13
Multidisciplinary Design Optimization

DAC-13-1
MULTIDISCIPLINARY DESIGN OPTIMIZATION

Level 1, Hynes CC, Room 101 11:40am – 12:40am

Session Chair: Po Ting Lin, Chung Yuan Christian University, Chungli, Taiwan

Session Co-Chair: James Allison, University of Illinois Urbana-Champaign, Champaign, IL, United States

A NEW SEQUENTIAL MULTI-DISCIPLINARY OPTIMIZATION METHOD FOR BI-LEVEL DECOMPOSED SYSTEMS

Technical Publication. DETC2015-46307

Jianhua Zhou, Shanghai Jiao Tong University, Shanghai, China, Mian Li, UM-SJTU Joint Institute, Shanghai, China, Min Xu, Shanghai Jiao Tong University, Shanghai, China

DECOMPOSITION-BASED DESIGN OPTIMIZATION OF HYBRID ELECTRIC POWERTRAIN ARCHITECTURES: SIMULTANEOUS CONFIGURATION AND SIZING DESIGN

Technical Publication. DETC2015-46861

Alparslan Emrah Bayrak, Namwooo Kang, Panos Papalambros,
University of Michigan, Ann Arbor, MI, United States

INTRODUCTION OF A TRADEOFF INDEX FOR EFFICIENT TRADE SPACE EXPLORATION

Technical Publication. DETC2015-46895

Mehmet Unal, Gordon Warn, Timothy Simpson, Pennsylvania State
University, University Park, PA, United States

DAC-7 Design for the Developing World

DAC-7-1

DESIGN FOR THE DEVELOPING WORLD I

Level 1, Hynes CC, Room 102 11:40am - 12:40pm

Session Chair: Kenneth "Mark" Bryden, Iowa State University, Ames,
IA, United States

Session Co-Chair: Amos G. Winter V, Massachusetts Institute of
Technology, Cambridge, MA, United States

PRESERVING THE USABILITY OF A PERUVIAN COOK-STOVE: A MORE BALANCED APPROACH TO IMPROVED COOKSTOVE DESIGN

Technical Publication. DETC2015-47270

Kendall Thacker, McCall Barger, Christopher Mattson, Brigham
Young University, Provo, UT, United States

MODELING TECHNOLOGY AND POLICY STRATEGIES FOR ENERGY SERVICES IN RURAL DEVELOPING COMMUNITIES

Technical Publication. DETC2015-46806

Nordica MacCarty, Kenneth "Mark" Bryden, Iowa State University,
Ames, IA, United States

DEVELOPMENT OF BIOMASS ENERGY TECHNOLOGIES AND BUSINESS MODELS FOR SOUTHERN AFRICA

Technical Publication. DETC2015-48033

Malena Agyeman, Nathan Johnson, Arizona State University, Mesa,
AZ, United States

DAC-15 Platform Architecture and Product Family Design

DAC-15-1

PLATFORM ARCHITECTURE AND PRODUCT FAMILY DESIGN I

Level 1, Hynes CC, Room 103 11:40am - 12:40pm

Session Chair: Scott Ferguson, North Carolina State University,
Raleigh, NC, United States

Session Co-Chair: Christopher Hoyle, Oregon State University,
Corvallis, OR, United States

TRADE-OFF ANALYSIS OF SYSTEM ARCHITECTURE MODULARITY USING DESIGN STRUCTURE MATRICES

Technical Publication. DETC2015-46403

Roozbeh Sanaei, Kevin Otto, Katja Holtta-Otto, Jianxi Luo, Singa-
pore University of Technology and Design, Singapore, Singapore

SENSITIVITY AND CORRELATION ANALYSIS AND IMPLICATIONS IN SCALABLE PRODUCT FAMILY DESIGN FOR PLUG-IN HYBRID ELECTRIC VEHICLES

Technical Publication. DETC2015-46687

Zhila Pirmoradi, Gary Wang, Simon Fraser University, Surrey, BC,
Canada

ASSESSING AND GENERATING MODULES FOR PRODUCT RECOVERY

Technical Publication. DETC2015-47130

Samyeon Kim, Seung Ki Moon, Nanyang Technological University,
Singapore, Singapore

DEC-5 Creativity & Innovation

DEC-5-1 CREATIVITY & INNOVATION

Level 1, Hynes CC, Room 105

11:40am – 12:40pm

Session Chair: Gul Kremer, Pennsylvania State University, State College, PA, United States

Session Co-Chair: Beshoy Morkos, Florida Institute of Technology, Melbourne, FL, United States

CREATIVITY “MISRULES”: FIRST YEAR ENGINEERING STUDENTS- PRODUCTION AND PERCEPTION OF CREATIVITY IN DESIGN IDEAS

Technical Publication. DETC2015-46492

Colin M. Gray, Seda Yilmaz, Iowa State University, Ames, IA, United States, Shanna Daly, Colleen M. Seifert, Richard Gonzalez, University of Michigan, Ann Arbor, MI, United States

EVALUATING THE EFFECTIVENESS OF PROBLEM FORMULATION AND IDEATION SKILLS LEARNED THROUGHOUT AN ENGINEERING DESIGN COURSE

Technical Publication. DETC2015-46542

Mahmoud Dinar, Yong-Seok Park, Jami Shah, Arizona State University, Tempe, AZ, United States

A CROSS-SECTIONAL AND LONGITUDINAL EXAMINATION OF THE DEVELOPMENT OF INNOVATION CAPABILITY IN UNDERGRADUATE ENGINEERING STUDENTS

Technical Publication. DETC2015-47650

Trina C. Kershaw, Rebecca L. Peterson, Molly A. McCarthy, Adam P. Young, University of Massachusetts Dartmouth, North Dartmouth, MA, United States, Carolyn Conner Seepersad, Paul T. Williams, University of Texas at Austin, Austin, TX, United States, Katja Holttä-Otto, Singapore University of Technology, Singapore, Singapore, Sankha Bhowmick, University of Massachusetts Dartmouth, North Dartmouth, MA, United States

DFMLC-11 NSF Workshop

DFMLC-11-2 NSF PROPOSAL WRITING WORKSHOP

Level 1, Hynes CC, Room 107

11:40am – 12:40pm

Session Chair: Gul Kremer, Pennsylvania State University, State College, PA, United States

Session Co-Chair: Linda Schmidt, University Of Maryland, College Park, MD, United States

DTM-1 Biologically-Inspired Design

DTM-1-1 BIOLOGICALLY-INSPIRED DESIGN

Level 1, Hynes CC, Room 104

11:40am – 12:40pm

Session Chair: Shradda Sangelkar, Pennsylvania State University, Erie, PA, United States

Session Co-Chair: Robert Stone, Oregon State University, Corvallis, OR, United States

GENE TRANSCRIPTIONS AND TRANSLATION IN DESIGN

Technical Publication. DETC2015-46128

Yuemin Hou, Ji Linhong, Tsinghua University, Beijing, Beijing, China

CAMELS AND FENNEC FOXES: A CASE STUDY ON BIOLOGICALLY INSPIRED DESIGN OF SAND TRACTION SYSTEMS

Technical Publication. DETC2015-46286

Elizabeth Gendreau, Andrew Shumaker, Eric Joiner, Chase Pritchett, Keith Karmilovich, Alix Griffin, Steven O’Shields, Joshua Summers, Clemson University, Clemson, SC, United States

TEACHING STUDENTS TO INNOVATE: EVALUATING METHODS FOR BIOINSPIRED DESIGN AND THEIR IMPACT ON DESIGN SELF EFFICACY

Technical Publication. DETC2015-47716

Fabien Durand, Michael Helms, Georgia Institute of Technology, Atlanta, GA, United States, Joanna Tsenn, Texas A&M University, Bryan, TX, United States, Erin McTigue, Daniel McAdams, Texas A&M University, College Station, TX, United States, Julie Linsey, Georgia Institute of Technology, Atlanta, GA, United States

MESA-20 **Keynote Lecture**

MESA-20-1 **TBD**

Level 1, Hynes CC, Room 110

11:40am - 12:40pm

WHERE BIOMECHATRONICS MET FRACTIONAL CALCULUS

Blas M. Vinagre, University of Extremadura, Badajoz, Spain

MR-13 **Keynotes/Awards**

MR-13-1 **STRONG, COMPLIANT AND SOLID-STATE MECHANICAL DEVICES FOR MEMS, AIRCRAFT WINGS AND SOFT ROBOTS**

Level 2, Hynes CC, Room 210

11:40am - 12:40pm

Session Chair: Anurag Purwar, Stony Brook University, Stony Brook, NY, United States

Session Co-Chair: Xianwen Kong, Heriot-Watt University, Edinburgh, Scotland

MNS-2 **Bio MEMS/NEMS**

MNS-2-1 **BIO MEMS/NEMS**

Level 3, Hynes CC, Room 307

11:40am - 12:40pm

Session Chair: Brian Jensen, Brigham Young University, Provo, UT, United States

Session Co-Chair: Gou-Jen Wang, National Chung-Hsing University, Taichung, Taiwan, Dumitru Caruntu, University of Texas Pan American, Edinburg, TX, United States

A CASCADE MICROFLUIDIC DEVICE FOR HIGH QUALITY MITOCHONDRIA EXTRACTION

Technical Publication. DETC2015-46117

Ching-Wen Li, Pao-Hsin Yen, Gou-Jen Wang, National Chung-Hsing University, Taichung, Taiwan

A CHARACTERIZATION OF A MICROFABRICATED DIFFERENTIAL SCANNING CALORIMETER

Technical Publication. DETC2015-46136

Shuyu Wang, Shifeng Yu, Stony Brook University, Stony Brook, NY, United States, Lei Zuo, Virginia Tech, Blacksburg, VA, United States

CASIMIR AND VAN DER WAALS EFFECTS ON PARAMETRIC RESONANCE OF BIO-NEMS CIRCULAR PLATE RESONATORS

Technical Publication. DETC2015-46578

Dumitru Caruntu, Reynaldo Oyervides, University of Texas Pan American, Edinburg, TX, United States

A NOVEL NON-ENZYMATIC ELECTROCHEMICAL GLUCOSE BIOSENSOR BASED ON A SIMPLE LITHOGRAPHIC PROCESS

Technical Publication. DETC2015-46954

Che Wei Hsu, Fang-Ci Su, National Chung Hsing University, Taichung, Taiwan, Po-Yu Peng, Phoenix Silicon International Corporation, Hsinchu, Taiwan, Hong-Tsu Young, National Taiwan University, Taipei, Taiwan, Mike Yang, Phoenix Silicon International Corporation, Hsinchu, Taiwan, Gou-Jen Wang, National Chung-Hsing University, Taichung, Taiwan

INJECTION FORCE EFFECTS ON PROPIDIUM IODIDE UPTAKE IN NANOINJECTED HELA CELLS

Technical Publication. DETC2015-47630

Tyler E. Lewis, Brian Jensen, Sandra H. Burnett, Brigham Young University, Provo, UT, United States

MSNDC-10/VIB-10 **Vehicle Dynamics**

MSNDC-10-5/VIB-10-5 **VEHICLE DYNAMICS V**

Level 3, Hynes CC, Room 308 11:40am – 12:40pm

Session Chair: Paramsothy Jayakumar, US Army TARDEC, Warren, MI, United States

Session Co-Chair: Tamer Wasfy, Indiana University Purdue University Indianapolis, Indianapolis, IN, United States

SYNTHESIS OF STRUCTURE BORNE VEHICLE INTERIOR NOISE DUE TO TIRE/ROAD INTERACTION

Technical Publication. DETC2015-46083

Sakthivel Palanivelu, Krishna Kumar Ramarathnam, Indian Institute of Technology Madras, Chennai, Tamil Nadu, India

DYNAMIC EFFECTS OF OBSTACLES ON TWO-WHEELED INVERTED-PENDULUM TRANSPORTERS

Technical Publication. DETC2015-47479

John Harber, Christopher Adams, Arnolando Castro, William Singhose, Georgia Tech, Atlanta, GA, United States

A NEW PERFORMANCE INDICATOR FOR IMPACT INTENSITY WITH APPLICATIONS TO PLANETARY ROVERS

Technical Presentation Only. DETC2015-47747

Sadhbh MacMahon, McGill University, Montreal, QC, Canada, Francisco Gonzalez, University of La Coruña, Ferrol, Spain, Bahareh Ghotbi, Jozsef Kovecses, McGill University, Montreal, QC, Canada

MSNDC-20 Student Paper Competition

MSNDC-20-1 MSNDC STUDENT PAPER COMPETITION

Level 3, Hynes CC, Room 300 11:40am – 12:40pm

PTG-3 Gear Dynamics and Noise

PTG-3-3

GEAR DYNAMICS & NOISE (3)

Level 1, Hynes CC, Room 108 11:40am – 12:40pm

Session Chair: Chan Il Park, Gangneung-Wonju National University, Wonju, Gangwon-do, Republic of Korea

Session Co-Chair: Heyun Bao, Nanjing University of Aeronautics and Astronautics, Nanjing, China

EFFECT OF TEETH FRICTION ON TRANSMISSION ERRORS AND TOOTH LOAD OF SPUR GEARS

Technical Publication. DETC2015-47048

Chan Il Park, Gangneung-Wonju National University, Wonju, Gangwon-do, Republic of Korea

OPTIMIZATION OF TOOTH BENDING FATIGUE CHARACTERISTICS OF SPUR GEAR PAIRS USING A GEAR DYNAMICS-BASED APPROACH

Technical Publication. DETC2015-47136

Yalin Ozturk, Turkish Aerospace Industries, Ankara, Turkey, Ender Cigeroglu, H. Nevzat Ozguven, Middle East Technical University, Ankara, Turkey

RESEARCH ON TOOTH PROFILE MODIFICATION OF THE HERRINGBONE PLANETARY GEAR TRAIN

Technical Publication. DETC2015-46821

Heyun Bao, Huan Liu, Rupeng Zhu, Fengxia Lu, Miaomiao Li, Nanjing University of Aeronautics and Astronautics, Nanjing, Jiangsu, China

PTG-9 Transmission Systems Including Novel Concepts

PTG-9-2 TRANSMISSION SYSTEMS INCLUDING NOVEL CONCEPTS (2)

Level 1, Hynes CC, Room 109 11:40am – 12:40pm

Session Chair: Andrey A. Pazyak, Tumen State Oil and Gas University, Tumen, Russia

Session Co-Chair: Jacob Jurewicz, Massachusetts Institute of Technology, Cambridge, MA, United States

DESIGN AND OPTIMIZATION OF POWERTRAIN USING HYBRID PLANETARY GEARBOX FOR FORMULA STUDENT VEHICLE

Technical Publication. DETC2015-46782

Gagan Makhija, Manthan Mahajan, Nilesh Bansod, Soovadeep Bakshi, Indian Institute of Technology Bombay, Mumbai, India

DESIGN OF A CLUTCH-LESS HYBRID TRANSMISSION FOR A HIGH-PERFORMANCE VEHICLE

Technical Publication. DETC2015-46812

Jacob Jurewicz, Chad L. Jacoby, Guillermo Pamanes, Daniel Dorsch, Amos G. Winter V, Joshua E. Siegel, Patricia Yen, Young Suk Jo, Massachusetts Institute of Technology, Cambridge, MA, United States

THE DESIGN AND PRODUCTION OF DRIVES BASED ON PAN PRECESS GEAR FOR OIL AND GAS MACHINERY

Technical Publication. DETC2015-47096

Vladimir N. Syzrantsev, Tumen State Oil and Gas University, Tumen, Russia, Yuri G. Denisov, ECL, Kurgan, Russia, Andrey A. Pazyak, Vyacheslav P. Wiebe, Tumen State Oil and Gas University, Kurgan, Russia

MSNDC-9/VIB-9 Energy Transfer, Energy Harvesting, and Damping

MSNDC-9-6/VIB-9-6 ENERGY TRANSFER, ENERGY HARVESTING, AND DAMPING VI

Level 3, Hynes CC, Room 306 11:40am - 12:40pm

Session Chair: Mohammed Daqaq, Clemson University, Clemson, SC, United States

Session Co-Chair: Frank Fisher, Stevens Institute of Technology, Hoboken, NJ, United States

MAGNETIC FORCE OF PIEZOELECTRIC CANTILEVER ENERGY HARVESTERS WITH EXTERNAL MAGNETIC FIELD BASED ON MAGNETIZING CURRENT APPROACH

Technical Publication. DETC2015-46127

Dan Tan, Yong Gang Leng, Sheng Bo Fan, Tianjin University, Tianjin, China

ANALYSIS OF MAGNETIC FORCES IN TWO-DIMENSIONAL SPACE WITH APPLICATIONS FOR THE TUNING OF VIBRATION ENERGY HARVESTING DEVICES

Technical Publication. DETC2015-47647

Lin Dong, Frank Fisher, Stevens Institute of Technology, Hoboken, NJ, United States

COMPARATIVE STUDY OF MAGNETORHEOLOGICAL DAMPER MODELS FOR FORCE TRACKING

Student Competition Paper. DETC2015-46468

Anria Strydom, CSIR, Pretoria, South Africa, Werner Scholtz, Schalk Els, University of Pretoria, Hatfield, South Africa

VIB-17 Keynote Lectures

VIB-17-1 J. P. DEN HARTOG KEYNOTE LECTURE

Level 3, Hynes CC, Room 302 11:40am - 12:40pm

Session Chair: D. Dane Quinn, The University of Akron, Akron, OH, United States

Session Co-Chair: Jeffrey Rhoads, Purdue University, West Lafayette, IN, United States

BIOMED-7 General Biomedical Devices

BIOMED-7-2 MONITORING AND ASSISTIVE DEVICES

Level 2, Hynes CC, Room 209 11:40am - 12:40pm

Session Chair: Jeff Hawks, University of Nebraska - Lincoln, Lincoln, NE, United States

Session Co-Chair: Gregory Fischer, Worcester Polytechnic Institute, Worcester, MA, United States

SOFT PRESSURE SENSING SLEEVE FOR DIRECT CARDIAC COMPRESSION DEVICE

Technical Publication. DETC2015-47567

Markus A Horvath, Ellen T Roche, Daniel M Vogt, David J Mooney, Harvard University, Cambridge, MA, United States, Frank A Pigula, Boston Childrens Hospital, Boston, MA, United States, Conor Walsh, Harvard University, Cambridge, MA, United States

ROBOTIC ASSISTIVE DEVICE FOR PHLEBOTOMY

Technical Publication. DETC2015-47620

Paulo Carvalho, Anurag Kesari, Sean Weaver, Gregory Fischer, Patrick Flaherty, Worcester Polytechnic Institute, Worcester, MA, United States

IN VIVO TESTING OF NONINVASIVE ICP MONITORING METHODOLOGY IN A PORCINE MODEL

Technical Publication. DETC2015-47655

Jeff Hawks, Max Twedt, Chase Pfeifer, University of Nebraska-Lincoln, Lincoln, NE, United States, James Gigantelli, William Thorell, University of Nebraska Medical Center, Omaha, NE, United States, Greg Bashford, University of Nebraska - Lincoln, Lincoln, NE, United States

**AVT-2
Advances in Methods for Tire Design and Mechanics**

**AVT-2-1
ADVANCES IN METHODS FOR TIRE DESIGN AND MECHANICS (1)**

Level 3, Hynes CC, Room 309 2:00pm - 3:00pm

Session Chair: Massimiliano Gobbi, Politecnico di Milano, Milan, Italy

WEIGHTED ORTHOGONAL DISTANCE REGRESSION FOR TIRE MODELS PARAMETERS IDENTIFICATION

Technical Publication. DETC2015-46498

JoseLuis Olazagoitia, Alberto Lopez, Nebrija University, Madrid, Madrid, Spain

FEA TIRE MODELING AND VALIDATION TECHNIQUES

Technical Publication. DETC2015-46514

Mehrsa Marjani, Moustafa El-Gindy, Univeristy Of Ontario Institute of Technology, Oshawa, ON, Canada, David Phillips, Volvo Group Trucks Technology, Greensboro, NC, United States, Fredrik Oijer, Inge Johansson, Volvo Group Trucks Technology, Göteborg, Sweden

STRUCTURAL STIFFNESS OF TIRE CALCULATED FROM STRAIN ENERGY

Technical Publication. DETC2015-46589

Namcheol Kang, Jong-Jin Bae, Kyungpook National University, Daegu, Republic of Korea, Jong Beom Suh, Hankook Tire Co., Ltd, Deajeon, Republic of Korea

MOTORCYCLE TIRE MODELING

Student Competition Paper. DETC2015-46607

Federico Ballo, Massimiliano Gobbi, Giampiero Mastinu, Giorgio Previati, Roberto Zerboni, Politecnico di Milano, Milan, Italy

**CIE-26
VES: Game Ecosystems in Engineering**

**CIE-26-1
VES: GAME ECOSYSTEMS IN ENGINEERING**

Level 3, Hynes CC, Room 311 2:00pm - 3:00pm

Session Chair: Robert Wendrich, University of Twente, Enschede, Netherlands

Session Co-Chair: Jannicke Baalsrud Hauge, University of Bremen, Bremen, Germany

FROM GAMEPLAY EXPERIENCE TO HAPTIC-AIDED PROCESS PLANNING

Technical Publication. DETC2015-46500

Theodore Lim, Craig Fletcher, James Ritchie, Heriot Watt University, Edinburgh, Scotland

A VIRTUAL REALITY APPROACH FOR MINIMIZING INFORMATION LOSS IN MULTI-USER, SCALABLE ENVIRONMENTS

Technical Publication. DETC2015-47414

Bryan Dickens, Gabe Harms, Steven Sellers, Owen Shartle, Conrad Tucker, Pennsylvania State University, State College, PA, United States

INTEGRATING GAMIFICATION IN MECHANICAL ENGINEERING SYSTEMS TO SUPPORT KNOWLEDGE PROCESSES

Technical Publication. DETC2015-47695

Jannicke Baalsrud Hauge, University of Bremen, Bremen, Germany, Ioana Andreea Stanescu, Advanced Distributed Learning Romania, Bucharest, Romania, Maira B. Carvalho, TU Eindhoven, Eindhoven, Netherlands, Antoniu Stefan, Marian Banica, Advanced Technology Systems, Targoviste, Romania, Theodore Lim, Heriot-Watt University, Edinburgh, Scotland

CIE-11-2

OPTIMIZATION FOR AM - II

Level 3, Hynes CC, Room 313 2:00pm - 3:00pm

Session Chair: Seung-Kyum Choi, Georgia Tech, Atlanta, GA, United States

Session Co-Chair: Namhun Kim, Ulsan National Institute of Science and Technology, Ulsan, Republic of Korea

MULTI MATERIAL TOPOLOGY OPTIMIZATION FOR ADDITIVE MANUFACTURING

Technical Publication. DETC2015-46268

Amirmassoud Mirzendehtdel, Krishnan Suresh, University of Wisconsin, Madison, WI, United States

OPTIMIZATION OF ADDITIVELY MANUFACTURED MULTI-MATERIAL LATTICE STRUCTURES USING GENERALIZED OPTIMALITY CRITERIA

Technical Publication. DETC2015-47403

Tino Stankovic, Jochen Mueller, Paul Egan, Kristina Shea, ETH

Zurich, Zurich, Switzerland

CONVERGENCE STUDY OF GENETIC PROGRAMMING APPROACH TO ESTIMATE SURFACE INTEGRITY ON ADDITIVE MANUFACTURING PARTS

Technical Publication. DETC2015-47997

Saeed Jamiolahmadi, Ahmad Barari, University of Ontario Institute of Technology, Oshawa, ON, Canada

DAC-13

Multidisciplinary Design Optimization

DAC-13-2

MULTIDISCIPLINARY DESIGN OPTIMIZATION

Level 1, Hynes CC, Room 101 2:00pm - 3:00pm

Session Chair: Mian Li, UM- SJTU Joint Institute, Shanghai, China

Session Co-Chair: Yi Ren, Arizona State University, Mesa, AZ, United States

RESOURCE ALLOCATION FOR REDUCTION OF EPISTEMIC UNCERTAINTY IN SIMULATION-BASED MULTIDISCIPLINARY DESIGN

Technical Publication. DETC2015-47302

Zhen Jiang, Northwestern University, Evanston, IL, United States, Shishi Chen, Beijing Institute of Technology, Beijing, China, D. Apley, Wei Chen, Northwestern University, Evanston, IL, United States

DUAL RESIDUAL FOR DISTRIBUTED AUGMENTED LAGRANGIAN COORDINATION BASED ON OPTIMALITY CONDITIONS

Technical Publication. DETC2015-47002

Meng Xu, Georges Fadel, Margaret M. Wiecek, Clemson University, Clemson, SC, United States

TOWARDS A METHODOLOGY FOR MULTIDISCIPLINARY DESIGN OPTIMIZATION OF HAPTIC DEVICES

Technical Publication. DETC2015-47181

Xuan Sun, Kjell Andersson, Ulf Sellgren, KTH Royal Institute of Technology, Stockholm, Sweden

Design for the Developing World

DAC-7-2

DESIGN FOR THE DEVELOPING WORLD II

Level 1, Hynes CC, Room 102 2:00pm - 3:00pm

Session Chair: Nathan Johnson, Arizona State University, Mesa, AZ, United States

Session Co-Chair: Christopher Mattson, Brigham Young University, Provo, UT, United States

TOWARD CUSTOMER NEEDS CULTURAL RISK INDICATOR INSIGHTS FOR PRODUCT DEVELOPMENT

Technical Publication. DETC2015-46513

Douglas L. Van Bossuyt, Jered Dean, Colorado School of Mines, Golden, CO, United States

JUSTIFICATION, DESIGN, AND ANALYSIS OF A VILLAGE-SCALE PV-POWERED ELECTRODIALYSIS REVERSAL SYSTEM FOR RURAL INDIA

Technical Publication. DETC2015-46521

Natasha C. Wright, Georgia D. Van de Zande, Amos G. Winter V, Massachusetts Institute of Technology, Cambridge, MA, United States

FEASIBILITY STUDY OF AN ELECTRODIALYSIS SYSTEM FOR IN-HOME WATER DESALINATION AND PURIFICATION IN URBAN INDIA

Technical Publication. DETC2015-47613

Prithviraj Sundararaman, Kishor G. Nayar, Jeffrey D. Schacherl, Catherine L. O'Connor, Michael L. Heath, Mario Orozco Gabriel, Natasha C. Wright, Amos G. Winter V, Massachusetts Institute of Technology, Cambridge, MA, United States

DAC-15

Platform Architecture and Product Family Design

DAC-15-2

PLATFORM ARCHITECTURE AND PRODUCT FAMILY DESIGN II

Level 1, Hynes CC, Room 103 2:00pm - 3:00pm

Session Chair: Timothy Simpson, Pennsylvania State University, University Park, PA, United States

Session Co-Chair: Seung Ki Moon, Nanyang Technological University, Singapore, Singapore

AN INTEGRATED APPROACH TO PRODUCT FAMILY REDESIGN USING COMMONALITY AND VARIETY METRICS

Technical Publication. DETC2015-46894

Sangjin Jung, Timothy Simpson, Pennsylvania State University, University Park, PA, United States

MEASUREMENT OF ASSEMBLY SYSTEM COMPLEXITY BASED ON THE TASK DIFFERENCES INDUCED FROM PRODUCT VARIETY

Technical Publication. DETC2015-47129

Kwansuk Oh, Daeyoung Kim, Yoo-suk Hong, Seoul National University, Seoul, Republic of Korea

AN AUTOMATED APPROACH TO THE DESIGN OF SMALL AERIAL SYSTEMS USING RAPID MANUFACTURING

Technical Publication. DETC2015-47786

Pete Mangum Jr., Zachary Fisher, Daniel Cooksey, Dimitri N. Mavris, Georgia Institute of Technology, Atlanta, GA, United States, Eric Spero, John Gerdes, Army Research Laboratory, Aberdeen Proving Ground, MD, United States

DEC-6

An Advanced Placement Exam in Engineering

DEC-6-1

AN ADVANCED PLACEMENT EXAM IN ENGINEERING: OBJECTIVES, ASSESSMENT, AND COURSE DESIGN

Level 1, Hynes CC, Room 105

2:00pm - 3:00pm

Session Chair: Daniel Frey, Massachusetts Institute of Technology, MA, United States

DFMLC-12 Sustainability of Industrial Systems (Special Session)

DFMLC-12-3 SUSTAINABLE DESIGN AND MANUFACTURING IN A PRODUCT LIFE CYCLE PERSPECTIVE

Level 1, Hynes CC, Room 107 2:00pm – 3:00pm

Session Chair: Qing Wang, Durham University, Durham, United Kingdom

DTM-5 Design of Complex Systems and Product Architecture

DTM-5-1 DESIGN OF COMPLEX SYSTEMS AND PRODUCT ARCHITECTURE I

Level 1, Hynes CC, Room 104 2:00pm – 3:00pm

Session Chair: Michel-Alexandre Cardin, National University of Singapore, Singapore

Session Co-Chair: Jonathan Cagan, Carnegie Mellon University, Pittsburgh, PA, United States

THE REALIZATION OF ENGINEERED SYSTEMS WITH CONSIDERATIONS OF COMPLEXITY

Technical Publication. DETC2015-46211

Warren Smith, Australian Defence Force Academy, Canberra, Australia, Jelena Milisavljevic, Maryam Sabeghi, Janet Allen, Farrokh Mistree, University of Oklahoma, Norman, OK, United States

THE D3 SCIENCE-TO-DESIGN METHODOLOGY: AUTOMATED AND COGNITIVE-BASED PROCESSES FOR DISCOVERING, DESCRIBING, AND DESIGNING COMPLEX NANOMECHANICAL BIOSYSTEMS

Technical Publication. DETC2015-47466

Paul Egan, ETH Zurich, Zurich, Switzerland, Jonathan Cagan, Philip LeDuc, Carnegie Mellon University, Pittsburgh, PA, United States, Christian Schunn, University of Pittsburgh, Pittsburgh, PA, United States, Jeffrey Moore, Boston University, Boston, MA, United States, Felix Chiu, Carnegie Mellon University, Pittsburgh, PA, United States

States

USING MOLECULAR FINGERPRINTING TO INFER FUNCTIONAL SIMILARITY IN ENGINEERED SYSTEMS

Technical Publication. DETC2015-46888

Ryan Arlitt, Charles A. Manion, Robert Stone, Matt Campbell, Irem Tumer, Oregon State University, Corvallis, OR, United States

MESA-6 Design and Verification Methodologies for Mechatronic and Embedded Systems

MESA-6-1 DESIGN AND VERIFICATION METHODOLOGIES FOR MECHATRONIC AND EMBEDDED SYSTEMS

Level 1, Hynes CC, Room 109 2:00pm – 3:00pm

Session Chair: Jürgen Hausladen, UAS Technikum Wien, Vienna, Austria

Session Co-Chair: Nicola Bezzo, University of Pennsylvania, Philadelphia, PA, United States

SOFTWARE BASED METHODS TO HARDEN EMBEDDED SOFTWARE AT RUN-TIME - A SURVEY

Technical Publication. DETC2015-47357

Michael Kramer, Martin Horauer, UAS Technikum Wien, Vienna, Austria

RAPID CO-DESIGN OF ELECTRO-MECHANICAL SPECIFICATIONS FOR ROBOTIC SYSTEMS

Technical Publication. DETC2015-47472

Nicola Bezzo, Matthew Piccoli, Peter Gebhard, Vijay Kumar, M. Yim, Insup Lee, University of Pennsylvania, Philadelphia, PA, United States

MESA-8 Fractional Derivatives and Their Applications

**MESA-8-8
FRACTIONAL ORDER DYNAMIC MODELING**

Level 1, Hynes CC, Room 111 2:00pm-3:00pm

Session Chair: Sheng Quan Xie, University of Auckland, Auckland, New Zealand

Session Co-Chair: Ke-Cai Cao, Nanjing University of Posts and Telecommunications, Nanjing, China

A NEW FRACTIONAL ORDER DYNAMIC MODEL FOR HUMAN CROWD STAMPEDE SYSTEM

Technical Publication. DETC2015-47007

Ke-Cai Cao, Nanjing University of Posts and Telecommunications, Nanjing, China, YangQuan Chen, University of California, Merced, Merced, CA, United States, Dan Stuart, Utah State University, Logan, UT, United States

MODELING DIFFERENT GROUPS OF PEDESTRIANS WITH PHYSICAL DISABILITY, USING THE SOCIAL FORCE MODEL AND FRACTIONAL ORDER POTENTIAL FIELDS.

Technical Publication. DETC2015-47042

Daniel Stuart, Mohammad Sadra Sharifi, Keith Christensen, Anthony Chen, Yong Seog Kim, Utah State University, Logan, UT, United States, YangQuan Chen, University of California Merced, Merced, CA, United States

ENERGY STORAGE IN FRACTIONAL-ORDER ELEMENTS WITH CONSTANT INPUTS

Technical Publication. DETC2015-47450

Tom Hartley, University of Akron, Columbus, OH, United States, Robert J. Veillette, Jay Adams, University of Akron, Akron, OH, United States, Carl F. Lorenzo, NASA Glenn Research Center, Cleveland, OH, United States

**MESA-9
Mechatronics for Advanced Manufacturing**

**MESA-9-1
MECHATRONICS SYSTEMS FOR ADVANCED MANUFACTURING AND AMBIENT INTELLIGENCE**

Level 1, Hynes CC, Room 110 2:00pm – 3:00pm

Session Chair: Emanuele Frontoni, Università Politecnica delle Marche, Ancona, Ancona, Italy

Session Co-Chair: Adriano Mancini, Università Politecnica delle Marche, Italy

CONSIDERING MACHINING TOLERANCES IN HIGH SPEED CORNER TRACKING

Technical Publication. DETC2015-46047

Sepehr Zarifmansour, Rudolf Seethaler, University of British Columbia, Kelowna, BC, Canada

AUTOMATIC CLASSIFICATION FOR ANTI MIXUP EVENTS IN ADVANCED MANUFACTURING SYSTEM

Technical Publication. DETC2015-46303

Marina Paolanti, Emanuele Frontoni, Primo Zingaretti, Adriano Mancini, Roberto Pierdicca, Università Politecnica delle Marche, Ancona, Italy

DEVELOPMENT OF ADVANCED CNC INTERPOLATION ALGORITHM WITH CONSIDERATION OF COMMAND AND DYNAMIC ERRORS

Technical Publication. DETC2015-46562

Meng-Shiun Tsai, Ying-Che Huang, National Chung-Cheng University, Minhsing, Taiwan

**MR-13
Keynotes/Awards**

**MR-13-2
MULTI-SCALE, MULTI-MATERIAL MANUFACTURING BASED ON FOLDED COMPOSITES: MOTIVATIONS, PROCESS TECHNOLOGIES, AND APPLICATIONS IN ROBOTICS**

Level 2, Hynes CC, Room 210 2:00pm – 3:00pm

Session Chair: James Joo, Air Force Research Laboratory, Wright-Patterson Airforce Base, OH, United States

Session Co-Chair: Larry Howell, Brigham Young University, Provo, UT, United States, Anurag Purwar, Stony Brook University, Stony Brook, NY, United States

MNS-4**Micro- and Nanomechanisms and Robotics****MNS-4-1****MICRO- AND NANOMECHANISMS AND ROBOTICS**

Level 3, Hynes CC, Room 307

2:00pm – 3:00pm

Session Chair: Dan Popa, The University of Texas Arlington, Fort Worth, TX, United States

A LASER CALIBRATION DEVICE FOR MINI ROBOTS

Technical Publication. DETC2015-46241

Giovanni Legnani, University of Brescia, Brescia, Italy, Irene Fassi, Institute of Industrial Technologies and Automation, Milano, Italy, Serena Ruggeri, Gianmauro Fontana, National Research Council – ITIA, Milano, Italy, Andrea Gabrielli, Abdelmajid Ousdad, University of Brescia, Brescia, BS, Italy

IMAGE GUIDED AUTOMATED NON-PREHENSILE MAGNETIC MICROMANIPULATION OF CELLS

Technical Publication. DETC2015-46569

Akash Das, Ajay D. Thakur, Atul Thakur, Indian Institute of Technology Patna, Patna, India

FOOT-TERRAIN IMPACT MODELING FOR SILICON MICRO-ROBOTS

Technical Presentation Only. DETC2015-47168

Jeong Ryou, Kenn Oldham, University of Michigan, Ann Arbor, MI, United States

PATH PLANNING AND OPTIMAL CONTROL FOR AUTONOMOUS NAVIGATION OF SINGLE AND MULTIPLE MAGNETIC MOBILE MICROROBOTS

Technical Publication. DETC2015-47313

Sagar Chowdhury, Wuming Jing, Peter Jaron, David Cappelleri, Purdue University, West Lafayette, IN, United States

CONTROL OF MULTIPLE MAGNETIC MICRO ROBOTS

Technical Publication. DETC2015-47683

Denise Wong, Jeremy Wang, Edward Steager, Vijay Kumar, University of Pennsylvania, Philadelphia, PA, United States

MSNDC-12/VIB-12**Time-Varying and Time-Delay Systems****MSNDC-12-1/VIB-12-1****TIME-VARYING AND TIME-DELAY SYSTEMS I**

Level 3, Hynes CC, Room 308

2:00pm – 3:00pm

Session Chair: Subhash Sinha, Auburn University, Auburn, AL, United States

Session Co-Chair: Gabor Stepan, Budapest University of Technology and Economics, Budapest, Hungary

STABILITY OF HOPF BIFURCATIONS IN TIME-DELAYED FULLY-CONNECTED PLL NETWORKS

Technical Publication. DETC2015-46203

Diego P. Ferruzzo Correa, José R. C. Piqueira, Universidade de São Paulo, São Paulo, Brazil, Atila M. Bueno, Universidade Estadual Paulista, Sorocaba, Brazil

SYMBOLIC COMPUTATION OF QUANTITIES ASSOCIATED WITH TIME-PERIODIC DYNAMICAL SYSTEMS

Technical Publication. DETC2015-47486

W. Grant Kirkland, Subhash Sinha, Auburn University, Auburn, AL, United States

SKATEBOARD: A HUMAN CONTROLLED NON-HOLO-NOMIC SYSTEM

Technical Publication. DETC2015-47512

Balazs Varszegi, Budapest University of Technology and Economics, Budapest, Hungary, Denes Takacs, MTA-BME, Budapest, Hungary, Gabor Stepan, Budapest University of Technology and Economics, Budapest, Hungary

MSNDC-18

Keynote Lectures

**MSNDC-18-1
LYAPUNOV AWARD LECTURE**

Level 3, Hynes CC, Room 302 2:00pm – 3:00pm

Session Chair: Walter Lacarbonara, Sapienza University of Rome, Rome, Italy

Session Co-Chair: Rudranarayan Mukherjee, Jet Propulsion Laboratory, Pasadena, CA, United States

**PTG-10
Keynote Lecture**

**PTG-10-1
ON SOME CONCEPTS AND ISSUES IN GEAR DYNAMIC SIMULATIONS**

Level 1, Hynes CC, Room 108 2:00pm – 3:00pm

**MSNDC-13/VIB-13
Industrial Applications of Dynamics, Vibration, and Acoustics**

**MSNDC-13-2/VIB-13-2
INDUSTRIAL APPLICATIONS II**

Level 3, Hynes CC, Room 305 2:00pm – 3:00pm

Session Chair: Venkat Ramakrishnan, Fiat Chrysler Automobiles, Auburn Hills, MI, United States

Session Co-Chair: Ronald Couch, Johns Hopkins University Applied Physics Laboratory, Laurel, MD, United States

NOISE CONTROL IN A SMALL HOUSEHOLD APPLIANCE BY MEANS OF EXPERIMENTAL ANALYSIS OF VIBRATION PATHS

Technical Publication. DETC2015-46509

Alberto Doria, Paolo Florian, University of Padova, Italy, Floriano Franzon, DeLonghi Appliances, Treviso, Italy

VIBEX: VIBRATION REDUCTION GEL FOR CONTINUOUSLY FORCED AND IMPACTED SYSTEMS

Technical Presentation Only. DETC2015-47164

Venkat Ramakrishnan, Fiat Chrysler Automobiles, Auburn Hills, MI, United States, Xing Xing, Thomas Theisen, Michigan State University, East Lansing, MI, United States, Brian F. Feeny, Andrew LaRouche, Tom Corden, Permawick, Birmingham, MI, United States

HIGH-RESOLUTION DEFORMATION MEASUREMENT SYSTEM FOR FAST ROTATING TIRES

Technical Publication. DETC2015-47495

Kuya Takami, Tomonari Furukawa, Virginia Tech, Blacksburg, VA, United States

**BIOMED-1
Keynote Lecture**

**BIOMED-1-1
INNOVATION IN MEDICAL DEVICES**

Level 3, Hynes CC, Room 310 2:00pm – 3:00pm

**AVT-2
Advances in Methods for Tire Design and Mechanics**

**AVT-2-2
ADVANCES IN METHODS FOR TIRE DESIGN AND MECHANICS (2)**

Level 3, Hynes CC, Room 309 3:30pm – 5:10pm

Session Chair: Edoardo Sabbioni, Politecnico Di Milano, Milan, Italy

Session Co-Chair: James Yang, Texas Technology University, Lubbock, TX, United States

A PARTICLE FILTER APPROACH FOR IDENTIFYING TYRE MODEL PARAMETERS FROM FULL-SCALE EXPERIMENTAL TESTS

Technical Publication. DETC2015-46614

Edoardo Sabbioni, Politecnico Di Milano, Milan, Italy, Federico Cheli, Ruixin Bao, Francesco Braghin, Politecnico di Milano, Milano, Italy

IN-PLANE FLEXIBLE RING TIRE MODEL VALIDATION THROUGH ADAMS FTIRE MODEL VIRTUAL TESTS

Technical Publication. DETC2015-46630

Bin Li, Texas Technology University, Lubbock, TX, United States, Xiaobo Yang, Oshkosh Corporation, Oshkosh, WI, United States, Ankang Jin, Yunqing Zhang, HUST, Wuhan, China, James Yang, Texas Technology University, Lubbock, TX, United States

KINEMATIC ANALYSIS OF THE PLANAR MOTION OF VEHICLES WHEN TRAVELLING ALONG TRACTRIX CURVES

Technical Publication. DETC2015-46924

Giorgio Figliolini, DiCEM/University Of Cassino & Southern Lazio, Cassino 03043, Italy, Chiara Lanni, University of Cassino & Southern Lazio, Cassino, Italy

DUAL-STIFFNESS BEHAVIOR OF FATIGUED TIRE RUBBER

Technical Publication. DETC2015-47782

Erol Sancaktar, Ruofan Liu, University of Akron, Akron, OH, United States

APPLICATION OF X-RAY MICRO-CT METHOD TO ASSESS DAMAGE/FLAW PRESENCE AND PROGRESSION IN TIRE RUBBER MATERIALS

Technical Publication. DETC2015-47809

Erol Sancaktar, Ruofan Liu, University of Akron, Akron, OH, United States

**CIE-11
AMS/SEIKM/CAPPD: Design, Simulation and Optimization for Additive Manufacturing****CIE-11-3
DESIGN AND SIMULATION FOR AM - I**

Level 3, Hynes CC, Room 313 3:30pm - 5:10pm

Session Chair: Rahul Rai, University at Buffalo, Buffalo, NY, United States

Session Co-Chair: Yayue Pan, University of Illinois at Chicago, Chicago, IL, United States

MODELING AND 3D PRINTING OF RULED SURFACES

Technical Publication. DETC2015-46494

Michael Hennessey, Alex J. Beaulier, Cheri Shakiban, University of St. Thomas, St. Paul, MN, United States

ALGORITHMS FOR MULTILAYER CONFORMAL ADDITIVE MANUFACTURING

Technical Publication. DETC2015-47596

Joshua D. Davis, The Johns Hopkins University, Baltimore, MD, United States, MDM Kutzer, United States Naval Academy, Baltimore, MD, United States, Gregory S. Chirikjian, The Johns Hopkins University, Baltimore, MD, United States

OPTIMIZATION OF PROCESS PARAMETERS IN LASER ENGINEERED NET SHAPING (LENS) DEPOSITION OF MULTI-MATERIALS

Technical Publication. DETC2015-47856

Jingyuan Yan, Nafiseh Masoudi, Clemson University, Central, SC, United States, Ilenia Battiato, San Diego State University, San Diego, CA, United States, Georges Fadel, Clemson University, Clemson, SC, United States

3D CONFORMAL PIEZO-RESISTIVE SENSOR PRINTING

Technical Publication. DETC2015-46089

Gaurav Siwach, Rahul Rai, University at Buffalo, Buffalo, NY, United States

KNOWLEDGE MANAGEMENT WITH AN INTELLIGENT TOOL FOR ADDITIVE MANUFACTURING

Technical Publication. DETC2015-46615

Douglas C. Eddy, Sundar Krishnamurty, Ian Grosse, University of Massachusetts, Amherst, MA, United States, Farhad Ameri, Texas State University, San Marcos, TX, United States, Maxwell Perham, Jack Wileden, University of Massachusetts Amherst, Amherst, MA, United States

CIE-24

VES: Interaction and Interfaces

CIE-24-2

VES: INTERACTION AND INTERFACES II

Level 3, Hynes CC, Room 311 3:30pm – 5:10pm

Session Chair: Theodore Lim, Heriot-Watt University, Edinburgh, Scotland

Session Co-Chair: Marina Carulli, Politecnico di Milano, Milano, Italia, Italy

SKETCH BEAUTIFICATION IN AIR

Technical Publication. DETC2015-46092

Nianteng Feng, Prakhar Jaiswal, Rahul Rai, University at Buffalo, Buffalo, NY, United States

EVALUATING INDUSTRIAL PRODUCTS IN AN INNOVATIVE VISUAL-OLFACTORY ENVIRONMENT

Technical Publication. DETC2015-46708

Marina Carulli, Monica Bordegoni, Umberto Cugini, Politecnico di Milano, Milano, Italia, Italy

AN INTERACTIVE VIRTUAL USER INTERFACE FOR INTEGRATING BLIND PERSONS IN HOME ENVIRONMENTS

Technical Publication. DETC2015-47132

Maura Mengoni, Lorenzo Cavalieri, Damiano Raponi, Margherita Peruzzini, Polytechnic University of Marche, Ancona, Italy

DEVELOPMENT OF GRAPHICAL USER INTERFACES TO IMPROVE HUMAN DESIGN PROFICIENCY FOR COMPLEX MULTI-LEVEL BIOSYSTEMS

Technical Publication. DETC2015-47460

Paul Egan, ETH Zurich, Zurich, Switzerland, Christian Schunn, University of Pittsburgh, Pittsburgh, PA, United States, Jonathan Cagan, Philip LeDuc, Carnegie Mellon University, Pittsburgh, PA, United States

A NOVEL APPROACH TO THE DESIGN AND DEVELOPMENT OF AN INTERACTIVE LEARNING APP FOR

AUTOMOTIVE IVI SYSTEMS

Technical Publication. DETC2015-47906

Yifan Chen, Basavaraj Tonshal, Pramita Mitra, Craig Simonds, Paul Aldighieri, Ford Motor Company, Dearborn, MI, United States

DAC-1

Application-Tailored Optimization Methods

DAC-1-1

APPLICATION-TAILORED OPTIMIZATION METHODS

Level 1, Hynes CC, Room 101 3:30pm – 5:10pm

Session Chair: Ashraf Nassef, American University In Cairo, Cairo, Egypt

Session Co-Chair: Mohammed Shalaby, GE Global Research, Niskayuna, NY, United States

MULTI-OBJECTIVE OPTIMIZATION UNDER UNCERTAINTY IN ADVANCED ABRASIVE MACHINING PROCESSES VIA A FUZZY-EVOLUTIONARY APPROACH

Technical Publication. DETC2015-46311

Adel Abbas, King Saud University, Riyadh, Saudi Arabia, Mohamed Aly, American University in Cairo, Cairo, Egypt, Karim Hamza, University of Michigan, Ann Arbor, MI, United States

THERMAL LOSSES CONSIDERATIONS IN THERMOACOUSTIC ENGINE DESIGN

Technical Publication. DETC2015-46426

L. K. Tartibu, Mangosuthu University of Technology, Durban, Kwazulu Natal, South Africa, Bohua Sun, M. A. E. Kaunda, Cape Peninsula University of Technology, Cape Town, Western Cape, South Africa

MULTI-OBJECTIVE OPTIMIZATION OF GAS BLEND ALTERNATIVE REFRIGERANTS FOR VAPOR-COMPRESSION REFRIGERATION SYSTEMS

Technical Publication. DETC2015-46472

Mohamed El-Morsi, American University in Cairo, Cairo, Egypt, Karim Hamza, University of Michigan, Ann Arbor, MI, United States

MULTI-UCAVS TARGET ASSIGNMENT USING OPPOSITION-BASED GENETIC ALGORITHM WITH MULTIPLE MUTATION OPERATORS

Technical Publication. DETC2015-47094

Yonglu Wen, Li Liu, Zhu Wang, Jiaxun Kou, Teng Long, Beijing Institute of Technology, Beijing, China

OPTIMIZATION OF CUTTING CONDITIONS IN VIBRATION ASSISTED DRILLING OPERATIONS VIA MULTI-OBJECTIVE EFFICIENT GLOBAL OPTIMIZATION

Technical Publication. DETC2015-47532

Ahmed Sadek, National Research Council of Canada, Montreal, QC, Canada, Mohamed Aly, American University in Cairo, Cairo, Egypt, Karim Hamza, University of Michigan, Ann Arbor, MI, United States, Mouhab Meshreki, National Research Council Canada, Montreal, QC, Canada, Ashraf Nassef, American University In Cairo, Cairo, Egypt, Helmi Attia, National Research Council of Canada, Montreal, QC, Canada

DAC-6

Design for Resilience and Failure Recovery

DAC-6-1

DESIGN FOR RESILIENCE AND FAILURE RECOVERY

Level 1, Hynes CC, Room 102 3:30pm – 5:10pm

Session Chair: Pingfeng Wang, Wichita State University, Wichita, KS, United States

Session Co-Chair: Po Ting Lin, Chung Yuan Christian University, Chungli, Taoyuan, Taiwan

DATA DRIVEN PROGNOSTICS WITH LACK OF TRAINING DATASETS

Technical Publication. DETC2015-46932

Zhimin Xi, Xiangxue Zhao, University of Michigan – Dearborn, Dearborn, MI, United States

DIAGNOSTICS, PROGNOSTICS, AND UNCERTAINTY MANAGEMENT OF LITHIUM-ION BATTERIES

Technical Publication. DETC2015-46935

Zhimin Xi, University of Michigan – Dearborn, Dearborn, MI, United States, Rong Jing, Ford, Dearborn, MI, United States, Cheol Lee,

University Of Michigan – Dearborn, Dearborn, MI, United States

ONLINE ESTIMATION OF LITHIUM-ION BATTERY CAPACITY USING SPARSE BAYESIAN LEARNING

Technical Publication. DETC2015-46964

Chao Hu, Gaurav Jain, Melani Sullivan, Carrie Strief, Craig Schmidt, Medtronic, Inc., Minneapolis, MN, United States

RESILIENCE ANALYSIS AND ALLOCATION FOR COMPLEX SYSTEMS USING BAYESIAN NETWORK

Technical Publication. DETC2015-46999

Nita Yodo, Pingfeng Wang, Wichita State University, Wichita, KS, United States

A GENERIC FUSION PLATFORM OF FAILURE DIAGNOSTICS FOR RESILIENT ENGINEERING SYSTEM DESIGN

Technical Publication. DETC2015-47009

Amirmahyar Abdolsamadi, Wichita State University, Wichita, KS, United States, Prasanna Tamilselvan, Bureau Veritas North America, Inc, Houston, TX, United States, Pingfeng Wang, Wichita State University, Wichita, KS, United States

DAC-8

Design of Complex Systems

DAC-8-1

DESIGN OF COMPLEX SYSTEMS

Level 1, Hynes CC, Room 103 3:30pm – 5:10pm

Session Chair: James Allison, University of Illinois Urbana-Champaign, IL, United States

Session Co-Chair: Beshoy Morkos, Florida Institute of Technology, Melbourne, FL, United States

AUTONOMOUS MICROGRID DESIGN USING CLASSIFIER-GUIDED SAMPLING

Technical Publication. DETC2015-46107

Peter B. Backlund, John P. Eddy, Sandia National Laboratories, Albuquerque, NM, United States

TOWARD A DEDICATED FAILURE FLOW ARRESTOR FUNCTION METHODOLOGY

Technical Publication. DETC2015-46270

Michael R.S. Slater, Douglas L. Van Bossuyt, Colorado School of Mines, Golden, CO, United States

TOWARD A FUNCTIONAL FAILURE MODELING METHOD OF REPRESENTING PROGNOSTIC SYSTEMS DURING THE EARLY PHASES OF DESIGN

Technical Publication. DETC2015-46400

Caitlin R. Stack, Douglas L. Van Bossuyt, Colorado School of Mines, Golden, CO, United States

NON-NEGATIVE MATRIX FACTORIZATION BASED UNCERTAINTY QUANTIFICATION METHOD FOR COMPLEX NETWORKED SYSTEMS

Technical Publication. DETC2015-46087

Arpan Mukherjee, Rahul Rai, Puneet Singla, Tarunraj Singh, Abani Patra, University at Buffalo, Buffalo, NY, United States

A MULTI-OBJECTIVE SIMULATED ANNEALING APPROACH TOWARDS 3D PACKING PROBLEMS WITH STRONG CONSTRAINTS: CMOS

Technical Publication. DETC2015-47670

Pei Cao, Zhaoyan Fan, Robert Gao, Jiong Tang, University of Connecticut, Storrs, CT, United States

**DEC-7
Advances in Systems Realization: Research and Education**

**DEC-7-1
ADVANCES IN SYSTEMS REALIZATION: RESEARCH AND EDUCATION**

Level 1, Hynes CC, Room 105 3:30pm – 5:10pm

Session Chair: Carolyn Conner Seepersad, University of Texas at Austin, Austin, TX, United States

**DTM-7
Human Behavior in Design**

**DTM-7-1
HUMAN BEHAVIOR IN DESIGN**

Level 1, Hynes CC, Room 104 3:30pm – 5:10pm

Session Chair: Georges Fadel, Clamson University, Greenville, SC, United States

Session Co-Chair: Maria Yang, Massachusetts Institute of Technology, Cambridge, MA, United States

MEASURING THE EVOKED HARDNESS OF DESIGN PROBLEMS USING TRANSIENT MICROSTATES

Technical Publication. DETC2015-46502

Philon Nguyen, Thanh An Nguyen, Yong Zeng, Concordia University, Montreal, QC, Canada

CONSIDERING DIFFERENT MOTIVATIONS IN DESIGN FOR CONSUMER-BEHAVIOR CHANGE

Technical Publication. DETC2015-47625

Jayesh Srivastava, L.H. Shu, University Of Toronto, Toronto, ON, Canada

STUDYING HUMAN DESIGN TEAMS VIA COMPUTATIONAL TEAMS OF SIMULATED ANNEALING AGENTS

Technical Publication. DETC2015-46545

Christopher McComb, Jonathan Cagan, Kenneth Kotovsky, Carnegie Mellon University, Pittsburgh, PA, United States

CONCEPT DESIGN, VIRTUAL PROTOTYPING AND ERGONOMIC OPTIMIZATION OF AN INNOVATIVE SKIDDING WINCH USING A DES-TRIZ APPROACH

Technical Publication. DETC2015-47043

Giuseppe Di Gironimo, Alessio Balsamo, Gianpiero Esposito, University of Naples Federico II, Naples, Italy, Kenan Melemez, Bartin University, Bartin, Turkey, Antonio Lanzotti, University of Naples Federico II, Napoli, Italy

PARAMETER DESIGN STRATEGIES: A COMPARISON

BETWEEN HUMAN DESIGNERS AND THE SIMULATED ANNEALING ALGORITHM

Technical Publication. DETC2015-47674

Bo Y Yu, Olivier De Weck, Maria Yang, Massachusetts Institute of Technology, Cambridge, MA, United States

**MESA-7
Embedded Systems Infrastructure and Theory****MESA-7-1
EMBEDDED SYSTEMS INFRASTRUCTURE AND THEORY**

Level 1, Hynes CC, Room 109 3:30pm – 5:10pm

Session Chair: Jia Xu, York University, Toronto, ON, Canada

Session Co-Chair: Michael Kramer, UAS Technikum Wien, Vienna, Austria

BPM: A BAD PAGE MANAGEMENT STRATEGY FOR THE LIFETIME EXTENSION OF FLASH MEMORY

Technical Publication. DETC2015-46604

Wei Debao, Qiao Liyan, Zhang Peng, Peng Xiyuan, Harbin Institute of Technology, Harbin, China

A CLOUD-BASED APPROACH TO DEVELOPMENT OF EMBEDDED SYSTEMS SOFTWARE

Technical Publication. DETC2015-47082

Jürgen Hausladen, Martin Horauer, Birgit Pohn, UAS Technikum Wien, Vienna, Austria

EFFICIENTLY HANDLING PROCESS OVERRUNS AND UNDERRUNS IN REAL-TIME EMBEDDED SYSTEMS

Technical Publication. DETC2015-47759

Jia Xu, York University, Toronto, ON, Canada

PROGRAMMING ARDUINO BOARDS WITH THE C/C++ INTERPRETER CH

Technical Publication. DETC2015-47837

Curtis Turley, Maria Alessandra Montironi, Harry H. Cheng, University of California, Davis, Davis, CA, United States

**MESA-8
Fractional Derivatives and Their Applications****MESA-8-7
NUMERICAL METHODS FOR FRACTIONAL ORDER SYSTEM**

Level 1, Hynes CC, Room 111 3:30pm-5:10pm

Session Chair: Hongguang Sun, Hohai University, Nan Jing, China

Session Co-Chair: Rajesh Pandey, Indian Institute of Technology (BHU), Varanasi, India

COMPARISON OF FOUR NUMERICAL SCHEMES FOR ISOPERIMETRIC CONSTRAINT FRACTIONAL VARIATIONAL PROBLEMS WITH A-OPERATOR

Technical Publication. DETC2015-46570

Rajesh Pandey, Indian Institute of Technology (BHU), Varanasi, India, Om Agrawal, Southern Illinois University Carbondale, Carbondale, IL, United States

A NUMERICAL ALGORITHM TO INITIAL VALUE PROBLEM OF LINEAR CAPUTO FRACTIONAL-ORDER DIFFERENTIAL EQUATION

Technical Publication. DETC2015-46668

Lu Bai, Dingyu Xue, Northeastern University, Shenyang, China

A NUMERICAL ALGORITHM TO INITIAL VALUE PROBLEM OF CAPUTO FRACTIONAL-ORDER DIFFERENTIAL EQUATION

Technical Publication. DETC2015-46699

Lu Bai, Dingyu Xue, Northeastern University, Shenyang, China

SIMULATION AND ANALYSIS OF A FRACTIONALLY CONTROLLED ACTIVE SUSPENSION SYSTEM USING QUARTER CAR MODEL

Technical Publication. DETC2015-46190

Duval Johnson, University of California, Merced, CA, United States

A MATLAB TOOLBOX FOR PARTICLE TRANSPORT SIMULATION IN FRACTAL MEDIA

Technical Publication. DETC2015-47186

Jie Cui, HongGuang Sun, Xu Zhang, Ailian Chang, Hohai University, Nanjing, China

**MESA-9
Mechatronics for Advanced Manufacturing**

**MESA-9-2
MECHATRONICS AND EMBEDDED SYSTEMS FOR ADVANCED MANUFACTURING**

Level 1, Hynes CC, Room 110 3:30pm – 5:10pm

Session Chair: Tapio Heikkilä, VTT Technical Research Centre of Finland, Oulu, Finland

Session Co-Chair: Bob Brennan, University Of Calgary, Calgary, AB, Canada

MEASUREMENT OF 3D OBJECTS IN A ROBOTIC CELL

Technical Publication. DETC2015-46458

Jakub Wojciechowski, Olaf Ciszak, Poznan University of Technology, Poznan, Poland

AN AGENT-BASED SYSTEM TO SIMULATE DYNAMIC AND NOISY AMBIENCE OF INDUSTRIAL WIRELESS SENSOR NETWORKS

Technical Publication. DETC2015-46797

Mohammad Gholami, Bob Brennan, University Of Calgary, Calgary, AB, Canada

SAFETY ASSESSMENT PROCESS FOR HUMAN-ROBOT HANDLING TASKS

Technical Publication. DETC2015-47006

Timo Malm, Tapio Heikkilä, Jari Ahola, VTT Technical Research Centre of Finland Ltd, Oulu, Finland

DEVELOPMENT OF IMPEDANCE CONTROL FOR HUMAN/ROBOT INTERACTIVE HANDLING OF HEAVY PARTS AND LOADS

Technical Publication. DETC2015-47045

Jari Ahola, Jukka Koskinen, Tuomas Seppälä, Tapio Heikkilä, VTT Technical Research Centre of Finland, Oulu, Finland

A MULTI-ROBOT TESTBED FOR ADAPTIVE SAMPLING EXPERIMENTATION VIA RADIO FREQUENCY FIELDS

Technical Publication. DETC2015-47697

Jose Acain, Christopher Kitts, Thomas Adamek, Kamak Ebadi, Mike Rasay, Santa Clara University, Santa Clara, CA, United States

**MR-1
Planar Mechanism Analysis and Synthesis**

**MR-1-6
PLANAR ANALYSIS AND APPLICATIONS**

Level 2, Hynes CC, Room 204 3:30pm – 5:10pm

Session Chair: TaeWon Seo, Yeungnam University, Gyeongsan, Republic of Korea

Session Co-Chair: Gim Song Soh, Singapore University of Technology and Design, Singapore, Singapore

SINGULARITY TRACES OF PLANAR LINKAGES THAT INCLUDE PRISMATIC AND REVOLUTE JOINTS

Technical Publication. DETC2015-47390

Saleh Almestiri, David Myszka, Andrew Murray, University of Dayton, Dayton, OH, United States, Charles W. Wampler, General Motors R&D Center, Warren, MI, United States

UNCERTAINTY OF COUPLER POINT POSITION OF SLIDER CRANK MECHANISMS

Technical Publication. DETC2015-46377

Zetao Yu, Kwun-Lon Ting, Kuan-Lun Hsu, Tennessee Technological University, Cookeville, TN, United States, Jun Wang, Hubei University of Technology, Wuhan, China, Wesley Waggoner, Tennessee

Technological University, Cookeville, TN, United States

ANALYSIS AND DESIGN OF A TWO DEGREE OF FREEDOM HOECKENS-PANTOGRAPH LEG MECHANISM

Technical Publication. DETC2015-47330

Dmitri Fedorov, Lionel Birglen, Polytechnique Montreal, Montreal, QC, Canada

GEOMETRICAL KINEMATIC ANALYSIS OF A PLANAR SERIAL MANIPULATOR USING A BARYCENTRIC FORMULA

Technical Publication. DETC2015-46001

Chan Lee, Jeh Won Lee, TaeWon Seo, Yeungnam University, Gyeongsan, Republic of Korea

COMPREHENSIVE EVALUATION OF PARALLEL MECHANISM AND ROBOT PERFORMANCE BASED ON PRINCIPAL COMPONENT ANALYSIS AND KERNEL PRINCIPAL COMPONENT ANALYSIS

Technical Publication. DETC2015-47032

Liming Li, Jing Zhao, Beijing University of Technology, Beijing, China

MR-3 Robot Kinematics and Motion Planning

MR-3-2 MOTION PLANNING

Level 2, Hynes CC, Room 206

3:30pm – 5:10pm

Session Chair: Justus Herder, Delft University of Technology, Delft, Netherlands

Session Co-Chair: Ehsan T. Esfahani, State University of New York at Buffalo, Buffalo, NY, United States

FOCUSED REFINEMENT IN THE RRT*: TRADING OPTIMALITY FOR IMPROVED PERFORMANCE

Technical Publication. DETC2015-46535

Beth Boardman, University of California San Diego, La Jolla, CA,

United States, Troy Harden, Los Alamos National Laboratory, Los Alamos, NM, United States, Sonia Martinez, University of California San Diego, La Jolla, CA, United States

PLANNING AND CONTROL OF AGGRESSIVE MANEUVERS FOR PERCHING ON INCLINED AND VERTICAL SURFACES

Technical Publication. DETC2015-47710

Justin Thomas, Giuseppe Loianno, University of Pennsylvania, Philadelphia, PA, United States, Morgan Pope, Elliot Hawkes, Matt Estrada, Hao Jiang, Mark Cutkosky, Stanford University, Stanford, CA, United States, Vijay Kumar, University of Pennsylvania, Philadelphia, PA, United States

USING HUMAN SENSORIMOTOR CONTROL FOR ROBOTIC SURGERY TRAJECTORY SEGMENTATION

Technical Publication. DETC2015-47813

Somayeh Besharat Shafiei, State University of New York at Buffalo, Amherst, NY, United States, Khurshid A. Guru, Roswell Park Cancer Institute, Buffalo, NY, United States, Ehsan T. Esfahani, State University of New York at Buffalo, Buffalo, NY, United States

AUTOMATED CAD BASED TRAJECTORY FOR SPRAY PAINTING ROBOT: VARIABLE VELOCITY APPROACH

Technical Publication. DETC2015-46587

Mayur Andulkar, Shital Chiddarwar, Visvesvaraya National Institute of Technology, Nagpur, India

MINIMUM-JERK TRAJECTORY PLANNING OF A 3-DOF TRANSLATIONAL PARALLEL MANIPULATOR

Technical Publication. DETC2015-46866

Song Lu, Yangmin Li, University of Macau, Taipa Macao, Macau

MR-8 Novel Mechanisms, Robots and Applications

MR-8-2 FLYING ROBOTS

Level 2, Hynes CC, Room 202

3:30pm – 5:10pm

Session Chair: Carl Nelson, University of Nebraska – Lincoln, Lincoln, NE, United States

Session Co-Chair: Satyandra Gupta, University of Maryland, College Park, MD, United States

A SYSTEMATIC EXPLORATION OF WING SIZE ON FLAPPING WING AIR VEHICLE PERFORMANCE

Technical Publication. DETC2015-47316

John Gerdes, US Army Research Laboratory, Aberdeen Proving Ground, MD, United States, Hugh Bruck, Satyandra Gupta, University of Maryland, College Park, MD, United States

LIGHTWEIGHT, LOW-COST, COMPLIANT GRASPER FOR UAV-BASED PICK-AND-PLACE OPERATIONS

Technical Publication. DETC2015-47377

Charles Welch, Saeideh Akbarisamani, Carrick Detweiler, Carl Nelson, University of Nebraska – Lincoln, Lincoln, NE, United States

ENHANCING THE DESIGN OF SOLAR-POWERED FLAPPING WING AIR VEHICLES USING MULTIFUNCTIONAL STRUCTURAL COMPONENTS

Technical Publication. DETC2015-47570

Ariel Perez-Rosado, Hugh Bruck, Satyandra Gupta, University of Maryland, College Park, MD, United States

DESIGN OF PROPELLER-ASSISTED FLAPPING WING AIR VEHICLES FOR ENHANCED AERODYNAMIC PERFORMANCE

Technical Publication. DETC2015-47577

Alex Holness, Hugh Bruck, Satyandra Gupta, University of Maryland, College Park, MD, United States

DESIGN AND FABRICATION OF SAFE, LIGHT-WEIGHT, FLYING ROBOTS

Technical Publication. DETC2015-47864

Yash Mulgaonkar, Terry Kientz, Michael Whitzer, Vijay Kumar, University of Pennsylvania, Philadelphia, PA, United States

**MR-10
Origami-Based Engineering Design**

**MR-10-7
ORIGAMI-BASED MANUFACTURING AND MATERIALS**

Level 2, Hynes CC, Room 203

3:30pm – 5:10pm

Session Chair: Yan Chen, Tianjin, China

Session Co-Chair: Joseph Gattas, University of Queensland, Brisbane, Australia

RAREFACTION WAVE PROPAGATION IN ORIGAMI-BASED MECHANICAL METAMATERIALS

Technical Publication. DETC2015-48083

Hiroshi Yasuda, Jinkyu Yang, University of Washington, Seattle, WA, United States

A STIFFNESS MODEL FOR ORIGAMI FOLDING

Technical Publication. DETC2015-46731

Hitoshi Iwai, Japan Advanced Institute of Science and Technology, Nomi, Japan, Kazumasa Nakaya, Komatsu High School, Komatsu, Japan, Ryuhei Uehara, Japan Advanced Institute of Science and Technology, Nomi, Japan, Masashi Yamabe, Kanazawa Institute of Technology, Nonoichi, Japan, Yusuke Nakada, Yota Fujieda, Taisei Mori, Komatsu High School, Komatsu, Japan

DEVELOPMENT OF GROOVING TECHNIQUE FOR ORIGAMI-FORMING

Technical Publication. DETC2015-47079

Hoan Thai Tat Nguyen, Meiji University, Tokyo, Japan, Kousuke Terada, Fukushima National College of Technology, Fukushima, Japan, Sunao Tokura, Ichiro Hagiwara, Meiji University, Kanagawa, Japan

DEVELOPMENT OF MANUFACTURING METHOD FOR TRUSS CORE PANEL BASED ON ORIGAMI-FORMING

Technical Publication. DETC2015-47087

Hoan Thai Tat Nguyen, Phuong Thao Thai, Bo Yu, Ichiro Hagiwara, Meiji University, Kanagawa, Japan

FABRICATION OF POLYMER ORIGAMI-BASED V-TYPE FOLDED CORE

Technical Publication. DETC2015-46686

Danyang Zhao, Yujie Li, Minjie Wang, Chunzheng Duan, Dalian University of Technology, Dalian, Liaoning, China, Zhong You, University of Oxford, Oxford, United Kingdom

MR-13

Keynotes/Awards

MR-13-3

MR PANEL: FUTURE DIRECTIONS IN MECHANISM AND ROBOT DESIGN RESEARCH AND EDUCATION

Level 2, Hynes CC, Room 210

3:30pm – 5:10pm

Session Chair: Anurag Purwar, Stony Brook University, Stony Brook, NY, United States

Session Co-Chair: Xianwen Kong, Heriot-Watt University, Edinburgh, Scotland

MNS-5

Micro and Nanomanufacturing

MNS-5-1

MICRO AND NANOMANUFACTURING

Level 3, Hynes CC, Room 307

3:30pm – 5:10pm

Session Chair: Irene Fassi, Institute of Industrial Technologies and Automation, Milano, Italy

MICRO-EDM STUDIES OF THE FABRICATION OF CUSTOMIZED INTERNAL FIXATION DEVICES FOR ORTHOPEDIC SURGERY

Technical Publication. DETC2015-46489

Francesco Modica, Claudia Pagano, Valeria Marrocco, Institute of Industrial Technologies and Automation, Bari, Italy, Irene Fassi, Institute of Industrial Technologies and Automation, Milano, Italy

POLYMERIC MICRO-FILTER FABRICATION USING A

MICRO INJECTION MOULDING PROCESS

Technical Publication. DETC2015-47615

Rossella Surace, Vincenzo Bellantone, Irene Fassi, Institute of Industrial Technologies and Automation, Milano, Milano, Italy

ORDERLY PERFORATION OF POLYESTERER FILMS BY EXCIMER LASER

Technical Publication. DETC2015-47731

Erol Sancaktar, Wenqi Li, University of Akron, Akron, OH, United States

A CONCENTRIC TUBE REACTOR FOR ROLL-TO-ROLL THIN FILM DEPOSITION ON FLEXIBLE SUBSTRATES

Technical Presentation Only. DETC2015-47948

Erik Polsen, US Army TARDEC, Warren, MI, United States, Georges Pavlidis, Georgia Institute of Technology, Atlanta, GA, United States, A. John Hart, Massachusetts Institute of Technology, Cambridge, MA, United States

LASER MICROMACHINING OF THIN BEAMS FOR SILICON MEMS: OPTIMIZATION OF CUTTING PARAMETERS USING TAGUCHI METHOD

Technical Publication. DETC2015-48100

Nima Tolou, Tim Pusch, Delft University of Technology, Delft, Netherlands, Mario D'Auria, Andrew Holmes, Imperial College London, London, United Kingdom

DESIGN AND DEVELOPMENT OF A FULLY AUTOMATED ASSEMBLY SOLUTION FOR OPTICAL BACKPLANE INTERCONNECTION CIRCUITS

Technical Publication. DETC2015-47095

Serena Ruggeri, National Research Council – ITIA, Milano, Italy, Vito Basile, CNR-ITIA, Bari, Italy, Gianmauro Fontana, National Research Council – ITIA, Milano, Italy, Irene Fassi, Institute of Industrial Technologies and Automation, Milano, Italy

MSNDC-5/VIB-5

Nonlinear Dynamical Systems and Phenomena

MSNDC-5-6/VIB-5-6

ADVANCED APPROACHES TO NONLINEAR DYNAMICS

Level 3, Hynes CC, Room 304

3:30pm – 5:10pm

Session Chair: Young S. Lee, New Mexico State University, Las Cruces, NM, United States

Session Co-Chair: Albert Luo, Southern Illinois University, Edwardsville, IL, United States

HPC METHODS FOR DOMAINS OF ATTRACTION COMPUTATION

Technical Publication. DETC2015-46095

Pierpaolo Belardinelli, Stefano Lenci, Polytechnic University of Marche, Ancona, Italy

PERIOD-1 MOTIONS IN A TWO DEGREES-OF-FREEDOM NONLINEAR OSCILLATOR WITH PERIODIC EXCITATION

Technical Publication. DETC2015-48103

Albert Luo, Bo Yu, Southern Illinois University Edwardsville, Edwardsville, IL, United States

BIFURCATION TREES OF PERIOD-1 MOTION TO CHAOS IN A DUFFING OSCILLATOR WITH DOUBLE-WELL POTENTIAL

Technical Publication. DETC2015-48104

Yu Guo, Midwestern State University, Wichita Falls, TX, United States, Albert Luo, Southern Illinois University, Edwardsville, IL, United States

MULTI-PULSE ORBITS AND HOMOCLINIC TREES IN A NON-AUTONOMOUS RESONANT HAMILTONIAN SYSTEM

Technical Publication. DETC2015-46583

Sha Zhou, Wei Zhang, Minghui Yao, Beijing University of Technology, Beijing, China

MSNDC-12/VIB-12

Time-Varying and Time-Delay Systems

MSNDC-12-2/VIB-12-2

TIME-VARYING AND TIME-DELAY SYSTEMS II

Level 3, Hynes CC, Room 308

3:30pm – 5:10pm

Session Chair: Rifat Sipahi, Northeastern University, Boston, MA, United States

Session Co-Chair: Gabor Orosz, Ann Arbor, MI, United States

STATE-DEPENDENT, NON-SMOOTH MODEL OF CHATTER VIBRATIONS IN TURNING

Student Competition Paper. DETC2015-46748

David Lehotzky, Tamas Insperger, Gabor Stepan, Budapest University of Technology and Economics, Budapest, Hungary

OPTIMIZATION OF THE ROBUST STABILITY LIMIT FOR MULTI-CUTTER TURNING PROCESSES

Technical Publication. DETC2015-47484

Marta Reith, Daniel Bachrathy, Gabor Stepan, Budapest University of Technology and Economics, Budapest, Hungary

INVESTIGATING MULTISCALE PHENOMENA IN MACHINING: THE EFFECT OF CUTTING-FORCE DISTRIBUTION ALONG THE TOOL'S RAKE FACE ON PROCESS STABILITY

Technical Publication. DETC2015-47165

Tamas G. Molnar, Tamas Insperger, Budapest University of Technology and Economics, Budapest, Hungary, S. John Hogan, University of Bristol, Bristol, United Kingdom, Gabor Stepan, Budapest University of Technology and Economics, Budapest, Hungary

THE EFFECT OF NON-SYMMETRIC FRF ON MACHINING: A CASE STUDY

Student Competition Paper. DETC2015-47037

David Hajdu, Tamas Insperger, Gabor Stepan, Budapest University of Technology and Economics, Budapest, Hungary

MSNDC-16

Modeling and Formulation of Multibody Systems**MSNDC-16-1
MODELING AND FORMULATION OF MULTIBODY
SYSTEMS I**

Level 3, Hynes CC, Room 303 3:30pm – 5:10pm

Session Chair: Olivier Bauchau, Hong Kong University of Science and Technology, Hong Kong, China

Session Co-Chair: J. M. Hsu, CA, United States

**A TOTAL LAGRANGIAN ANCF LIQUID SLOSHING
APPROACH FOR MULTIBODY SYSTEM APPLICATIONS**

Technical Publication. DETC2015-46207

Cheng Wei, Harbin Institute of Technology, Harbin, China, Liang Wang, Ahmed A. Shabana, University Of Illinois, Chicago, IL, United States

**A NOVEL METHOD FOR MODELING ANCF BASED
FINITE ELEMENT TIRE ASSEMBLIES**

Technical Publication. DETC2015-46214

Mohil Patel, University of Illinois at Chicago, Chicago, IL, United States, Grzegorz Orzechowski, Warsaw University of Technology, Warsaw, Poland, Qiang Tian, Beijing Institute of Technology, Beijing, China, Ahmed A. Shabana, University of Illinois, Chicago, IL, United States

**EQUATIONS OF MOTION FOR MECHANICAL SYSTEMS
WITH SCLERONOMIC CONSTRAINTS**

Technical Publication. DETC2015-46618

Sotirios Natsiavas, Elias Paraskevopoulos, Aristotle University, Thessaloniki, Greece

**ON THE ALMANZI-MICHELL PROBLEM FOR FLEXIBLE
MULTIBODY DYNAMICS**

Technical Publication. DETC2015-47154

Shilei Han, Shanghai Jiao Tong University, Shanghai, China, Olivier Bauchau, Hong Kong University of Science and Technology, Hong Kong, China

**MSNDC-17
Biomechanics****MSNDC-17-1
BIOMECHANICS I**

Level 3, Hynes CC, Room 310 3:30pm – 5:10pm

Session Chair: Joao Paulo Flores Fernandes, University of Minho, Guimaraes, Portugal

Session Co-Chair: Philip Voglewede, Marquette University, Milwaukee, WI, United States

**INFLUENCE OF THE HIP JOINT MODELS ON THE
KINEMATICS OF HUMAN GAIT**

Technical Publication. DETC2015-46340

Joao Costa, Joaquim Peixoto, Pedro Moreira, Antonio Pedro Souto, Joao Paulo Flores Fernandes, University of Minho, Guimaraes, Portugal, Hamid Lankarani, Wichita State University, Wichita, KS, United States

**THE DEVELOPMENT OF A HUMAN GAIT MODEL WITH
PREDICTIVE CAPABILITY AND THE SIMULATION OF
ABLE-BODIED GAIT**

Technical Publication. DETC2015-47382

Jinming Sun, Shaoli Wu, Philip Voglewede, Marquette University, Milwaukee, WI, United States

**LOADED VERSUS UNLOADED GAIT BALANCE STABIL-
ITY: A MEASURE OF DYNAMIC WALKING**

Technical Publication. DETC2015-47741

Carlotta Mummolo, New York University, Brooklyn, NY, United States, Sukyung Park, Korea Advanced Institute of Science and Technology, Daejeon, Republic of Korea, Luigi Mangialardi, Politecnico of Bari, Bari, Italy, Joo H. Kim, New York University, Brooklyn, NY, United States

**PTG-3
Gear Dynamics and Noise****PTG-3-4
GEAR DYNAMICS & NOISE (4)**

Level 1, Hynes CC, Room 108

3:30pm – 5:10pm

Session Chair: Alessandro Toso, Siemens Industry Software, Leuven, Belgium

Session Co-Chair: Fengxia Lu, Nanjing University of Aeronautics and Astronautics, Nanjing, China

ON THE CORRELATION BETWEEN DYNAMIC TRANSMISSION ERROR AND DYNAMIC TOOTH LOADS IN THREE-DIMENSIONAL GEAR SYSTEMS

Technical Publication. DETC2015-46063

Nina Sainte-Marie, INSA/Airbus Helicopters, Villeurbanne, France, Philippe Velez, INSA, Villeurbanne, France, Guillaume Roulois, Franck Marrot, Airbus Helicopters, Marignane, France

ON THE EFFECT OF LIGHTWEIGHT GEAR BLANK TOPOLOGY ON TRANSMISSION DYNAMICS

Technical Publication. DETC2015-47646

Alessandro Toso, Siemens Industry Software, Leuven, Belgium, Freek van Wermeskerken, Vrije Universiteit Amsterdam, Amsterdam, Netherlands, Niccolo' Cappellini, University of Leuven, Leuven, Belgium, Gert Heirman, Siemens Industry Software, Leuven, Belgium

DYNAMIC CHARACTERISTICS OF DOUBLE HELICAL PLANETARY GEAR TRAIN WITH TOOTH FRICTION

Technical Publication. DETC2015-48022

Fengxia Lu, Rupeng Zhu, Haofei Wang, Heyun Bao, Miaomiao Li, Nanjing University of Aeronautics and Astronautics, Nanjing, China

MSNDC-2/VIB-2 Structures and Continuous Systems

MSNDC-2-5/VIB-2-5 STRUCTURES AND CONTINUOUS SYSTEMS V

Level 3, Hynes CC, Room 302

3:30pm – 5:10pm

Session Chair: Young S. Lee, New Mexico State University, Las Cruces, NM, United States

Session Co-Chair: Cornel Sultan, Virginia Tech, Blacksburg, VA, United States

ESTIMATING CONSTITUTIVE LAW OF A FILAMENT FROM ITS DEFORMED SHAPES USING INPUT RECONSTRUCTION

Student Competition Paper. DETC2015-46791

Roshan Chavan, Harish Palanthandalam-Madapusi, Indian Institute of Technology Gandhinagar, Motera, India, Sachin Goyal, University of California, Merced, Merced, CA, United States

EFFECT OF MATERIAL AND GEOMETRIC PARAMETERS ON THE STEADY-STATE BELT STRESSES AND BELT SLIP FOR FLAT BELT-DRIVES

Technical Publication. DETC2015-47147

Cagkan Yildiz, Tamer Wasfy, Indiana University Purdue University Indianapolis, Indianapolis, IN, United States, Hatem Wasfy, Jeanne Peters, Advanced Science and Automation Corp., Hampton, VA, United States

ON THE NONLINEAR DYNAMIC STABILITY OF PRE-STRESSABLE STRUCTURES

Technical Publication. DETC2015-47248

Cornel Sultan, Virginia Tech, Blacksburg, VA, United States

A CRITICAL ANALYSIS OF THE INEXTENSIBILITY CONSTRAINT IN THE VIBRATION OF ROTATING ELASTIC RINGS COUPLED TO SPACE-FIXED STIFFNESSES

Technical Presentation Only. DETC2015-47551

Christopher G. Cooley, Southern Illinois University Carbondale, Carbondale, IL, United States, Robert Parker, Virginia Tech, Blacksburg, VA, United States

MSNDC-3/VIB-3 Design and Optimization of Dynamical Systems

MSNDC-3-3/VIB-3-3 DESIGN AND OPTIMIZATION OF DYNAMICAL SYSTEMS III

Level 3, Hynes CC, Room 301

3:30pm – 5:10pm

Session Chair: Jean-Philippe Noel, University of Liege, Liege,

Belgium

Session Co-Chair: Radu Serban, University of Wisconsin – Madison, Madison, WI, United States

BIFURCATION ANALYSIS OF A SPACECRAFT STRUCTURE USING THE HARMONIC BALANCE METHOD

Student Competition Paper. DETC2015-46259

Thibaut Detroux, Ludovic Renson, Luc Masset, Jean-Philippe Noel, Gaetan Kerschen, University Of Liège, Liege, Belgium

VIBRATION ANALYSIS OF A HIGH-SPEED PNEUMATIC-HYDRAULIC LOADING SYSTEM UNDER IMPULSE-TYPE LOADING

Technical Presentation Only. DETC2015-46931

Omid Saber, Frederick M. Chester, Jorge Alvarado, Texas A&M University, College Station, TX, United States

DESIGN PROCEDURE OF AN EDDY CURRENT DAMPER TYPE REACTION FORCE COMPENSATION (RFC) MECHANISM FOR A LINEAR MOTOR MOTION STAGE

Technical Publication. DETC2015-48080

Hyeong-Joon Ahn, Soongsil University, Seoul, Republic of Korea

DECENTRALIZED FUZZY VIBRATION CONTROL OF SMART SOLAR PANEL

Technical Publication. DETC2015-47253

Rui Xu, Jianping Jiang, Dongxu Li, National University of Defense Technology, Changsha, China

MSNDC-7/VIB-7 Rotordynamics and Rotating Systems

MSNDC-7-5/VIB-7-5 ROTORDYNAMICS AND ROTATING SYSTEMS V

Level 3, Hynes CC, Room 300 3:30pm – 5:10pm

Session Chair: Pierangelo Masarati, Politecnico di Milano, Milan, Italy

Session Co-Chair: C Nataraj, Villanova University, Villanova, PA,

United States

HELICOPTER GROUND RESONANCE INVESTIGATION WITH DISSIMILAR NONLINEAR LEAD-LAG DAMPERS

Technical Publication. DETC2015-46809

Aykut Tamer, Pierangelo Masarati, Politecnico di Milano, Milan, Italy

NONLINEAR DYNAMICS OF FLEXIBLE ROTATING SHAFTS WITH CENTRIFUGAL PENDULUM VIBRATION ABSORBERS

Technical Publication. DETC2015-47889

Mustafa A. Acar, Steven Shaw, Brian F. Feeny, Michigan State University, East Lansing, MI, United States

RECURRENCE ANALYSIS OF EXPERIMENTAL TIME SERIES OF A ROTOR RESPONSE WITH BEARING OUTER RACE FAULTS

Technical Publication. DETC2015-48106

Cedrick Aurelien Kitio Kwuimy, Mohsen Samadani, C Nataraj, Villanova University, Villanova, PA, United States, Pavan Kumar Kankar, PDPM Indian Institute of Information Technology Design and Manufacturing, Jabalpur, India

OBSERVED ROTORDYNAMIC PHENOMENA IN AIR-CRAFT GAS TURBINE DEVELOPMENT

Technical Publication. DETC2015-48108

Fredric Ehrich, Massachusetts Institute of Technology, Cambridge, MA, United States

MSNDC-13/VIB-13 Industrial Applications of Dynamics, Vibration, and Acoustics

VIB-13-3 INDUSTRIAL APPLICATIONS III

Level 3, Hynes CC, Room 305

3:30pm – 5:10pm

Session Chair: Tan Chai, Southern Illinois University, Carbondale, IL, United States

Session Co-Chair: William Singhose, Georgia Tech, Atlanta, GA, United States

IDENTIFICATION OF HYDRAULIC BUSHING NONLINEAR DYNAMIC PROPERTIES

Technical Presentation Only. DETC2015-47593

Tan Chai, Southern Illinois University, Carbondale, IL, United States, Jason Dreyer, Rajendra Singh, The Ohio State University, Columbus, OH, United States

PREDICTION AND MEASUREMENT OF PAYLOAD SWING FROM OFF-CENTERED CRANE LIFTS

Technical Publication. DETC2015-47618

Kelvin Peng, William Singhose, Georgia Tech, Atlanta, GA, United States

3D PRINTING COMPLEX STRUCTURES USING MODELING AND SIMULATION

Student Competition Paper. DETC2015-47916

Hammad Mazhar, University of Wisconsin Madison, Madison, WI, United States

**VIB-16
System Identification, Damage Detection, and Diagnostics**

**VIB-16-1
SYSTEM IDENTIFICATION, DAMAGE DETECTION, AND DIAGNOSTICS I**

Level 3, Hynes CC, Room 306 3:30pm – 5:10pm

Session Chair: Stefano Lenci, Università Politecnica delle Marche, Ancona, Ancona, Italy

Session Co-Chair: Weidong Zhu, University of Maryland, Baltimore County, Baltimore, MD, United States

VIBRATION-BASED SHM OF ORDINARY BUILDING: DETECTION AND QUANTIFICATION OF STRUCTURAL DAMAGE

Technical Publication. DETC2015-46763

Alessio Pierdicca, Università Politecnica delle Marche – DICEA, ANCONA, Italy, Francesco Clementi, Diletta Maracci, Università

Politecnica delle Marche, Ancona, Italy, Daniela Isidori, Loccioni Group, Angeli di Rosora, Ancona, Italy, Stefano Lenci, Università Politecnica delle Marche, Ancona, Italy

STRUCTURAL HEALTH MONITORING OF TIME VARIANT SYSTEMS

Technical Presentation Only. DETC2015-47343

Luigi Garibaldi, Politecnico di Torino, Torino, Italy, Jean-Luc Dion, Franck Renaud, SUPMECA, Saint Ouen, France

AN IMPROVED VARIATIONAL VIBRATION MODEL OF DAMAGED BEAMS TO OBTAIN AN UNCONDITIONALLY NUMERICAL STABLE MODEL

Technical Publication. DETC2015-46914

Mahmoud Alzahrani, Seung-Kyum Choi, Georgia Tech, Atlanta, GA, United States

A NEW METHOD EWT-BASED FOR ROLLING ELEMENT BEARING WEAK FAULT DIAGNOSIS

Student Competition Paper. DETC2015-46022

Xingxing Jiang, Shunming Li, Chun Cheng, Nanjing University of Aeronautics and Astronautics, Nanjing, China, Aijuan Li, Shan Dong Jiaotong University, Jinan, China

THE EFFECT OF ROLL MISALIGNMENT ON VIBRATION RESPONSE OF ROLL GRINDER

Technical Publication. DETC2015-48000

Liang Li, Liming Wang, Shao Yimin, Chongqing University, Chongqing, China, Yilin Yuan, Ningbo Baoxin Stainless Steel Company, Ningbo, China

**BIOMED-7
General Biomedical Devices**

**BIOMED-7-3
NEW FRONTIERS IN BIOMEDICAL DEVICES**

Level 2, Hynes CC, Room 209 3:30pm – 5:10pm

Session Chair: Anton Bowden, Brigham Young University, Provo, UT, United States

Session Co-Chair: Katherine Stephenson, Stanford University, Redwood City, CA, United States

DESIGN AND VALIDATION OF A DYNAMIC DIGITAL RULER FOR HANDS-FREE CHRONIC WOUND ASSESSMENT

Technical Publication. DETC2015-46997

Etienne Dumesnil, Divya Konda, Gabriel Aldaz, Hnin Ookhin, David Pickham, Lauren Aquino Shluzas, Stanford University, Stanford, CA, United States

STRUCTURAL ANTIBACTERIAL PROPERTIES OF CARBON-INFILTRATED CARBON NANOTUBE COATINGS

Technical Presentation Only. DETC2015-47656

Stephanie Morco, Anton Bowden, Brian Jensen, Brigham Young University, Provo, UT, United States, Dustin L. Williams, University of Utah, Salt Lake City, UT, United States

A DETAILED FIVE-YEAR REVIEW OF MEDICAL DEVICE ADDITIVE MANUFACTURING RESEARCH AND ITS POTENTIAL FOR TRANSLATION TO CLINICAL PRACTICE

Technical Publication. DETC2015-47671

Katherine Stephenson, Stanford University, Stanford, CA, United States

MSNDC-6/VIB-6 Dynamics of Jointed Structures

MSNDC-6-3/VIB-6-3 JOINTED STRUCTURES AND NONLINEAR SYSTEMS

Level 2, Hynes CC, Exhibit Hall C

6:30pm – 7:30pm

EFFECTS OF EXPERIMENTAL METHODS ON PREDICTIONS OF STIFFNESS AND DAMPING

Poster. DETC2015-48113

Scott Smith, University of Maryland, Baltimore County, Baltimore, MD, United States

NUMERICAL ROUND ROBIN FOR PREDICTING THE DYNAMICS OF JOINTED STRUCTURES

Poster. DETC2015-48114

Johann Gross, University of Stuttgart, Stuttgart, Germany

QUANTIFICATION OF UNCERTAINTY IN LAP JOINTS

Poster. DETC2015-48115

Matthew Bonney, University of Wisconsin, Madison, WI, United States

REDUCED ORDER MODELING METHODOLOGY ASSESSMENT

Poster. DETC2015-48116

Dan Roettgen, University of Wisconsin, Madison, WI, United States

STRESS WAVE PROPAGATION THROUGH JOINTED INTERFACES

Poster. DETC2015-48117

Keegan Moore, University of Illinois, Urbana-Champaign, Urbana, IL, United States

STRUCTURAL DESIGN WITH JOINTS FOR MAXIMUM (OR MINIMUM) DISSIPATION

Poster. DETC2015-48118

Merten Stender, Technical University of Hamburg, Hamburg, Germany

NONLINEAR DYNAMICS AND CONTROLS OF MICROSYSTEMS

Poster. DETC2015-48119

Adnan Raza, University of New Mexico, Albuquerque, NM, United States

Wednesday, August, 05

AVT-3 Advances in Ground Vehicle Safety and Ergonomics

AVT-3-1 ADVANCES IN GROUND VEHICLE SAFETY AND ERGONOMICS I

Level 3, Hynes CC, Room 309 9:30am – 11:10am

Session Chair: Costin Untaroiu, Virginia Tech, Blacksburg, VA, United States

Session Co-Chair: Lars Drugge, Royal Institute Of Technology, KTH, Stockholm, Sweden, James Yang, Texas Technology University, Lubbock, TX, United States

EXPERIMENTAL STUDY ON SINGLE WHEEL HUB MOTOR FAILURES AND THEIR IMPACT ON THE DRIVER-VEHICLE BEHAVIOR

Technical Publication. DETC2015-46178

Daniel Wanner, Royal Institute of Technology, Stockholm, Sweden, Isabel Neumann, TU Chemnitz, Chemnitz, Germany, Lars Drugge, Royal Institute of Technology, Stockholm, Sweden, Peter Cocron, TU Chemnitz, Chemnitz, Germany, Maxim Bierbach, Federal Highway Research Institute, Bergisch Gladbach, Germany, Annika Stensson Trigell, Royal Institute Of Technology, Stockholm, Sweden

STUDY OF OCCUPANT SAFETY AND AIRBAG DEPLOYMENT TIME

Technical Publication. DETC2015-46507

Steven Yang, Kristian Lardner, Moustafa El-Gindy, University of Ontario Institute of Technology, Oshawa, ON, Canada

CORRUGATED TUBE INVERSION FOR ENERGY ABSORPTION

Technical Publication. DETC2015-47135

Yang Li, Zhong You, University of Oxford, Oxford, UK, United Kingdom

AVT-5 Advances in Vehicle Electrification and Powertrain Design

AVT-5-1 ADVANCES IN VEHICLE ELECTRIFICATION AND POWERTRAIN DESIGN I

Level 3, Hynes CC, Room 308 9:30am – 11:10am

Session Chair: Joel Anstrom, Pennsylvania State, University Park, PA, United States

Session Co-Chair: Haiyan Zhang, Purdue University, West Lafayette, IN, United States

COST-EFFECTIVE ARCHITECTURE FOR INTEGRATING LOOK-AHEAD INFORMATION FOR COMMERCIAL VEHICLE POWERTRAINS

Technical Publication. DETC2015-46206

Xubin Song, Zhijun Tang, Rajeev Verma, Eaton Corp., Southfield, MI, United States

ANALYSIS ON THREE-MODE CONFIGURATIONS OF POWER-SPLIT HYBRID ELECTRIC VEHICLE

Technical Publication. DETC2015-46754

Chunwang Liu, Jibin Hu, Zengxiong Peng, Beijing Institute of Technology, Beijing, China, Shujun Yang, YanShan university, HeBei, China

SIMULATION AND CONTROL OF A NOVEL TWO-SPEED UNINTERRUPTED MECHANICAL TRANSMISSION FOR ELECTRIC VEHICLES

Technical Publication. DETC2015-46939

Shengnan Fang, Jian Song, Yuzhuo Tai, Fei Li, Truong Sinh Nguyen, Tsinghua University, Beijing, China

APPLICATION OF HUB-WHEEL ELECTRIC MOTOR INTEGRATED WITH TWO STEP PLANETARY TRANSMISSION FOR HEAVY OFF-ROAD VEHICLES

Technical Publication. DETC2015-47030

Mohammad Tehrani, Juho Montonen, Paula Immonen, Simo Sinkko, Esa-Pekka Kaikko, Jarkko Nokka, Jussi Sopenan, Juha Pyrhönen,

Lappeenranta University of Technology, Lappeenranta, Finland

CIE-17
CAPPD/AMS: Human Modeling: Methods and Applications in Engineering

CIE-17-1
CAPPD/AMS: HUMAN MOTION MODELING

Level 3, Hynes CC, Room 311 9:30am – 11:10am

Session Chair: Giorgio Colombo, Politecnico di Milano, Milano, Milano, Italy

Session Co-Chair: Caterina Rizzi, Università di Bergamo, Dalmine, Italy

IDENTIFYING POSSIBLE PATIENT SLIPS AND FALLS USING MOTION CAPTURE EXPERIMENTS

Technical Publication. DETC2015-46635

Aimee Cloutier, James Yang, Debajyoti Pati, Shabboo Valipoor, Brandon Snailer, Jerrod Hollers, Texas Technology University, Lubbock, TX, United States

PEDESTRIAN ACCIDENT RECONSTRUCTION USING A HUMAN BODY FINITE ELEMENT MODEL

Technical Publication. DETC2015-46969

Atsutaka Tamura, Takao Koide, Tottori University, Tottori, Japan

PREDICTING THE PROBABILITY OF SLIP IN GAIT: RAMP WALKING

Technical Publication. DETC2015-47562

Jared Gragg, University of Louisville, Louisville, KY, United States

TOWARDS AUTOMATIC GAIT ASSESSMENT BY MEANS OF RGB-D MOCAP

Technical Publication. DETC2015-48021

Daniele Regazzoni, Caterina Rizzi, Claudio Comotti, Federico Massa, University of Bergamo, Dalmine, Italy

CIE-34
PANEL: Engineering and Design of Complex Systems

CIE-34-1
ENGINEERING AND DESIGN OF COMPLEX SYSTEMS

Level 3, Hynes CC, Room 312 9:30am – 11:10am

SEIKM: Smart Manufacturing Informatics

CIE-22-1
SEIKM: SMART MANUFACTURING INFORMATICS

Level 3, Hynes CC, Room 313 9:30am – 11:10am

Session Chair: Ashis Banerjee, General Electric Global Research, Clifton Park, NY, United States

Session Co-Chair: Farhad Ameri, Texas State University, San Marcos, TX, United States

CHALLENGES IN DEVELOPING A COMPUTATIONAL PLATFORM TO INTEGRATE DATA ANALYTICS WITH SIMULATION-BASED OPTIMIZATION

Technical Publication. DETC2015-46410

Yunpeng Li, Utpal Roy, Syracuse University, Syracuse, NY, United States

A TEXT MINING TECHNIQUE FOR MANUFACTURING SUPPLIER CLASSIFICATION

Technical Publication. DETC2015-46694

Peyman Yazdizadeh Shotorbani, Farhad Ameri, Texas State University, San Marcos, TX, United States

A HYBRID STATISTICAL METHOD FOR ACCURATE PREDICTION OF SUPPLIER DELIVERY TIMES OF AIRCRAFT ENGINE PARTS

Technical Publication. DETC2015-47605

Ashis Banerjee, Walter Yund, Dan Yang, Peter Koudal, John Carbone, Joseph Salvo, General Electric Global Research, Niskayuna, NY, United States

AN SEMANTIC SIMILARITY BASED DISPATCHING

RULE SELECTION SYSTEM FOR JOB SHOP SCHEDULING WITH MULTIPLE PRODUCTION OBJECTIVES

Technical Publication. DETC2015-47822

Heng Zhang, Utpal Roy, Syracuse University, Syracuse, NY, United States

AMS: Computational Multiphysics Applications

CIE-7-1

AMS: COMPUTATIONAL MULTIPHYSICS APPLICATIONS

Level 3, Hynes CC, Room 310 9:30am - 11:10am

Session Chair: Ashok Kumar, University of Florida, Gainesville, FL, United States

Session Co-Chair: John Michopoulos, Naval Research Laboratory, Washington, DC, United States

COUPLED ELECTROSTATIC-STRUCTURAL ANALYSIS USING MESH INDEPENDENT APPROACH

Technical Publication. DETC2015-46865

Pushkar Mishra, Ashok Kumar, University of Florida, Gainesville, FL, United States

PRELIMINARY COMPUTATION ON NOX EMISSION REDUCTION FOR DIFFERENT TEMPERATURES

Technical Publication. DETC2015-47228

Jobaidur Khan, University of Buffalo, Buffalo, NY, United States

AN EFFICIENT SADDLE POINT SEARCH METHOD USING KRIGING METAMODEL

Technical Publication. DETC2015-47386

Lijuan He, Yan Wang, Georgia Institute of Technology, Atlanta, GA, United States

FUNDAMENTALS OF A MERO-OPERANDI THEORY TO SUPPORT TRANSDISCIPLINARY MODELING AND CO-DESIGN OF CYBER- PHYSICAL SYSTEMS

Technical Publication. DETC2015-46702

Imre Horvath, Shahab Pourtalebi, Delft University of Technology,

Delft, The Netherlands

**DAC-10
Data-Driven Design**

DAC-10-1

DATA-DRIVEN DESIGN

Level 1, Hynes CC, Room 1019:30am - 11:10am

Session Chair: Andrew Olewnik, University at Buffalo, Buffalo, NY, United States

Session Co-Chair: Yi Ren, Arizona State University, Mesa, AZ, United States

ECORACER: GAME-BASED OPTIMAL ELECTRIC VEHICLE DESIGN AND DRIVER CONTROL USING HUMAN PLAYERS

Technical Publication. DETC2015-46836

Yi Ren, Arizona State University, Mesa, AZ, United States, Alparslan Emrah Bayrak, Panos Papalambros, University of Michigan, Ann Arbor, MI, United States

PREDICTIVE MODELING OF PRODUCT RETURNS FOR REMANUFACTURING

Technical Publication. DETC2015-46875

Jungmok Ma, Harrison Kim, University of Illinois, Urbana, IL, United States

DECISION SUPPORT FOR PERFORMANCE ARTS USING SUPPORT VECTOR REGRESSION WITH GENETIC AND PARTICLE SWARM ALGORITHMS

Technical Publication. DETC2015-47059

Meifang Li, Mian Li, UM-SJTU Joint Institute, Shanghai, China

A NOVEL APPLICATION OF GAMIFICATION FOR COLLECTING HIGH-LEVEL DESIGN INFORMATION

Technical Publication. DETC2015-47383

Hyunmin Cheong, Wei Li, Francesco Iorio, Autodesk Research, Toronto, ON, Canada

AUTOMATIC EXTRACTION OF FUNCTION KNOWLEDGE FROM TEXT

Technical Publication. DETC2015-47541

Hyunmin Cheong, Wei Li, Adrian Cheung, Andy Nogueira, Francesco Iorio, Autodesk Research, Toronto, ON, Canada

**DAC-12
Metamodel-Based Design Optimization (MBDO)****DAC-12-1
METAMODEL-BASED DESIGN OPTIMIZATION**

Level 1, Hynes CC, Room 102 9:30am - 11:10am

Session Chair: David Romero, University of Toronto, Toronto, ON, Canada

Session Co-Chair: Gary Wang, Simon Fraser University, Surrey, BC, Canada

METAMODEL UNCERTAINTY QUANTIFICATION BY USING BAYES' THEOREM

Technical Publication. DETC2015-46746

Mi Xiao, Qiangzhuang Yao, Liang Gao, Haihong Xiong, Fengxiang Wang, Huazhong University of Science & Technology, Wuhan, Hubei, China

ON USING ADAPTIVE SURROGATE MODELING IN DESIGN FOR EFFICIENT FLUID POWER

Technical Publication. DETC2015-46832

Lakshmi Gururaja Rao, Jonathon Schuh, Randy H. Ewoldt, James Allison, University of Illinois Urbana-Champaign, Champaign, IL, United States

VARIABLE-FIDELITY OPTIMIZATION WITH IN-SITU SURROGATE MODEL REFINEMENT

Student Competition Paper. DETC2015-47188

Ali Mehmani, Syracuse University, Syracuse, NY, United States, Souma Chowdhury, Achille Messac, Mississippi State University, Mississippi State, MS, United States

OPTIMIZATION ON METAMODELING-SUPPORTED**ITERATIVE DECOMPOSITION**

Technical Publication. DETC2015-47525

Kambiz Haji Hajikolaie, George Cheng, Gary Wang, Simon Fraser University, Surrey, BC, Canada

FUNCTION EXTRAPOLATION AT ONE INACCESSIBLE POINT USING CONVERGING LINES

Technical Publication. DETC2015-47689

Yiming Zhang, Nam Ho Kim, Raphael T. Haftka, Chanyoung Park, The University of Florida, Gainesville, FL, United States

**DAC-2
Artificial Intelligence and Computational Synthesis****DAC-2-1
ARTIFICIAL INTELLIGENCE AND COMPUTATIONAL SYNTHESIS**

Level 1, Hynes CC, Room 103 9:30am -11:10am

Session Chair: Matt Campbell, Oregon State University, Corvallis, OR, United States

Session Co-Chair: Ritesh Khire, United Technologies Research Center, East Hartford, CT, United States

TOWARDS AUTOMATED DESIGN OF MECHANICALLY FUNCTIONAL MOLECULES

Technical Publication. DETC2015-46078

Charles Manion, Ryan Arlitt, Matt Campbell, Irem Tumer, P. Alex Greaney, Oregon State University, Corvallis, OR, United States

A PREDICTION MODELING FRAMEWORK: TOWARD INTEGRATION OF NOISY MANUFACTURING DATA AND PRODUCT DESIGN

Technical Publication. DETC2015-46236

Junheung Park, Kyoung-yun Kim, Wayne State University, Detroit, MI, United States, Raj Sohmshtetty, Ford Motor Company, Dearborn, MI, United States

AUTOMATICALLY SYNTHESIZING PRINCIPLE SOLUTIONS IN MULTI-DISCIPLINARY CONCEPTUAL DESIGN

WITH FUNCTIONAL AND STRUCTURAL KNOWLEDGE

Technical Publication. DETC2015-46373

Jin Qi, Jie Hu, Guoniu Zhu, Yinghong Peng, Shanghai Jiao Tong University, Shanghai, China

A METHOD FOR VISUALIZING THE RELATIONS BETWEEN GRAMMAR RULES, PERFORMANCE OBJECTIVES AND SEARCH SPACE EXPLORATION IN GRAMMAR-BASED COMPUTATIONAL DESIGN SYNTHESIS

Technical Publication. DETC2015-46761

Corinna Königseder, Kristina Shea, ETH Zurich, Zurich, Switzerland

AUTOMATED CONCEPT GENERATION BASED ON FUNCTION-FORM SYNTHESIS

Technical Publication. DETC2015-47687

Sung Woo Kang, Conrad Tucker, Pennsylvania State University, State College, PA, United States

**DEC-10
Thinking in Design**

**DEC-10-1
THINKING IN DESIGN**

Level 1, Hynes CC, Room 105 9:30am – 11:10am

Session Chair: Maria Yang, Massachusetts Institute of Technology, Cambridge, MA, United States

Session Co-Chair: Linda Schmidt, University Of Maryland, College Park, MD, United States

COURSE-BASED UNDERGRADUATE RESEARCH: A REVIEW OF MODELS & PRACTICES

Technical Publication. DETC2015-46126

Anne Harris, Tianchang Gu, Mohammed Babkoo, Worcester Polytechnic Institute, Worcester, MA, United States, Gul E. Kremer, Pennsylvania State University, State College, PA, United States

IDEATION VARIETY IN MECHANICAL DESIGN: EXAMIN-

ING THE EFFECTS OF COGNITIVE STYLE AND DESIGN HEURISTICS

Technical Publication. DETC2015-46334

Kathryn Jablokow, Wesley Teerlink, Pennsylvania State University, University Park, PA, United States, Seda Yilmaz, Iowa State University, Ames, IA, United States, Shanna Daly, University of Michigan, Ann Arbor, MI, United States, Eli Silk, Rutgers University, New Brunswick, NJ, United States, Christian Wehr, Iowa State University, Ames, IA, United States

BRIDGING LEARNING GAP THROUGH PEER-TO-PEER INFORMATION EXCHANGE IN A FLAT ENVIRONMENT

Technical Publication. DETC2015-47379

Madhumitha Ramachandran, Zahed Siddique, University of Oklahoma, Norman, OK, United States, Gul Kremer, Pennsylvania State University, State College, PA, United States, Firas Akasheh, Tuskegee University, Tuskegee, AL, United States

DESIGN TALKING: HOW DESIGN PRACTITIONERS TALK ABOUT DESIGN RESEARCH METHODS

Technical Publication. DETC2015-47843

Celeste Roschuni, Julia Kramer, Alice Agogino, University of California Berkeley, Berkeley, CA, United States

FOSTERING DIVERSE ANALOGICAL TRANSFER IN BIO-INSPIRED DESIGN

Technical Publication. DETC2015-47922

Jacquelyn Nagel, James Madison University, Harrisonburg, VA, United States, Linda Schmidt, Werner Born, University Of Maryland, College Park, MD, United States

**DFMLC-2
Sustainable Design and Manufacturing**

**DFMLC-2-1
SUSTAINABLE DESIGN AND MANUFACTURING**

Level 1, Hynes CC, Room 107 9:30am – 11:10am

Session Chair: Gul Kremer, Pennsylvania State University, State College, PA, United States

Session Co-Chair: Sudarsan Rachuri, National Institute of Standards and Technology, Gaithersburg, MD, United States

Session Co-Chair: Hamid Afshari, Univeristy of Manitoba, Winnepeg, Canada

DEVELOPMENT OF AN ENERGY-EFFICIENT CUTTING EDGE GEOMETRY FOR SOLID END MILLS: A DESIGN OF EXPERIMENTS-BASED APPROACH

Technical Publication. DETC2015-46151

Hans Westermann, Fraunhofer IPA, Eva Eisinger, Bayreuth University, Bayreuth, Germany, Andreas Kruse, Fraunhofer IPA, Bayreuth, Germany, Rolf Steinhilper, University of Bayreuth, Bayreuth, Germany

A MODULAR PRODUCT DESIGN APPROACH TO IMPROVE PRODUCT SOCIAL SUSTAINABILITY PERFORMANCE

Technical Publication. DETC2015-46623

Junfeng Ma, Gul Kremer, Pennsylvania State University, State College, PA, United States

ENSEMBLE NEURAL NETWORK MODEL FOR PREDICTING THE ENERGY CONSUMPTION OF A MILLING MACHINE

Technical Publication. DETC2015-47957

Ronay Ak, Moneer M. Helu, Sudarsan Rachuri, National Institute of Standards and Technology, Gaithersburg, MD, United States

HOW CAN DFM HELP THE STUDY OF NEUROANATOMY?

Technical Publication. DETC2015-47540

Vijitashwa Pandey, Oakland University, Rochester, MI, United States, James Wolfe, Toledo, OH, United States, Vipul Shukla, University of Toledo, Toledo, OH, United States

DESIGN FOR FUSED FILAMENT FABRICATION (FFF) ADDITIVE MANUFACTURING

Technical Publication. DETC2015-46355

John Steuben, Douglas L. Van Bossuyt, Cameron Turner, Colorado

School of Mines, Golden, CO, United States

DFMLC-5 Design for Manufacturing and Assembly

DFMLC-5-1 DESIGN FOR MANUFACTURING AND ASSEMBLY

Level 2, Hynes CC, Room 209

9:30am – 11:10am

Session Chair: Kazuhiro Saitou, University of Michigan, Ann Arbor, MI, United States

Session Co-Chair: Joshua Summers, Clemson University, Clemson, SC, United States

AN AGENT OPTIMIZATION MODEL FOR A COMPLEX MANUFACTURING SYSTEM IN AN UNCERTAIN ENVIRONMENT

Technical Publication. DETC2015-46257

Michael Mitnovitsky, Technion-Israel Institute of Technology, Haifa, Israel, Miri Weiss Cohen, Braude College of Engineering, Karmiel, Israel, Moshe Shpitali, Technion-Israel Institute of Technology, Haifa, Israel

METHODS FOR SELECTING LEVEL OF AUTOMATION: A CRITICAL COMPARISON OF APPROACHES AND INTEGRATED PROPOSAL

Technical Publication. DETC2015-46285

Anas Salmi, Grenoble INP / GSCOP Laboratory, Grenoble, France, Jayavardhan Dhulia, Joshua Summers, Clemson University, Clemson, SC, United States, Pierre David, Eric Blanco, INP-Grenoble, Grenoble, France

DISCRETE-EVENT SIMULATION SOFTWARE FOR MODELING FLEXIBILITY-DRIVEN MANUFACTURING PROCESSES

Technical Publication. DETC2015-47411

Nadia Galaske, Erdal Tantik, Reiner Anderl, Technische Universität Darmstadt, Darmstadt, Germany

STOCHASTIC OPTIMIZATION OF REPAIR SHOPS LOCATION PROBLEM USING PARTICLE SWARM

OPTIMIZATION ALGORITHM

Technical Publication. DETC2015-46605

Masoud Sharafi, Hamid Afshari, University of Manitoba, Winnipeg, MB, Canada, Tarek Y.EIMekkawy, Andrei Vasiljevitsy Sleptchenko, Qatar University, Doha, Qatar, Qingjin Peng, University of Manitoba, Winnipeg, MB, Canada

BEYOND OPTIMAL SEQUENCING: DEFINING PART ORIENTATION AND WORKER ALLOCATION IN ASSEMBLY

Technical Publication. DETC2015-46068

Nima Raftbakhsh, Matt Campbell, Oregon State University, Corvallis, OR, United States

**DTM-8
Managing Design Processes**

**DTM-8-1
MANAGING DESIGN PROCESSES**

Level 1, Hynes CC, Room 104 9:30am – 11:10am

Session Chair: Scott Ferguson, North Carolina State University, Raleigh, NC, United States

Session Co-Chair: Kyoung-yun Kim, Wayne State University, Detroit, MI, United States

WHICH ONE SHOULD I PICK? CONCEPT SELECTION IN ENGINEERING DESIGN INDUSTRY

Technical Publication. DETC2015-46522

Christine Toh, Lisa Miele, Scarlett Miller, Pennsylvania State University, University Park, PA, United States

DESIGN PRINCIPLES: THE FOUNDATION OF DESIGN

Technical Publication. DETC2015-46157

Katherine Fu, Georgia Institute of Technology, Atlanta, GA, United States, Maria Yang, Massachusetts Institute of Technology, Cambridge, MA, United States, Kristin Wood, Singapore University of Technology and Design, Singapore, TX, Singapore

FAILURE BASED DESIGN PROCESS

Technical Publication. DETC2015-46733

Chad Foster, Cummins Inc, Columbus, IN, United States

DISCOVERY AND EVALUATION OF DESIGN METHODS IN PRACTICE: AN EMPIRICAL STUDY

Technical Publication. DETC2015-47387

Kilian Gericke, University of Luxembourg, Luxembourg, Luxembourg, Celeste Roschuni, Julia Kramer, University of California, Berkeley, Berkeley, CA, United States

A PILOT STUDY OF CUSTOMER REQUIREMENT DERIVATION METHODS AMONG ENGINEERING STUDENTS

Technical Publication. DETC2015-47584

Julian Steffen Renz, Heidenhain Corporation, Schaumburg, IL, United States, Andrew Olewnik, University at Buffalo, Buffalo, NY, United States

**MESA-13
Mechatronics and Embedded Systems in Education**

**MESA-13-1
MECHATRONICS AND EMBEDDED SYSTEMS IN EDUCATION**

Level 1, Hynes CC, Room 111 9:30am – 11:10am

Session Chair: Sukhdeep S. Dhama, National Institute of Technical Teachers Training & Research, Chandigarh, India

Session Co-Chair: Ty A. Lasky, University of California – Davis, Davis, CA, United States

MODULAR FLEXIBLE PRODUCTION SYSTEM - CONSTRUCTION AND APPLICATION IN EDUCATION

Technical Publication. DETC2015-47262

Arkadiusz Pietrowiak, Olaf Cizak, Jakub Wojciechowski, Marcin Winiewski, Poznan University of Technology, Poznan, Poland

GESTURE BASED CONTROL OF A SIMULATED ROBOT MANIPULATOR

Technical Publication. DETC2015-47419

Sukhdeep S. Dhami, National Institute of Technical Teachers Training & Research, Chandigarh, India, Ashutosh Sharma, Panjab University Hoshiarpur, Punjab, India, Rohit Kumar, Parveen Kalra, PEC University of Technology, Chandigarh, India

AN INTERACTIVE VIRTUAL ENVIRONMENT FOR PROGRAMMING MODULAR ROBOTS

Student Competition Paper. DETC2015-47705

Kevin J. Gucwa, Harry H. Cheng, University of California, Davis, Davis, CA, United States

A COMPARATIVE EXPERIMENTAL EVALUATION OF IMU DESIGNS

Technical Publication. DETC2015-46358

Bahram Ravani, Jason Sherrett, Ty A. Lasky, University of California - Davis, Davis, CA, United States

MANEUVERING CAR TRACKING USING THE INTERACTIVE MULTIPLE MODEL 2ND-ORDER SVSF METHOD

Technical Publication. DETC2015-47375

Mina Attari, Hamed Hossein Afshari, Saeid Habibi, McMaster University, Hamilton, ON, Canada

MESA-16 **Robotics and Mobile Machines**

MESA-16-1 **ROBOTICS AND MOBILE MACHINES**

Level 1, Hynes CC, Room 109

9:30am-11:10am

Session Chair: Massimo Callegari, Polytechnic University of Marche, Ancona, Italy

Session Co-Chair: Yousef Naranjani, University of California Merced, Merced, CA, United States

NOVEL CONTACTLESS ACTIVE ROBOTIC JOINT USING AMB: DESIGN AND CONTROL

Technical Publication. DETC2015-46732

Mohamed Selmy, Mohamed Fanni, Abdelfatah Mohamed, Egypt-Japan University of Science and Technology, Alexandria, Egypt

A GRIPPER FOR HANDLING LARGE LEATHER PLIES STACKED ON BEAMS

Technical Publication. DETC2015-47371

David Corinaldi, Massimo Callegari, Polytechnic University of Marche, Ancona, Italy, Giacomo Palmieri, eCampus University, Novedrate, Italy, Matteo-Claudio Palpacelli, Polytechnic University of Marche, Ancona, Italy

MULTIBODY ANALYSIS AND DESIGN OF A RECONFIGURABLE PARALLEL KINEMATICS MANIPULATOR

Technical Publication. DETC2015-47399

Matteo-Claudio Palpacelli, Massimo Callegari, Polytechnic University of Marche, Ancona, Italy, Luca Carbonari, Istituto Italiano di Tecnologia, Genova, Genova, Italy, Giacomo Palmieri, eCampus University, Novedrate, Italy

EXPERIMENTAL CHARACTERIZATION OF A MESO-SCALE COMBUSTION DRIVEN ACTUATOR DESIGNED FOR HIGH EFFICIENCY

Technical Publication. DETC2015-47845

Alexandre Bélanger Desbiens, Jean-Sébastien Plante, Patrice Masson, Université de Sherbrooke, Sherbrooke, QC, Canada

CHMINDSTORMS FOR CONTROLLING MULTI-ROBOT SYSTEMS

Technical Publication. DETC2015-47862

Binsen Qian, Harry H. Cheng, University of California, Davis, Davis, CA, United States

MESA-17 **Sensors and Actuators**

MESA-17-1 **SENSORS AND ACTUATORS : DEVELOPMENT IN MANUFACTURING SYSTEM**

Level 1, Hynes CC, Room 110 9:30am-11:10am

Session Chair: Guangbo Hao, University College Cork, Cork, Ireland

INNOVATIVE AF VCM ACTUATOR FOR SMART PHONE CAMERA MODULE

Technical Publication. DETC2015-46031

Chien-Sheng Liu, Hong-Fei Li, National Chung Cheng University, Chiayi County, Taiwan, Min-Kai Lee, Industrial Technology Research Institute, Chiayi County, Taiwan

AUTOMOTIVE ANTI-THEFT SYSTEM

Student Competition Paper. DETC2015-46037

Pulkit Batra, Delhi Technological University, Delhi, India

DEVELOPMENT OF A COMPLIANT-MECHANISM-BASED COMPACT THREE-AXIS FORCE SENSOR FOR HIGH-PRECISION MANUFACTURING

Technical Publication. DETC2015-46166

Guangbo Hao, Marc Murphy, University College Cork, Cork, Ireland, Xichun Luo, University of Strathclyde, Glasgow, United Kingdom

DEVELOPMENT OF INTERGRATED ROLLER LEVELING SYSTEM FOR MAGNETIC ENCODING MEDIUM MANUFACTURING

Technical Publication. DETC2015-46729

Brian Chen, Jen-Yuan (James) Chang, National Tsing Hua University, Hsinchu, Taiwan

**MR-3
Robot Kinematics and Motion Planning**

**MR-3-4
ROBOTIC MECHANISM DESIGN AND CONTROL**

Level 2, Hynes CC, Room 206 9:30am - 11:10am

Session Chair: Nina P. Robson, California State University, Fullerton, Fullerton, CA, United States

Session Co-Chair: Jingjun Yu, Beihang University, Beijing, China

DESIGN OF A NON-ANTHROPOMORPHIC ARTICULATED SYSTEMS BASED ON AN ELBOW CONSTRAINT ARM KINEMATIC DATA FOR HUMAN INTERACTIVE ROBOTIC APPLICATIONS

Technical Publication. DETC2015-46530

Hyosang Moon, Nina P. Robson, California State University Fullerton, Fullerton, CA, United States

THE QUADROG ROBOT, A PARALLEL ROBOT WITH A CONFIGURABLE PLATFORM FOR HAPTIC APPLICATIONS

Technical Publication. DETC2015-46841

Salua Hamaza, Patrice Lambert, Delft University of Technology, Delft, Netherlands, Marco Carricato, University of Bologna, Bologna, Italy, Justus Herder, Delft University of Technology, Delft, Netherlands

ATTITUDE ADJUSTMENT OF A QUADRUPEL ROBOT IN THE AIR

Technical Publication. DETC2015-47348

Xu Pei, Wei Zhou, Yinong Chen, Yijun Ma, Beihang University, Beijing, Beijing, China

ARTICULATED VEHICLES WITH ACTIVE SUSPENSION MECHANISM FOR MOBILITY ON UNEVEN TERRAIN

Technical Publication. DETC2015-46333

Fang Feng, Chen Yan, Tian Jin University, Tianjin, China

**MR-5
Theoretical and Computational Kinematics (A.T. Yang Symposium)**

**MR-5-1
MECHANISM KINEMATICS**

Level 2, Hynes CC, Room 204 9:30am - 11:10am

Session Chair: Gregory S. Chirikjian, The Johns Hopkins University, Baltimore, MD, United States

Session Co-Chair: Diego Colón, University of São Paulo, São Paulo, Brazil

LOCAL ANALYSIS OF CLOSED-LOOP LINKAGES - MOBILITY, SINGULARITIES, AND SHAKINESS

Technical Publication. DETC2015-47485

Andreas Mueller, Johannes Kepler University, Linz, Austria

ANALYTICAL METHODS FOR SOLUTION SETS OF INTERVAL WRENCH

Technical Publication. DETC2015-47575

Leila Notash, Queens University, Kingston, ON, Canada

PLANAR LINKAGE SYNTHESIS FOR MIXED EXACT AND APPROXIMATED MOTION REALIZATION VIA KINEMATIC MAPPING

Technical Publication. DETC2015-47231

Ping Zhao, Hefei University of Technology, Hefei, China, Xin Ge, Stony Brook University, Stony Brook, NY, United States, Bin Zi, Hefei University of Technology, Hefei, China, Qiaode Ge, Stony Brook University, Stony Brook, NY, United States

TAILORED FORMULATIONS OF GEOMETRIC CONSTRAINTS FOR ALGEBRAIC ANALYSIS OF MECHANISM KINEMATICS

Technical Publication. DETC2015-46094

Samuli Piipponen, Eero Hyry, University of Tampere, Tampere, Finland, Jukka Tuomela, University of Eastern Finland, Joensuu, Finland, Andreas Müller, Johannes Kepler University, Linz, Austria

APPLICATIONS OF THE 4D GEOMETRIC ALGEBRA TO DIMENSIONAL MOBILITY CRITERIA OF DELAUS-PARALLELOGRAM AND BENNETT PARADOXICAL LINKAGES

Technical Publication. DETC2015-46667

Chung-ching Lee, National Kaohsiung University of Applied Sciences, Kaohsiung, Taiwan

MR-6

Compliant Mechanisms and Micro/Nano Mechanisms (A. Midha Symposium)

MR-6-3

COMPLIANT MECHANISMS FAST FORWARD AND INTERACTIVE II

Level 2, Hynes CC, Room 210

9:30am – 11:10am

Session Chair: Guangbo Hao, University College Cork, Cork, Ireland

Session Co-Chair: Shikui Chen, State University of New York at Stony Brook, Stony Brook, NY, United States

DESIGN OF CONTROL STRATEGY FOR A NOVEL COMPLIANT FLEXURE-BASED MICROGRIPPER WITH TWO JAWS

Technical Publication. DETC2015-46869

Zhigang Wu, Yangmin Li, University of Macau, Taipa Macao, Macau

ON SYNTHESIS OF CONTACT AIDED COMPLIANT MECHANISMS USING THE MATERIAL MASK OVERLAY METHOD

Technical Publication. DETC2015-47064

Prabhat Kumar, Indian Institute of Technology Kanpur, Kanpur, India, Roger Sauer, RWTH Aachen University, Aachen, Germany, Anupam Saxena, Indian Institute of Technology Kanpur, Kanpur, India

REVIEW, CATEGORISATION, AND COMPARISON OF 1DOF STATIC BALANCERS

Technical Publication. DETC2015-47217

Asthor Steinthorsson, Milton Aguirre, Gerard Dunning, Justus Herder, Delft University of Technology, Delft, Netherlands

PARALLEL SINGULARITIES FOR THE DESIGN OF SOFTENING SPRINGS USING COMPLIANT MECHANISMS

Technical Publication. DETC2015-47240

Quentin Boehler, University of Strasbourg, Strasbourg, France, Marc S. Vedrines, INSA Strasbourg, Strasbourg, France, Salih Abdelaziz, Philippe Poignet, LIRMM-UM2, Montpellier, France, Pierre Renaud, University of Strasbourg – CNRS – INSA Strasbourg, Strasbourg,

France

STUDYING THE EFFECTS OF BEAM GEOMETRY ON THE ACCURACY OF PSEUDO-RIGID-BODY MODELS

Technical Publication. DETC2015-47267

Venkatasubramanian Kalpathy Venkiteswaran, Hai-Jun Su, The Ohio State University, Columbus, OH, United States

DESIGN OF A COMPLIANT XY POSITIONING STAGE WITH LARGE WORKSPACE

Technical Publication. DETC2015-47271

Chao-Min Huang, Hai-Jun Su, The Ohio State University, Columbus, OH, United States

EXPERIMENTAL VALIDATION OF THE KINEMATICS OF A 3PRS COMPLIANT PARALLEL MECHANISM FOR MICROMILLING APPLICATIONS

Technical Publication. DETC2015-47449

Antonio Ruiz, Francisco Campa Gomez, Constantino Roldan-Paraponiaris, Oscar Altuzarra, University of the Basque Country, Vizcaya, Spain

SHAPE-MORPHING SPACE FRAME (SMSF) USING LINEAR BISTABLE ELEMENTS

Technical Publication. DETC2015-47526

Ahmad Alqasimi, Craig Lusk, The University of South Florida, Tampa, FL, United States

MODE SHAPES IN COMPLIANT MECHANISMS, AND A PROCEDURE TO IDENTIFY APPROPRIATE PSEUDO-RIGID-BODY MODEL TYPE

Technical Publication. DETC2015-47694

Ashok Midha, Pratheek Bagivalu Prasanna, Missouri University of Science and Technology, Rolla, MO, United States

FLEXURE DESIGN FOR EIGHT-BAR RECTILINEAR MOTION MECHANISM

Technical Publication. DETC2015-47863

Yang Liu, J. Michael McCarthy, University of California, Irvine, Irvine, CA, United States

LIMITATIONS IN THE USE OF SMALL-LENGTH FLEXURAL PIVOT IN A PSEUDO-RIGID-BODY MODEL

Technical Publication. DETC2015-47914

Vamsi Lodagala, Krutika Karthik, Ashok Midha, Missouri University of Science and Technology, Rolla, MO, United States

MECHANICAL ADVANTAGE OF A COMPLIANT MECHANISM AND SIGNIFICANT FACTORS AFFECTING IT, USING THE PSEUDO-RIGID-BODY MODEL APPROACH

Technical Publication. DETC2015-47930

Ashok Midha, Sushrut G. Bapat, Missouri University of Science and Technology, Rolla, MO, United States, Prem Midha, Georgia Institute of Technology, Atlanta, GA, United States

DEVELOPMENT OF A METHODOLOGY FOR PSEUDO-RIGID-BODY MODELS OF COMPLIANT BEAMS WITH INSERTS, AND EXPERIMENTAL VALIDATION

Technical Publication. DETC2015-47943

Ashok Midha, Missouri University of Science and Technology, Rolla, MO, United States, Raghvendra S. Kuber, Schaeffler Group USA, Rochester Hills, MI, United States, Sushrut G. Bapat, Missouri University of Science and Technology, Rolla, MO, United States

DYNAMIC MODELING FOR A CONTINUUM ROBOT WITH COMPLIANT STRUCTURE

Technical Publication. DETC2015-46683

Yong Guo, Rongjie Kang, Tianjin University, Tianjin, China, Lisha Chen, Tianjin Polytechnic University, Tianjin, China, Jian Dai, Kings College-University of London, London, United Kingdom

**MR-8
Novel Mechanisms, Robots and Applications**

**MR-8-3
NOVEL APPLICATIONS**

Level 2, Hynes CC, Room 202

9:30am – 11:10am

Session Chair: Vishesh Vikas, Tufts University, Cambridge, MA, United States

Session Co-Chair: Yoshihiro Takita, National Defense Academy, Yokosuka, Japan

FEATURE IMPROVEMENT AND COST REDUCTION OF BAITCASTING FISHING REELS FOR EMERGING MARKETS

Technical Publication. DETC2015-47367

Andrew Kriebel, Monica Isava, Jonathan Slocum, David Hume, Adam Marshall, Emily Koepsell, Amos G. Winter V, Mark Jeunnette, Massachusetts Institute of Technology, Cambridge, MA, United States

DESIGN METHODOLOGIES FOR SOFT MATERIAL ROBOTS THROUGH ADDITIVE MANUFACTURING, FROM PROTOTYPING TO LOCOMOTION

Technical Publication. DETC2015-47507

Eliad Cohen, University of Massachusetts, Lowell, Lowell, MA, United States, Vishesh Vikas, Barry Trimmer, Tufts University, Medford, MA, United States, Stephen McCarthy, University of Massachusetts, Lowell, Lowell, MA, United States

MINIMIZING THE ENERGY LOSS OF THE BI-ARTICULAR ACTUATION IN BIPEDAL ROBOTS

Technical Publication. DETC2015-47803

Derek Lahr, General Motors Global Research and Development center, Warren, MI, United States, Hak Yi, Dennis W. Hong, University of California Los Angeles, Los Angeles, CA, United States

WEARABLE UPPER BODY SUIT FOR ASSISTING HUMAN LOAD CARRIAGE

Technical Publication. DETC2015-47973

Joon-Hyuk Park, Paul Stegall, Sunil Agrawal, Columbia University, New York, NY, United States, Shridhar Yarlagadda, John Tierney, Shashank Sharma, John Gillespie, University of Delaware, Newark, DE, United States

DEVELOPMENT OF WHEEL CHAIR WITH CENTER

ARTICULATED BODY AND AUTONOMOUS CONTROL SYSTEM

Technical Publication. DETC2015-46970

Yoshihiro Takita, Shinya Ohkawa, Hisashi Date, National Defense Academy, Yokosuka, Japan

MR-9

Mobile Robots and Cable-Driven Systems

MR-9-1

MODELING AND CONTROL OF MOBILE ROBOTS

Level 2, Hynes CC, Room 203

9:30am – 11:10am

Session Chair: Pinhas Ben-Tzvi, The George Washington University, Washington, DC, United States

Session Co-Chair: James Schmiedeler, University of Notre Dame, Notre Dame, IN, United States

STATIC MODELING OF A MULTI-SEGMENT SERPENTINE ROBOTIC TAIL

Technical Publication. DETC2015-46655

William Rone, Pinhas Ben-Tzvi, The George Washington University, Washington, WA, United States

QUANTIFYING CONTROL AUTHORITY IN PERIODIC MOTIONS OF UNDERACTUATED MOBILE ROBOTS

Technical Publication. DETC2015-47666

David Post, Boeing Phantom Works, Huntington Beach, CA, United States, Bill Goodwine, James Schmiedeler, University of Notre Dame, Notre Dame, IN, United States

LOCALIZATION AND TRAJECTORY TRACKING OF AN AUTONOMOUS SPHERICAL ROLLING ROBOT USING IMU AND ODOMETRY

Technical Publication. DETC2015-47223

Vibhute Akash Ajay, Adi P. Suherlan, Gim Song Soh, Shaohui Foong, Kristin Wood, Kevin Otto, Singapore University of Technology & Design, Singapore, Singapore

TRAJECTORY CONTROL OF A SNAKE-LIKE ROBOT IN OPERATIONAL SPACE USING A DOUBLE LAYER SLIDING MODE CONTROLLER

Technical Publication. DETC2015-46480

Mahdi Haghshenas-Jaryani, UTA Research Institute, Fort Worth, TX, United States, Gholamreza Vossoughi, Sharif University of Technology, Tehran, Iran

AN INNOVATIVE NAVIGATION STRATEGY FOR AUTONOMOUS UNDERWATER VEHICLES: AN UNSCENTED KALMAN FILTER BASED APPROACH

Technical Publication. DETC2015-46432

Alessandro Ridolfi, Benedetto Allotta, University of Florence, Florence, Italy, Andrea Caiti, University of Pisa, Pisa, Italy, Luigi Chisci, Riccardo Costanzi, University of Florence, Florence, Italy, Francesco Di Corato, University of Pisa, Pisa, Italy, Claudio Fantacci, University of Florence, Florence, Italy, Davide Fenucci, University of Pisa, Pisa, Italy, Enrico Meli, Florence University, Florence, Italy

**MNS-6
Micro Mechanics and Surface Engineering of Artificial and Biological Materials**

**MNS-6-1
MICRO MECHANICS AND SURFACE ENGINEERING**

Level 3, Hynes CC, Room 307 9:30am – 11:10am

Session Chair: Mircea Teodorescu, University of California, Santa Cruz, Santa Cruz, CA, United States

Session Co-Chair: Hartono Sumali, Sandia National Lab, Albuquerque, NM, United States, Andrew Dick, Rice University, Houston, TX, United States

FABRICATION AND TRIBOLOGICAL BEHAVIOR OF NI-ZRO2 NANOCOMPOSITE COATINGS PREPARED BY ELECTRODEPOSITION IN ULTRASONIC FIELD

Technical Publication. DETC2015-46246

Yu-Jun Xue, Chun-Yang Liu, Ji-Shun Li, Wei Ma, Xin Sui, Fang Yang, Xi-Qiang Ma, Henan University of Science and Technology, Luoyang, China

THE EFFECT OF GEOMETRY ON THE VELOCITY AND

DRAG FORCE OF CATALYTIC MICRO/NANO-ROCKETS

Technical Publication. DETC2015-46881

Jiyuan Wang, Longqiu Li, Xiaocong Chang, Tianlong Li, Wenping Song, Guangyu Zhang, Harbin Institute of Technology, Harbin, China

DRAG FORCE REDUCTION AT THE INTERFACE OF TUBULAR MICROROCKETS

Technical Publication. DETC2015-46923

Xiaocong Chang, Longqiu Li, Dekai Zhou, Tianlong Li, Guangyu Zhang, Harbin Institute of Technology, Harbin, China

ANALYSIS OF CONTACT MECHANICS AND SMOOTHED PARTICLE HYDRODYNAMIC SIMULATIONS OF VISCO-ELASTIC POLYMER SINE WAVES

Technical Publication. DETC2015-47866

Nick Cramer, Mircea Teodorescu, University of California Santa Cruz, Santa Cruz, CA, United States, Janet Chao, Prosthetics Research Lab, LLC, Carmichael, CA, United States, Travis Tollefson, University of California, Davis, Sacramento, CA, United States

PROPER ORTHOGONAL DECOMPOSITION OF TAPPING MICROCANTILEVERS IN LIQUID ATOMIC FORCE MICROSCOPY

Technical Publication. DETC2015-47234

Il Kwang Kim, Soo Il Lee, University of Seoul, Seoul, Republic of Korea

**MSNDC-18/VIB-17
Keynote Lectures**

**MSNDC-18-2/VIB-17-2
MSNDC/VIB JOINT KEYNOTE LECTURES**

9:30am – 11:10am

**PTG-4
Gearbox Design, Reliability, and Diagnostics**

PTG-4-1**GEARBOX DESIGN, RELIABILITY, & DIAGNOSTICS (1)**

Level 1, Hynes CC, Room 108

9:30am – 11:10am

Session Chair: Song Xue, Curtin University, Perth, Australia

Session Co-Chair: Daniel Häggström, KTH Royal Institute of Technology, Stockholm, Sweden

RING-PLANET MESH STIFFNESS STUDY WITH DIFFERENT BOUNDARY CONDITIONS AND CRACK LOCATIONS

Technical Publication. DETC2015-47175

Song Xue, Ian Howard, Curtin University, Perth, Australia

DEVELOPMENT OF EASY SET-UP AND IN SITU AUTOMATIC GEAR DIAGNOSTIC SYSTEM USING A LASER BEAM

Technical Publication. DETC2015-47252

Keyaki Nakajima, Eiichirou Tanaka, Saitama University, Saitama-shi, Japan, Kazunari Okabe, MHI Sagami High-Technology Ltd, Sagamihara-shi, Kanagawa-ken, Japan, Hitoshi Takebe, Mitsubishi Heavy Industries, Ltd, Sagamihara-shi, Japan, Kazuteru Nagamura, Kiyotaka Ikejo, Hiroshima University, Higashi-Hiroshima, Japan, Shinji Hashimura, Shibaura Institute of Technology, Taito-ku, Japan, Keiichi Muramatsu, Keiichi Watanuki, Saitama University, Saitama, Japan, Ryoza Nemoto, Tokyo Metropolitan College of Industrial Technology, Arakawa-ku, Japan

AN EXPERIMENTAL STUDY ON THE MOTION TRANSMISSION ERROR OF PLANETARY GEAR SETS

Technical Publication. DETC2015-47275

Brian Boguski, Ahmet Kahraman, Ohio State University, Columbus, OH, United States

A VERIFIED AND VALIDATED MODEL FOR SIMULATION-DRIVEN DESIGN OF HEAVY DUTY TRUCK SYNCHRONIZERS

Technical Publication. DETC2015-47318

Daniel Häggström, Ulf L. Sellgren, KTH Royal Institute of Technology, Stockholm, Sweden, Wiktor Stenström, FS Dynamics, Stockholm, Sweden, Stefan Björklund, KTH Royal Institute of Technology, Stockholm, Sweden

A THREE-DIMENSIONAL LOAD SHARING MODEL OF PLANETARY GEAR SETS HAVING MANUFACTURING ERRORS

Technical Publication. DETC2015-47470

Nicholas Leque, Ahmet Kahraman, Ohio State University, Columbus, OH, United States

VIB-16**System Identification, Damage Detection, and Diagnostics****VIB-16-2****SYSTEM IDENTIFICATION, DAMAGE DETECTION, AND DIAGNOSTICS II**

Level 3, Hynes CC, Room 306

9:30am – 11:10am

Session Chair: Weidong Zhu, University of Maryland, Baltimore County, Baltimore, MD, United States

EFFICIENT UNCERTAINTY QUANTIFICATION IN STRUCTURAL DYNAMIC ANALYSIS USING TWO-LEVEL GAUSSIAN PROCESSES

Technical Publication. DETC2015-47724

Kai Zhou, Pei Cao, Jiong Tang, University of Connecticut, Storrs, CT, United States

EFFICIENT AND ACCURATE CALCULATION OF DISCRETE FREQUENCY RESPONSE FUNCTIONS AND IMPULSE RESPONSE FUNCTIONS

Student Competition Paper. DETC2015-47779

Yongfeng Xu, Weidong Zhu, University of Maryland, Baltimore County, Baltimore, MD, United States

SIMULTANEOUS OUTPUT-ONLY IDENTIFICATION OF PHYSICAL PARAMETERS AND UNKNOWN INPUTS FOR LINEAR SYSTEMS

Technical Publication. DETC2015-47659

Mostafa Ghobadi, Manoranjan Majji, Ehsan T. Esfahani, State University of New York at Buffalo, Buffalo, NY, United States

SENSITIVITY ANALYSIS AND IMPROVEMENT OF A PSEUDO-MODAL APPROACH FOR DAMAGE LOCALIZATION

Technical Publication. DETC2015-46715

Egidio Lofrano, Achille Paolone, Francesco Romeo, Sapienza University of Rome, Rome, Italy

FAULT DIAGNOSIS FROM SYMPTOMS IN FREQUENCY SPECTRUM BY USING GENETIC FUZZY NEURAL NETWORKS

Technical Publication. DETC2015-46316

Chun-Chieh Wang, Industrial Technology Research Institute, Chutung, Taiwan, Yuan Kang, Chung Yuan Christian University, Chung Li, Taiwan, Chin-Chi Liao, Industrial Technology Research Institute, Chutung, Taiwan

**MSNDC-18/VIB-17
Keynote Lectures**

**MSNDC-18-2/VIB-17-2
MSNDC/VIB JOINT KEYNOTE LECTURES**

Level 3, Hynes CC, Room 302 9:30am – 11:10am

Session Chair: D. Dane Quinn, The University of Akron, Akron, OH, United States

Session Co-Chair: Walter Lacarbonara, Sapienza University of Rome, Rome, Italy

**AVT-3
Advances in Ground Vehicle Safety and Ergonomics**

**AVT-3-2
ADVANCES IN GROUND VEHICLE SAFETY AND ERGONOMICS II**

Level 3, Hynes CC, Room 309 11:40am – 12:40pm

Session Chair: Costin Untaroiu, Virginia Tech, Blacksburg, VA, United States

Session Co-Chair: Tomonari Furukawa, Virginia Tech, Blacksburg, VA, United States, Alan Mayton, NIOSH – Pittsburgh Research

Laboratory, Pittsburgh, PA, United States, Yan Fu, Ford Motor Company, Dearborn, MI, United States

DEVELOPMENT AND PRELIMINARY VALIDATION OF A 50TH PERCENTILE PEDESTRIAN FINITE ELEMENT MODEL

Technical Publication. DETC2015-47781

Costin Untaroiu, Jacob Putnam, Virginia Tech, Blacksburg, VA, United States, Jeremy Schap, Wake Forest University, Winston-Salem, NC, United States, Matthew Davis, Wake Forest School of Medicine, Winston-Salem, NC, United States, Scott Gayzik, Wake Forest Baptist Health, Winston-Salem, NC, United States

MAP BASED NAVIGATION OF AN AUTONOMOUS CAR USING GRID-BASED SCAN-TO-MAP MATCHING

Technical Publication. DETC2015-47936

Tomonari Furukawa, Virginia Tech, Blacksburg, VA, United States, Xianqiao Tong, NVIDIA, Santa Clara, CA, United States, Kuya Takami, Virginia Tech, Blacksburg, VA, United States, Daniel Watman, Abbi Hamed, ZMP, Tokyo, Japan, Ravindra Ranasinghe, Gamini Dissanayake, University of Technology, Sydney, Australia

THE ACTIVE SAFETY OF THE AUTOMOBILE IN THE FUTURE

Student Competition Paper. DETC2015-47939

Huyao Wu, Eastern Michigan University, Ann Arbor, MI, United States

**AVT-5
Advances in Vehicle Electrification and Powertrain Design**

**AVT-5-2
ADVANCES IN VEHICLE ELECTRIFICATION AND POWERTRAIN DESIGN II**

Level 3, Hynes CC, Room 308 11:40am – 12:40pm

Session Chair: Jian Song, Tsinghua University, Beijing, China

Session Co-Chair: Guang Dong, Tesla Motors, Fremont, CA, United States

A STUDY ON REGENERATIVE BRAKING CONTROL STRATEGY IN REAR-DRIVE SP-HEB

Technical Publication. DETC2015-47080

Dongchen Qin, Yinqian Xie, Zhengzhou University, Zhengzhou, Henan Province, China

MODEL BASED DESIGN AND EVALUATION OF ELECTRIC VEHICLE POWERTRAIN WITH INDEPENDENT DRIVING MOTORS

Technical Publication. DETC2015-47980

Haotian Wu, Haiyan Zhang, Purdue University, West Lafayette, IN, United States

TOPOLOGICAL DESIGN OF PARALLEL HYBRID TRANSMISSION WITH ELECTRIC TORQUE SUPPORT

Technical Publication. DETC2015-48062

Zengxiong Peng, Shihua Yuan, Jibin Hu, Mingfei Gao, Beijing Institute of Technology, Beijing, China

VISUAL PERFORMANCE MAPS FOR HUMAN CHOICE IN HYBRID ELECTRIC VEHICLE'S IN-WHEEL MOTORS: PART I - PURCHASE CRITERIA

Technical Publication. DETC2015-47521

Delbert Tesar, Pradeepkumar Ashok, University of Texas Austin, Austin, TX, United States, Hoon Lee, Hyundai Motors in Korea, Gunpo-si, Republic of Korea

VISUAL PERFORMANCE MAPS FOR HUMAN CHOICE IN HYBRID ELECTRIC VEHICLES IN-WHEEL MOTORS: PART II - OPERATION, MAINTENANCE, AND REFRESHMENT CRITERIA

Technical Publication. DETC2015-47566

Delbert Tesar, Pradeepkumar Ashok, University of Texas Austin, Austin, TX, United States, Hoon Lee, Hyundai Motors in Korea, Gunpo-si, Republic of Korea

AMS: Simulation in Advanced Manufacturing**CIE-10-1****AMS: SIMULATION IN ADVANCED MANUFACTURING**

Level 3, Hynes CC, Room 311 11:40am - 12:40pm

Session Chair: Virginia Degiorgi, Naval Research Lab, Washington, DC, United States

Session Co-Chair: Zhimin Xi, University of Michigan - Dearborn, Dearborn, MI, United States

SUPPORTING OPTIMIZATION OF COMPLEX PRODUCT DEVELOPMENT PROCESSES THROUGH SIMULATION: A CASE-STUDY OF THICK FILM HEATERS DEVELOPMENT PROCESSES

Technical Publication. DETC2015-46021

Eliab Opiyo, Yu Song, Hidde Dorhout, Delft University of Technology, Delft, Netherlands, Gerd Kloppers, Ferro Techniek BV, Gaanderen, Netherlands

CONTAINERIZATION METHOD FOR LOGISTIC COST REDUCTION BASED ON CLOSED-LOOP SUPPLY CHAIN MODEL

Technical Publication. DETC2015-46371

Xinyan Ou, Qing Chang, Stony Brook University, Stony Brook, NY, United States, Guoxian Xiao, Jorge Arinez, General Motors Corp, Warren, MI, United States

MODELING THE LAMINATION OF A MULTILAYERED TAPE CAST CERAMIC COMPONENT WITH FUGITIVE PHASES BEFORE SINTERING

Technical Publication. DETC2015-47548

Stephanie Wimmer, Virginia Degiorgi, Edward Gorzkowski, Naval Research Laboratory, Washington, DC, United States

CIE-9**AMS: Uncertainty Quantification in Simulation and Model Verification & Validation****CIE-9-1****AMS: UNCERTAINTY QUANTIFICATION IN SIMULATION**

Level 3, Hynes CC, Room 312 11:40am - 12:40pm

Session Chair: Yan Wang, Georgia Institute of Technology, Atlanta, GA, United States

Session Co-Chair: Samy Missoum, University of Arizona, Tucson, AZ, United States

ANALYSIS OF HYBRID DYNAMICAL SYSTEMS WITH UNCERTAINTY IN INITIAL CONDITIONS

Technical Publication. DETC2015-46111

Yuhua He, Arpan Mukherjee, Rahul Rai, University at Buffalo, Buffalo, NY, United States

AN ADAPTIVE COPULA-BASED APPROACH FOR MODEL BIAS CHARACTERIZATION

Technical Publication. DETC2015-46945

Hao Pan, Zhimin Xi, University of Michigan - Dearborn, Dearborn, MI, United States, Ren-jye Yang, Ford Research & Advanced Engineering, Dearborn, MI, United States

QUANTIFICATION OF MODEL-FORM UNCERTAINTY IN DRIFT-DIFFUSION SIMULATION USING FRACTIONAL DERIVATIVES

Technical Publication. DETC2015-47677

Yan Wang, Georgia Institute of Technology, Atlanta, GA, United States

CIE-20 SEIKM: Knowledge Capture, Reuse, and Management

CIE-20-1 SEIKM: KNOWLEDGE MANAGEMENT

Level 3, Hynes CC, Room 313 11:40am - 12:40pm

Session Chair: Paul Witherell, National Institute of Standards and Technology, Gaithersburg, MD, United States

Session Co-Chair: Gregory Mocko, Clemson University, Clemson, SC, United States

DEVELOPMENT OF A PART-FOCUSED MANUFACTURING PROCESS ONTOLOGY: EXPLORING USE AND APPLICATIONS

Technical Publication. DETC2015-47591

Lucas Mesmer, Cobham Mission Systems, Orchard Park, NY, United States, Andrew Olewnik, University at Buffalo, Buffalo, NY, United States

ONTOLOGY-BASED EXECUTABLE DESIGN DECISION TEMPLATE REPRESENTATION AND REUSE

Technical Publication. DETC2015-46272

Zhenjun Ming, Yan Yan, Guoxin Wang, Beijing Institute of Technology, Beijing, China, Jitesh H. Panchal, Purdue University, West Lafayette, IN, United States, Chung Hyun Goh, Janet Allen, Farrokh Mistree, University of Oklahoma, Norman, OK, United States

TAKAGI-SUGENO MODEL BASED SIMULATION DATA MINING FOR EFFICIENT PRODUCT DESIGN

Technical Publication. DETC2015-47040

Xin Li, Yanli Shao, Yusheng Liu, Zhejiang University, Hangzhou, China

EXTRACTION OF MANUFACTURING RULES FROM UNSTRUCTURED TEXT USING A SEMANTIC FRAMEWORK

Technical Publication. DETC2015-47556

SungKu Kang, Lalit Patil, University of Illinois at Urbana-Champaign, Champaign, IL, United States, Arvind Rangarajan, General Electric, San Ramon, CA, United States, Tao Jia, Abha Moitra, Dean Robinson, GE Global Research, Niskayuna, NY, United States, Debasish Dutta, Purdue University, West Lafayette, IN, United States

DAC-5 Design for Market Systems

DAC-5-1 DESIGN FOR MARKET SYSTEMS

Level 1, Hynes CC, Room 101 11:40am - 12:40pm

Session Chair: Scott Ferguson, North Carolina State University, Raleigh, NC, United States

Session Co-Chair: Kenneth "Mark" Bryden, Iowa State University, Ames, IA, United States

AUTONOMOUS ELECTRIC VEHICLE SHARING SYSTEM DESIGN

Technical Publication. DETC2015-46491

Namwo Kang, Fred M. Feinberg, Panos Papalambros, University of Michigan, Ann Arbor, MI, United States

MODELING NONCOMPENSATORY CHOICES WITH A COMPENSATORY MODEL FOR A PRODUCT DESIGN SEARCH

Technical Publication. DETC2015-47632

Jaekwan Shin, Scott Ferguson, North Carolina State University, Raleigh, NC, United States

A SIMPLIFIED MATHEMATICAL MODEL FOR TWO-SIDED MARKET SYSTEMS WITH AN INTERVENING ENGINEERED PLATFORM

Technical Publication. DETC2015-46657

Kaushik Sinha, Massachusetts Institute of Technology, Cambridge, MA, United States, Edoardo Filippo Colombo, Politecnico di Milano, Milan, Italy, Narek R. Shougarian, Olivier De Weck, Massachusetts Institute of Technology, Cambridge, MA, United States

DAC-11

Geometric Modeling and Algorithms for Design and Manufacturing

DAC-11-1

GEOMETRIC MODELING AND ALGORITHMS FOR DESIGN AND MANUFACTURING

Level 1, Hynes CC, Room 102 11:40am - 12:40pm

Session Chair: Horea Ilies, University Of Connecticut, Storrs, CT, United States

Session Co-Chair: Saigopal Nelaturi, PARC, Palo Alto, CA, United States

HIERARCHICAL PRIMITIVE SURFACE CLASSIFICATION FROM TRIANGULATED SOLIDS FOR DEFINING PART-TO-PART DEGREES OF FREEDOM

Technical Publication. DETC2015-46069

Nima Rafibakhsh, Matt Campbell, Oregon State University, Corvallis, OR, United States

SPIRAL TOOLPATHS FOR HIGH-SPEED MACHINING OF 2D POCKETS WITH OR WITHOUT ISLANDS

Technical Publication. DETC2015-46255

Mikkel Abrahamsen, University of Copenhagen, København, Denmark

MULTI-SENSOR REVERSE ENGINEERING TECHNIQUE FOR THE ACQUISITION OF CENTRIFUGAL PUMP IMPELLERS

Technical Publication. DETC2015-47219

Daniele Traghella, Alessandro Paoli, Sandro Barone, Armando V. Razionale, University of Pisa, Pisa, Italy

DAC-14

Multi-Objective Optimization and Sensitivity Analysis

DAC-14-1

MULTIOBJECTIVE OPTIMIZATION AND SENSITIVITY ANALYSIS

Level 1, Hynes CC, Room 103 11:40am - 12:40pm

Session Chair: Mian Li, UM-SJTU Joint Institute, Shanghai, China

Session Co-Chair: David Romero, University of Toronto, Toronto, ON, Canada

SEARCH AS A SERVICE: MOEAS' PERFORMANCE IN A SUPPORT ROLE

Technical Publication. DETC2015-46891

Matthew Woodruff, Timothy Simpson, Pennsylvania State University, University Park, PA, United States, Patrick Reed, Cornell University, Ithaca, NY, United States

IMPROVING MULTIOBJECTIVE MULTIDISCIPLINARY OPTIMIZATION WITH A DATA MINING-BASED HYBRID METHOD

Technical Publication. DETC2015-47361

Hongyi Xu, Ching-hung Chuang, Ren-ye Yang, Ford Motor Company, Dearborn, MI, United States

THE EFFECT OF CREDIT DEFINITION AND AGGREGA-

TION STRATEGIES ON MULTI-OBJECTIVE HYPER-HEURISTICS

Technical Publication. DETC2015-47445

Nozomi Hitomi, Daniel Selva, Cornell University, Ithaca, NY, United States

DEC-9
Short Papers: Design Education Innovations

DEC-9-1
SHORT PAPERS: DESIGN EDUCATION INNOVATIONS

Level 1, Hynes CC, Room 105 11:40am - 12:40pm

Session Chair: Linda Schmidt, University Of Maryland, College Park, MD, United States

Session Co-Chair: Katja Holtta-Otto, Singapore University of Technology, Singapore, Singapore

DESIGN AND BUILD FOR GONDWANNA - A COURSE IN MECHANICAL AND ELECTRONIC DESIGN

Technical Publication. DETC2015-46646

Warren Smith, Australian Defence Force Academy, Canberra, Australia

EXPLORING THE RETENTION OF SUSTAINABLE DESIGN PRINCIPLES IN ENGINEERING PRACTICE THROUGH UNDERGRADUATE DESIGN EDUCATION

Technical Publication. DETC2015-46778

Bryony Dupont, Addison Wisthoff, Oregon State University, Corvallis, OR, United States

CASE STUDY FOR INTRODUCTORY MECHANICAL DESIGN COMPETITIONS

Technical Publication. DETC2015-47286

Daniela Faas, Robert D. Howe, Harvard University, Cambridge, MA, United States

DESIGN INTEGRATION INTO CIRCUITS AND MECHANICS COURSES

Technical Publication. DETC2015-47455

Jacquelyn Nagel, Keith Holland, James Madison University, Harrisonburg, VA, United States

ADVANCING STUDENT LEARNING OF DESIGN FOR ADDITIVE MANUFACTURING THROUGH AN EXTRA-CURRICULAR VEHICLE DESIGN COMPETITION

Technical Publication. DETC2015-47622

Christopher Williams, Logan Sturm, Alfred L. Wicks, Virginia Tech, Blacksburg, VA, United States

INTERDISCIPLINARY DESIGN EDUCATION BASED ON COLLABORATION BETWEEN ARTS AND ENGINEERING SCHOOLS

Technical Publication. DETC2015-47792

Sang Won Lee, Soo Yeon Leem, Sungkyunkwan University, Suwon, Republic of Korea

DFMLC-5
Design for Manufacturing and Assembly

DFMLC-5-2
DESIGN FOR MANUFACTURING AND ASSEMBLY

Level 2, Hynes CC, Room 209 11:40am - 12:40pm

Session Chair: Sara Behdad, University at Buffalo, Buffalo, NY, United States

Session Co-Chair: Gregory Mocko, Clemson University, Clemson, SC, United States

DATA-DRIVEN PREDICTIVE MODEL OF RESIN FILLING TIME OF COMPOSITE MOLDING PROCESS

Technical Publication. DETC2015-46974

Yuqing Zhou, Kazuhiro Saitou, University of Michigan, Ann Arbor, MI, United States

CONTROL OF THERMOFORMING PROCESS PARAMETERS TO INCREASE QUALITY OF SURFACES USING PIN-BASED TOOLING

Technical Publication. DETC2015-47682

Vijay Sarthy Mysore Sreedhara, Gregory Mocko, Clemson University, Clemson, SC, United States

OPTIMIZATION OF INJECTION MOLD DESIGN THROUGH APPLICATION OF EXTERNAL SELECTIVE INDUCTION HEATING

Technical Publication. DETC2015-46440

Krzysztof Mrozek, Poznan University of Technology, Poznan, Poland

DTM-5 Design of Complex Systems and Product Architecture

DTM-5-2 DESIGN OF COMPLEX SYSTEMS AND PRODUCT ARCHITECTURE II

Level 1, Hynes CC, Room 104 11:40am - 12:40pm

Session Chair: Rahul Rai, University at Buffalo, SUNY, Buffalo, NY, United States

Session Co-Chair: Mengqi Hu, Mississippi State University, Mississippi State, MS, United States

A COLLABORATIVE DECISION MODEL FOR LOW ENERGY BUILDING DESIGN OPTIMIZATION

Technical Publication. DETC2015-47288

Yang Chen, Mengqi Hu, Mississippi State University, Mississippi State, MS, United States, Zheng O'Neill, University of Alabama, Tuscaloosa, AL, United States

THE VALUE OF FLEXIBLE CAPACITY EXPANSION STRATEGIES IN DESIGN OF COMPLEX DECENTRALIZED ENGINEERING SYSTEMS

Technical Publication. DETC2015-46277

Junfei Hu, Michel-Alexandre Cardin, National University of Singapore, Singapore, Singapore

STOCHASTIC SUPPLY NETWORKS SERVICING PRE-

AND AFTER-SALES MARKETS

Technical Publication. DETC2015-46749

Shabnam Rezapour, The University of Oklahoma, Norman, OK, United States, Rahul Singh, Entercoms, Irving, TX, United States, Janet Allen, Farrokh Mistree, University of Oklahoma, Norman, OK, United States

MESA-20 Keynote Lecture

MESA-20-2 TBD

Level 1, Hynes CC, Room 110

11:40am - 12:40pm

MODELING, OPTIMIZATION AND REAL-TIME OPTIMAL CONTROL OF HYBRID ELECTRIC VEHICLES AND MARINE VESSELS

Zuomin Dong, University of Victoria, Canada

MR-3 Robot Kinematics and Motion Planning

MR-3-3 ROBOT ANALYSIS AND COOPERATIVE ROBOTS

Level 2, Hynes CC, Room 206

11:40am - 12:40pm

Session Chair: Gim Song Soh, Singapore University of Technology and Design, Singapore, Singapore

Session Co-Chair: Mark Plecnik, University of California, Irvine, Irvine, CA, United States

DECENTRALIZED ALGORITHM FOR FORCE DISTRIBUTION WITH APPLICATIONS TO COOPERATIVE TRANSPORT

Technical Publication. DETC2015-47752

Monroe D. Kennedy III, Luis Guerrero, Vijay Kumar, University of Pennsylvania, Philadelphia, PA, United States

ROBOT BASE PLACEMENT AND KINEMATIC EVALUA-

TION OF 6R SERIAL MANIPULATORS TO ACHIEVE COLLISION-FREE WELDING OF LARGE INTERSECTING CYLINDRICAL PIPES

Technical Publication. DETC2015-47038

Audelia Gumarus Dharmawan, Blake William Clark Sedore, Gim Song Soh, Shaohui Foong, Kevin Otto, Singapore University of Technology & Design, Singapore, Singapore

AUTOMATIC PLACEMENT OF THE HUMAN HEAD THANKS TO ERGONOMIC AND VISUAL CONSTRAINTS

Technical Publication. DETC2015-46153

Bilal Boualem, University of Tlemcen, Chetouane, Algeria, Damien Chablat, CNRS, Nantes, France, Abdelhak Moussaoui, University of Lorraine, Metz, France

**MR-4
Robot/Machine Dynamics and Control**

**MR-4-1
DYNAMICS MODELING**

Level 2, Hynes CC, Room 202 11:40am - 12:40pm

Session Chair: Raffaele Di Gregorio, University of Ferrara, Ferrara, Italy

Session Co-Chair: Dinesh Rabindran, Intuitive Surgical, Sunnyvale, CA, United States

SYSTEMATIC USE OF INSTANT CENTERS IN THE DYNAMICS ANALYSIS OF SINGLE-DOF PLANAR MECHANISMS

Technical Publication. DETC2015-46065

Raffaele Di Gregorio, University of Ferrara, Ferrara, Italy

DYNAMIC SIMULATION OF A TRIPOD BASED IN BOLTZMANN-HAMEL EQUATIONS

Technical Publication. DETC2015-47427

Oscar Altuzarra, Francisco Campa Gomez, Constantino Roldan-Paraponiaris, Charles Pinto, University of the Basque Country, Vizcaya, Spain

A LIE GROUP FORMULATION OF THE NEWTON-EULER EQUATIONS AND ITS APPLICATION TO ROBOT DYNAMICS

Technical Publication. DETC2015-47221

Genliang Chen, Hao Wang, Yong Zhao, Haidong Yu, Shanghai Jiao Tong University, Shanghai, China

**MR-6
Compliant Mechanisms and Micro/Nano Mechanisms (A. Midha Symposium)**

**MR-6-4
COMPLIANT MECHANISMS INTERACTIVE II CONTINUED AND AWARDS**

Level 2, Hynes CC, Room 210 11:40am - 12:40pm

Session Chair: Guangbo Hao, University College Cork, Cork, Ireland

Session Co-Chair: Shikui Chen, State University of New York at Stony Brook, Stony Brook, NY, United States

**MR-8
Novel Mechanisms, Robots and Applications**

**MR-8-6
NOVEL ROBOTS**

Level 2, Hynes CC, Room 204 11:40am - 12:40pm

Session Chair: Clement Gosselin, Universite Laval, Quebec, QC, Canada

Session Co-Chair: Gregory S. Chirikjian, The Johns Hopkins University, Baltimore, MD, United States

MODULE DESIGN AND FUNCTIONALLY NON-ISOMORPHIC CONFIGURATIONS OF THE HEX-DMR II SYSTEM

Technical Publication. DETC2015-47621

Joshua D. Davis, Yunuscan Sevimli, Baxter R. Eldridge, Gregory S. Chirikjian, The Johns Hopkins University, Baltimore, MD, United States

AUTONOMOUS ROBOTIC SYSTEM FOR PIN PULLING

OPERATION IN A RAIL YARD

Technical Publication. DETC2015-47874

Andrew Boddiford, Dhiral Chheda, Chris Hammel, Pradeepkumar Ashok, Delbert Tesar, University Of Texas, Austin, TX, United States

FORCE CAPABILITIES OF TWO-DEGREE-OF-FREEDOM SERIAL ROBOTS EQUIPPED WITH PASSIVE ISOTROPIC FORCE LIMITERS

Technical Publication. DETC2015-46486

Meiying Zhang, Thierry Laliberte, Clement Gosselin, Universite Laval, Quebec, QC, Canada

**MR-10
Origami-Based Engineering Design****MR-10-2
ENERGY AND STABILITY IN ORIGAMI MECHANISMS**

Level 2, Hynes CC, Room 203 11:40am - 12:40pm

Session Chair: Jian Dai, Kings College-University of London, London, United Kingdom

Session Co-Chair: Spencer Magleby, Brigham Young University, Provo, UT, United States

MULTISTABLE BEHAVIOR OF COMPLIANT KALEIDOCYCLES

Technical Publication. DETC2015-46637

Thomas Evans, Brett Rowberry, Spencer Magleby, Larry Howell, Brigham Young University, Provo, UT, United States

MULTI-CORRUGATED INDENTED FOLDCORE SANDWICH PANEL FOR ENERGY ABSORPTION

Technical Publication. DETC2015-47269

Yang Li, Zhong You, University of Oxford, Oxford, UK, United Kingdom

DESIGN CONCEPTS AND PROTOTYPES OF VIBRATION ISOLATORS USING BI-STABLE FOLDABLE STRUCTURES

Technical Publication. DETC2015-46409

Sachiko Ishida, Meiji University, Kawasaki, Japan, Hiroshi Uchida, Fukuyama University, Fukuyama, Hiroshima, Japan, Haruo Shimomura, Ichiro Hagiwara, Meiji University, Kanagawa, Japan

**MNS-7
MEMS Sensors and Actuators****MNS-7-1
MEMS SENSORS AND ACTUATORS**

Level 3, Hynes CC, Room 307 11:40am - 12:40pm

Session Chair: Kenn Oldham, University of Michigan, Ann Arbor, MI, United States

Session Co-Chair: Eihab Abdel-Rahman, University of Waterloo, Waterloo, ON, Canada, Dumitru Caruntu, University of Texas Pan American, Edinburg, TX, United States

A NOVEL MICRO HEATER INTEGRATED ON FLEXIBLE POLYIMIDE SUBSTRATE WITH FAST RESPONSE AND UNIFORM TEMPERATURE DISTRIBUTION

Technical Publication. DETC2015-46278

Shifeng Yu, Shuyu Wang, Stony Brook University, Stony Brook, NY, United States, Lei Zuo, Virginia Tech, Blacksburg, VA, United States, Ming Lu, Brookhaven National Lab, Brookhaven, NY, United States

A NOVEL CAPACITIVE SENSING PRINCIPLE FOR MICRODEVICES

Technical Publication. DETC2015-46554

Jian Zhou, Ronald Miles, Shahrzad Towfighian, Binghamton University, Binghamton, NY, United States

THE DESIGN AND OPTIMIZATION OF A NEW BLUFF BODY OF THE ELECTROMAGNETIC-VORTEX FLOWMETER BASED ON ISIGHT

Technical Publication. DETC2015-46680

Xu He, Li Zhen, Xu Yixian, Yu Hongpeng, Harbin Engineering University, Harbin City, China

DYNAMICS OF A THIN-FILM PIEZOELECTRIC VERTICAL-ROTATIONAL SCANNING ACTUATOR

Technical Publication. DETC2015-47169

Choong-Ho Rhee, Zhen Qiu, Jongsoo Choi, Thomas D. Wang, Kenn Oldham, University of Michigan, Ann Arbor, MI, United States

CARBON NANOTUBE MICROPILLARS FOR STRAIN SENSING

Technical Publication. DETC2015-47783

Giulia Lanzara, University of Rome, Rome, Italy

**MSNDC-5/VIB-5
Nonlinear Dynamical Systems and Phenomena**

**MSNDC-5-7/VIB-5-7
DYNAMICS INVOLVING HYSTERESIS, FRICTION, AND/OR IMPACT**

Level 3, Hynes CC, Room 304 11:40am - 12:40pm

Session Chair: Walter Lacarbonara, Sapienza University of Rome, Rome, Italy

Session Co-Chair: Hiroshi Yabuno, University of Tsukuba, Tsukuba-City, Japan

DYNAMIC RESPONSE OF NONLINEAR OSCILLATORS WITH HYSTERESIS

Technical Publication. DETC2015-46352

Biagio Carboni, Walter Lacarbonara, Sapienza University of Rome, Rome, Italy

NANO-SCALE CUTTING BY USING VIBRATIONAL MICRO-CANTILEVER TOOL

Technical Presentation Only. DETC2015-46406

Daisuke Dei, University of Tsukuba, Tsukuba-City, Japan, Masataka Kasagawa, Keio University, Yokohama, Japan, Kiwamu Ashida, National Institute of Advanced Industrial Science and Technology, Tsukuba-City, Japan, Hiroshi Yabuno, University of Tsukuba, Tsukuba-City, Japan

NONLINEAR VIBRATION RESPONSE OF AN ASSEMBLY WITH FRICTION JOINTS: TEST AND SIMULATION

Technical Presentation Only. DETC2015-46431

Maxence Claeys, Jean-Jacques Sinou, Ecole Centrale de Lyon, Ecully, France, Jean-Pierre Lambelin, Remy Todeschini, CEA, Le Barp, France

**MSNDC-8/VIB-5
Dynamics of Non-Smooth Systems, Contact, and Impact**

**MSNDC-8-1/VIB-8-1
MODELING AND ANALYSIS**

Level 3, Hynes CC, Room 300 11:40am - 12:40pm

Session Chair: James Gilbert, Clarkson University, Potsdam, New York, United States

Session Co-Chair: Matthew Brake, Sandia National Laboratories, Albuquerque, NM, United States

ANALYSIS OF PERIODIC CHATTER IN A MECHANICAL PRESSURE RELIEF VALVE

Technical Presentation Only. DETC2015-46752

Erika Fotsch, Harry Dankowicz, University of Illinois, Urbana, IL, United States, Alan Champneys, University of Bristol, Clifton, United Kingdom

NONSMOOTH MODAL ANALYSIS: INVESTIGATION OF A 2-DOF SPRING-MASS SYSTEM SUBJECT TO AN ELASTIC IMPACT LAW

Technical Publication. DETC2015-46796

Anders Thorin, Mathias Legrand, McGill University, Montreal, QC, Canada, Stéphane Junca, Laboratoire J.A. Dieudonné, Nice, France

ANALYTICAL AND EXPERIMENTAL STUDY OF A VIBRO-IMPACT NONLINEAR ENERGY SINK

Technical Presentation Only. DETC2015-47210

Giuseppe Pennisi, ONERA/ISAE, Châtillon, France, Cyrille Stéphan, ONERA, Châtillon, France, Guilhem Michon, ISAE, Toulouse, France

MSNDC-16 **Modeling and Formulation of Multibody Systems**

MSNDC-16-2 **MODELING AND FORMULATION OF MULTIBODY SYSTEMS II**

Level 3, Hynes CC, Room 303 11:40am - 12:40pm

Session Chair: Andreas Mueller, Johannes Kepler University, Linz, Austria

Session Co-Chair: Håvard Fjær Grip, Jet Propulsion Laboratory, Pasadena, CA, United States

USE OF ANCF FINITE ELEMENTS IN MULTIBODY SYSTEM TEXTILE APPLICATIONS

Technical Publication. DETC2015-46330

Liang Wang, University of Illinois, Chicago, IL, United States, Yongxing Wang, Donghua University, Shanghai, China, Antonio M. Recuero, Ahmed A. Shabana, University of Illinois, Chicago, IL, United States

PANTOGRAPH/CATENARY CONTACT FORCE CONTROL

Technical Publication. DETC2015-46501

Carmine M. Pappalardo, University of Salerno, Fisciano, Italy, Mohil Patel, Brian Tinsley, Ahmed A. Shabana, University of Illinois, Chicago, IL, United States

INERTIA PROPERTIES AND REPRESENTATIONS IN MECHANICAL SYSTEMS

Technical Publication. DETC2015-47582

Jozsef Kovecses, Laszlo Kovacs, McGill University, Montreal, QC, Canada

INTEGRATION OF MULTIBODY DYNAMICS SIMULATION WITH SYSTEMS MODEL IN SYSML

Technical Publication. DETC2015-48095

Johannes Gross, Rudranarayan Mukherjee, Jet Propulsion Laboratory, Pasadena, CA, United States

MSNDC-17 **Biomechanics**

MSNDC-17-2 **BIOMECHANICS II**

Level 3, Hynes CC, Room 310 11:40am - 12:40pm

Session Chair: Amit Shukla, Miami University, Oxford, OH, United States

Session Co-Chair: James Chagdes, Purdue University, West Lafayette, IN, United States

USING STATIC OPTIMIZATION IN FORWARD DYNAMIC SIMULATION OF HUMAN MUSCULOSKELETAL SYSTEMS

Technical Publication. DETC2015-47493

Mohammad Sharif Shourijeh, University of Ottawa, Ottawa, ON, Canada, Naser Mehrabi, John McPhee, University Of Waterloo, Waterloo, ON, Canada

NONLINEAR EFFECTS OF BONE DAMPING ON HUMAN POSTURAL BALANCE

Technical Publication. DETC2015-46886

Amit Shukla, Miami University, Oxford, OH, United States, Amit Bhattacharya, University of Cincinnati, Cincinnati, OH, United States

UNDERSTANDING THE ROLE OF TIME-DELAY IN MAINTAINING UPRIGHT STANCE ON ROTATIONAL BALANCE BOARDS

Technical Publication. DETC2015-47857

James Chagdes, Jeffrey M. Haddad, Shirley Rietdyk, Howard N. Zelaznik, Arvind Raman, Purdue University, West Lafayette, IN, United States

PTG-4 **Gearbox Design, Reliability, and Diagnostics**

PTG-4-2

GEARBOX DESIGN, RELIABILITY, & DIAGNOSTICS (2)

Level 1, Hynes CC, Room 108 11:40am - 12:40pm

Session Chair: Ru Yuan, Northwestern Polytechnical University, Xi'an, China

Session Co-Chair: Takanori Nukata, Toyota Motor Corporation, Toyota-cho, Japan

COMPOSITE DRIVE SYSTEM TRANSMISSION RATIO ALLOCATE AND OPTIMAL DESIGN

Technical Publication. DETC2015-46149

Ru Yuan, Hailong Zhou, Sanmin Wang, Northwestern Polytechnical University, Xi'an, China

RESEARCH ON EFFICIENCY AND LOAD SHARING CHARACTERISTICS OF HIGH-SPEED-RATIO PLANETARY GEAR TRANSMISSIONS

Technical Publication. DETC2015-46245

Jianbin Liang, Datong Qin, Wei Wen, Jun Jiang, Chongqing University, Chongqing, China

PREDICTING METHOD OF DIFFERENTIAL CASE BOLT BEHAVIOR

Technical Publication. DETC2015-46586

Takanori Nukata, Yasuo Arai, Toyota Motor Corporation, Toyota, Japan, Mitsunori Kamimura, Taketoshi Kido, Toyota Technical Development Corporation, Toyota, Japan, Masahiko Yamasaki, Meitec Corporation, Toyota, Japan

GEAR AND BEARING FAILURE DETECTION USING VIBRATION MONITORING AND MAHALANOBIS-TAGUCHI SYSTEM

Technical Publication. DETC2015-46599

Takao Koide, Tottori University, Tottori, Japan, Daisuke Matsuura, Mitsubishi Heavy Industries, Ltd., Nagoya, Japan, Atsutaka Tamura, Takuya Yasugi, Takashi Mori, Tottori University, Tottori, Japan

MULTI-FREEDOM PLANETARY TRANSMISSION SCHEME BASED ON GRAPH THEORY OF TOPOLOGICAL SYNTHESIS

Technical Publication. DETC2015-46704

Dejun Mu, Huiying Wang, Huafeng Ding, Xiangwei Liu, Xing Zhang, Yanshan University, Qinhuangdao, China

PTG-8 Bearings, Clutches, Couplings, and Splines

PTG-8-1 MECHANICAL COMPONENT TOPICS

Level 1, Hynes CC, Room 109 11:40am - 12:40pm

Session Chair: Cheng Wang, University of Jinan, Jinan, China

Session Co-Chair: Geng Liu, Northwest Polytechnical University, Xi'an, China

A STIFFNESS FORMULATION FOR SPLINE JOINTS

Technical Publication. DETC2015-47336

Jiazheng Hong, David Talbot, Ahmet Kahraman, Ohio State University, Columbus, OH, United States

ACCURATE MODEL FOR THE MINIMUM VOLUME DESIGN OF SINGLE STAGE SPUR GEAR TRAIN

Technical Publication. DETC2015-46302

Cheng Wang, University of Jinan, Jinan, China, Zhaoyao Shi, Beijing University of Technology, Beijing, China

TOPOLOGY OPTIMIZATION OF GEARBOX TO REDUCE RADIATED NOISE

Technical Publication. DETC2015-48086

Jinpeng Wang, Geng Liu, Shan Chang, Liyan Wu, Northwestern Polytechnical University, Xi'an, Shaanxi, China

MSNDC-11/VIB-11 Control and Adaptive Structures

MSNDC-11-1/VIB-11-1 CONTROL AND ADAPTIVE STRUCTURES I

Level 3, Hynes CC, Room 302 11:40am - 12:40pm

Session Chair: Hornsen Tzou, Zhejiang University, Hangzhou, China

TIME DELAY CONSIDERATION ON A NEW ACTIVE CONTROL ALGORITHM

Technical Publication. DETC2015-46091

Arcan Yanik, Unal Aldemir, Mehmet Bakioglu, Istanbul Technical University, Istanbul, Turkey

A MULTIMODE WAVE-FORM COMMAND SHAPING CONTROL APPLIED ON DOUBLE PENDULUM

Technical Publication. DETC2015-46757

Khaled Alhazza, Kuwait University, Kuwait City, Kuwait, Ziyad Masoud, German Jordanian University, Amman, Jordan, Abdulsalam Alhazza, Building and Energy Center, Alsurra, Kuwait

NEURAL-NETWORK VIBRATION CONTROL OF RINGS WITH LIGHT-ACTIVATED SHAPE MEMORY POLYMER ACTUATORS

Student Competition Paper. DETC2015-47019

Huiyu Li, Hua Li, Hornsen Tzou, Zhejiang University, Hangzhou, China

VIB-15 Wave Propagation and Acoustics

VIB-15-1 WAVE PROPAGATION AND ACOUSTICS I

Level 3, Hynes CC, Room 301 11:40am - 12:40pm

Session Chair: Phillip Bayly, Washington University, Saint Louis, MO, United States

Session Co-Chair: Mahmoud Hussein, University of Colorado, Boulder, CO, United States

SEMI-ANALYTICAL BOUNDARY COLLOCATION TECHNIQUE FOR WAVE PROPAGATION APPLICATIONS

Technical Publication. DETC2015-48013

Zhuojia Fu, Hohai University, Nanjing, Jiangsu, China

LOW-FREQUENCY ENERGY TRANSMISSION ACROSS MATERIAL INTERFACES USING INCIDENT EVANESCENT WAVES

Technical Presentation Only. DETC2015-46533

Daniel C. Woods, J. Stuart Bolton, Jeffrey Rhoads, Purdue University, West Lafayette, IN, United States

IDENTIFICATION OF ANISOTROPIC MATERIAL PARAMETERS IN ELASTIC TISSUE USING MAGNETIC RESONANCE IMAGING OF SHEAR WAVES

Technical Publication. DETC2015-46539

Dennis Tweten, John Schmidt, Ruth Okamoto, Joel Garbow, Phillip Bayly, Washington University, Saint Louis, MO, United States

VIB-16 System Identification, Damage Detection, and Diagnostics

VIB-16-3 SYSTEM IDENTIFICATION, DAMAGE DETECTION, AND DIAGNOSTICS III

Level 3, Hynes CC, Room 306

11:40am - 12:40pm

Session Chair: Weidong Zhu, University of Maryland, Baltimore County, Baltimore, MD, United States

FULL-FIELD STRAIN MONITORING OF A WIND TURBINE USING VERY LIMITED SET OF DISPLACEMENTS MEASURED WITH THREE-DIMENSIONAL POINT TRACKING

Student Competition Paper. DETC2015-47413

Javad Baqersad, Peyman Poozesh, Christopher Niezrecki, Peter Avitabile, University of Massachusetts Lowell, Amherst, NH, United States

THERMO MECHANICAL ANALYSIS OF MIXED-MODE DAMAGE: COHESIVE ZONE MODELING

Technical Publication. DETC2015-46057

Hussain Altammar, University of Wisconsin - Milwaukee, Milwaukee,

WI, United States, Sudhir Kaul, Western Carolina University, Cullowhee, NC, United States, Anoop Dhingra, University of Wisconsin - Milwaukee, Milwaukee, WI, United States

PARAMETER IDENTIFICATION OF COMPLEX STRUCTURES USING FINITE ELEMENT MODEL UPDATING TECHNIQUES

Technical Publication. DETC2015-47500

Dimitrios Giagopoulos, Alexandros Arailopoulos, University of Western Macedonia, Kozani, Greece

**VIB-17
Keynote Lectures**

**VIB-17-3
C. D. MOTE, JR. EARLY CAREER AWARD LECTURE**

Level 3, Hynes CC, Room 305 11:40am - 12:40pm

Session Chair: D. Dane Quinn, The University of Akron, Akron, OH, United States

Session Co-Chair: Jeffrey Rhoads, Purdue University, West Lafayette, IN, United States

**AVT-4
Advances in Methods for Ground Vehicle Systems Design**

**AVT-4-1
ADVANCES IN METHODS FOR GROUND VEHICLE SYSTEMS DESIGN**

Level 3, Hynes CC, Room 309 2:00pm - 3:00pm

Session Chair: Lei Zuo, Virginia Tech, Blacksburg, VA, United States

Session Co-Chair: Moustafa El-Gindy, University Of Ontario Institute of Technology, Oshawa, ON, Canada

STABILITY OF CONTROLLED ROAD VEHICLES: A PRELIMINARY FUNDAMENTAL STUDY

Technical Publication. DETC2015-46608

Fabio Della Rossa, Massimiliano Gobbi, Giampiero Mastinu, Carlo Piccardi, Giorgio Previati, Politecnico di Milano, Milano, Italy

DESIGN OF A LIGHTWEIGHT TRUCK WHEEL

Technical Publication. DETC2015-47206

Massimiliano Gobbi, Mario Guagliano, Giampiero Mastinu, Giorgio Previati, Politecnico di Milano, Milano, Italy, Andrea Finzi, Gianetti Ruote srl, Ceriano Laghetto, Italy, Nicola Vaona, Gianetti Ruote srl, Ceriano Laghetto, Italy, Daniele Maestrini, Gianpaolo Marconi, 2 Effe Engineering, Soiano del lago, Italy, Alessandro Bailini, Giordano Pinarello, BlueThink, Milan, Italy

TRANSIENT THERMAL ANALYSIS OF BRAKE DISC IN REGENERATIVE BRAKING SYSTEM USING FINITE ELEMENT ANALYSIS

Technical Publication. DETC2015-47284

Parth Pandya, Indian Institute of Technology Bombay, Mumbai, Maharashtra, India

AN ENERGY HARVESTING SPEED BUMP AND ITS INTERACTIONS WITH VEHICLE DYNAMICS

Technical Presentation Only. DETC2015-47592

Lirong Wang, Stony Brook University of New York State, Stony Brook, NY, United States, Prakhar Todaria, Virginia Tech, Blacksburg, VA, United States, Abhishek Pandey, James O'Connor, David McAvoy, Terence Harrigan, Barbara Chernow, State University of New York at Stony Brook, Stony Brook, NY, United States, Lei Zuo, Virginia Tech, Blacksburg, VA, United States

OPTIMIZATION OF VARIOUS COMPONENTS OF A CAR FOR REDUCED MASS AND IMPROVED PERFORMANCE USING OPTISTRUCT OPTIMIZATION SOLVER PLATFORM

Technical Publication. DETC2015-47733

Ajinkya Bhagat, Indian Institute Of Technology Bombay, Mumbai, Maharashtra, India

**AVT-6
Advances in Light Vehicles Design**

**AVT-6-1
ADVANCES IN LIGHT VEHICLE DESIGN I**

Level 3, Hynes CC, Room 308 2:00pm - 3:00pm

Session Chair: Nicola Petrone, University of Padova, Padova, Italy
 Session Co-Chair: Liangyao Yu, Tsinghua University, Beijing, China

THE EFFECT OF FRONT FORK COMPLIANCE ON THE STABILITY OF BICYCLES

Technical Publication. DETC2015-46103

Alberto Doria, Luca Taraborrelli, Nicola Segliani, University of Padova, Padova, Italy

THE MODAL TWIST AXIS: A METHOD FOR DESCRIBING THE DYNAMICAL CHARACTERISTICS OF SINGLE TRACK VEHICLES

Technical Publication. DETC2015-46266

Alberto Doria, Luca Taraborrelli, University of Padova, Padova, Italy

ON-ROAD EVALUATION OF ENERGY COST ON CYCLING: A CASE STUDY FOR ANALYZING TIRE PRESSURE INFLUENCE

Technical Publication. DETC2015-46639

Sergio Roa, Luis Munoz, Universidad de los Andes, Bogota, Colombia

CIE-17

CAPPD/AMS: Human Modeling: Methods and Applications in Engineering

CIE-17-2

CAPPD/AMS: HUMAN MODELING AND SIMULATION I

Level 3, Hynes CC, Room 311 2:00pm - 3:00pm

Session Chair: James Yang, Texas Technology University, Lubbock, TX, United States

Session Co-Chair: Cameron Turner, Colorado School of Mines, Golden, CO, United States

DYNAMICALLY CONSISTENT WHOLE-BODY MODELING AND SIMULATION CAN REASONABLY PREDICT IN VIVO KNEE LOADS

Technical Publication. DETC2015-46934

Matthew Adams, Cameron Turner, Anne Silverman, Colorado School of Mines, Golden, CO, United States

COMPUTATIONAL METABOLIC ENERGY EXPENDITURE MODEL WITH NOVEL HEAT DISSIPATION FORMULATION

Technical Publication. DETC2015-47728

William Peng, Joo H. Kim, New York University, Brooklyn, NY, United States

PSEUDO ELIMINATION OF GEOMETRY DEPENDENCE IN SURROGATE MODELS OF DISTRIBUTED KNEE LOADS FROM AN EXPLICIT DYNAMIC FINITE ELEMENT ANALYSIS

Technical Publication. DETC2015-47850

Matthew Adams, Anne Silverman, Cameron Turner, Colorado School of Mines, Golden, CO, United States

VERIFICATION OF MODELS OF PERSONAL PERCEPTION OF FACES BY CLOSED-EYE CLASSIFIER USING HISTOGRAM CORRELATION

Technical Publication. DETC2015-47938

Luis Diago, Julian Romero, Junichi Shinoda, Ichiro Hagiwara, Meiji University, Kanagawa, Japan

CIE-11

AMS/SEIKM/CAPPD: Design, Simulation and Optimization for Additive Manufacturing

CIE-11-4

DESIGN AND SIMULATION FOR AM - II

Level 3, Hynes CC, Room 313 2:00pm - 3:00pm

Session Chair: Ahmad Barari, University of Ontario Institute of Technology, Oshawa, ON, Canada

Session Co-Chair: Paul Witherell, National Institute of Standards and Technology, Gaithersburg, MD, United States

TOLERANCE SPECIFICATION AND RELATED ISSUES FOR ADDITIVELY MANUFACTURED PRODUCTS

Technical Publication. DETC2015-47531

Gaurav Ameta, Washington State University, Pullman, WA, United States, Paul Witherell, Shawn Moylan, Robert Lipman, National Institute of Standards and Technology, Gaithersburg, MD, United States

TOWARDS AN INTEGRATED DATA SCHEMA DESIGN FOR ADDITIVE MANUFACTURING: CONCEPTUAL MODELING

Technical Publication. DETC2015-47802

Yan Lu, Sangsu Choi, Paul Witherell, National Institute of Standards and Technology, Gaithersburg, MD, United States

A FINITE ELEMENT APPROACH TO ESTIMATE THE DETAILED DEVIATION ZONE IN COORDINATE METROLOGY

Technical Publication. DETC2015-48008

Ahmad Barari, Amirali Lalehpour, Saeed Jamiolahmadi, University of Ontario Institute of Technology, Oshawa, ON, Canada

MODELLING OF CUSP GEOMETRY IN ADDITIVE MANUFACTURING PARTS USING A PIECE-WISE POLYNOMIAL

Technical Publication. DETC2015-48009

Ahmad Barari, University of Ontario Institute of Technology, Oshawa, ON, Canada, Farzaneh Kaji, University of Ontario Institute of Technology, Oshawa, ON, Canada

**CIE-33
PANEL: Internet of Things**

**CIE-33-1
INTERNET OF THINGS**

Level 3, Hynes CC, Room 312 2:00pm - 3:00pm

**DFMLC-3
Life Cycle Decision Making**

**DFMLC-3-2
LIFE CYCLE DECISION MAKING**

Level 1, Hynes CC, Room 107 2:00pm - 3:00pm

Session Chair: Fu Zhao, Purdue University, West Lafayette, IN, United States

Session Co-Chair: Junfeng Ma, Penn State University, State College PA, United States

A MULTIDISCIPLINARY FRAMEWORK TO MODEL COMPLEX TEAM-BASED PRODUCT DEVELOPMENT

Technical Publication. DETC2015-46631

Shun Takai, Northern Illinois University, DeKalb, IL, United States

COLLABORATIVE ENVIRONMENTS, KNOWLEDGE CREATION AND KNOWLEDGE REUSE FOR RAILWAY INDUSTRIES

Technical Publication. DETC2015-46727

Giuseppe Di Gironimo, Antonio Lanzotti, Fabio Peluso, Alessio Balsamo, University of Naples Federico II, Naples, Italy

ASSESSMENT OF PRODUCTS FUTURE REUSABILITY BASED ON CONSUMERS USAGE BEHAVIOR: IMPLICATIONS FOR LITHIUM-ION LAPTOP BATTERIES

Technical Publication. DETC2015-46880

Mostafa Sabbaghi, University at Buffalo, Buffalo, NY, United States, Behzad Esmaeilian, Northeastern University, Boston, MA, United States, Ardeshir Raihanian Mashhadi, University at Buffalo, Amherst, NY, United States, Willie Cade, PC Rebuilders & Recyclers, Chicago, IL, United States, Sara Behdad, University at Buffalo, Buffalo, NY, United States

**DFMLC-8
Design for End of Life Recovery**

**DFMLC-8-1
DESIGN FOR END OF LIFE RECOVERY**

Level 1, Hynes CC, Room 105 2:00pm - 3:00pm

Session Chair: Shun Takai, Northern Illinois University, DeKalb, IL, United States

Session Co-Chair: Andreas Hein

MULTI-PURPOSE DISASSEMBLY SEQUENCE PLANNING

Technical Publication. DETC2015-46906

Jida Huang, University at Buffalo, Amherst, NY, United States, Behzad Esmailian, Northeastern University, Boston, MA, United States, Sara Behdad, University at Buffalo, Buffalo, NY, United States

A COMPUTER VISION APPROACH FOR AUTOMATICALLY MINING AND CLASSIFYING END OF LIFE PRODUCTS AND COMPONENTS

Technical Publication. DETC2015-47401

Matthew Dering, Conrad Tucker, Pennsylvania State University, State College, PA, United States

APPLICATION OF SUSTAINABILITY ASSESSMENT TO A NOVEL PLASTIC RECYCLING PROCESS

Technical Publication. DETC2015-47937

Hari Prashanth Narayan Nagarajan, Karl R. Haapala, Oregon State University, Corvallis, OR, United States

DTM-5 Design of Complex Systems and Product Architecture

DTM-5-3 DESIGN OF COMPLEX SYSTEMS AND PRODUCT ARCHITECTURE III

Level 1, Hynes CC, Room 104 2:00pm - 3:00pm

Session Chair: Richard Malak, Texas A&M University, College Station, TX, United States

Session Co-Chair: Tolga Kurtoglu, Palo Alto Research Center, Palo Alto, CA, United States

ENABLING REUSE OF DOCUMENTATION IN NEW MEDICAL DEVICE DEVELOPMENT: A SYSTEMATIC ARCHITECTING APPROACH

Technical Publication. DETC2015-47272

Troels V. Jensen, Technical University of Denmark, Lyngby, Denmark, Jakob F. Parslov, Radiometer Medical ApS, Brønshøj, Denmark, Niels Henrik Mortensen, Technical University of Denmark, Kgs. Lyngby, Denmark

NON-INTUITIVE DEPENDENT DECISION MAKING: SUB-OPTIMAL DESIGN SELECTION

Technical Publication. DETC2015-47702

K. Daniel Cooksey, Dimitri N. Mavris, Georgia Institute of Technology, Atlanta, GA, United States

THE CONTRADICTION INDEX (CI): A NEW METRIC COMBINING SYSTEM COMPLEXITY AND ROBUSTNESS FOR EARLY DESIGN STAGES

Technical Publication. DETC2015-47255

Simon Moritz Göhler, Thomas J. Howard, Technical University of Denmark, Lyngby, Denmark

AUTOMATIC DISCOVERY OF DESIGN TASK STRUCTURE USING DEEP BELIEF NETS

Technical Publication. DETC2015-47369

Lijun Lan, National University of Singapore, Singapore, Singapore, Ying Liu, Cardiff University, Cardiff, United Kingdom, Wen Feng Lu, National University of Singapore, Singapore, Singapore, Awn Alghamdi, Cardiff University, Cardiff, United Kingdom

MESA-8 Fractional Derivatives and Their Applications

MESA-8-9 FRACTIONAL COMPLEX NETWORKS AND PREDICTION MODELING

Level 1, Hynes CC, Room 109 2:00pm-3:00pm

Session Chair: Changpin Li, Shanghai University, Shanghai, China

Session Co-Chair: Hadi Malek, Utah State University, Logan, UT, United States

FAILURE PREDICTION MODEL AND ESR MODELING OF ELECTROLYTIC CAPACITOR WITH APPLICATION TO PREDICTIVE MAINTENANCE

Technical Publication. DETC2015-46175

Hadi Malek, Sara Dadras, Utah State University, Logan, UT, United States, YangQuan Chen, University of California Merced, Merced, CA, United States

AN EVALUATION OF HURST PARAMETER ESTIMATION FOR DIFFERENTIATING BETWEEN NORMAL AND ABNORMAL HEART RATE VARIABILITY

Technical Publication. DETC2015-46966

Marwin Ko, Brandon Stark, YangQuan Chen, Monica Barbadillo, University of California, Merced, Merced, CA, United States

PINNING IMPULSIVE SYNCHRONIZATION OF FRACTIONAL COMPLEX DYNAMICAL NETWORKS

Student Competition Paper. DETC2015-47029

Weiyuan Ma, Lanzhou University, Lanzhou, China, Changpin Li, Shanghai University, Shanghai, China, Yujiang Wu, Lanzhou University, Lanzhou, China

MESA-8-10 STABILITY OF FRACTIONAL ORDER SYSTEM

Level 1, Hynes CC, Room 110 2:00pm-3:00pm

Session Chair: Jean-Claude Trigeassou, University of Bordeaux, Talence, France

Session Co-Chair: Jay Adams, University Of Akron, Akron, OH, United States

LYAPUNOV STABILITY OF NON COMMENSURATE FRACTIONAL ORDER SYSTEMS: AN ENERGY BALANCE APPROACH

Technical Publication. DETC2015-46188

Jean-Claude Trigeassou, University of Bordeaux, Talence, France, Nezha Maamri, University of Poitiers, Poitiers, France, Alain Oustaloup, University of Bordeaux, Talence, France

LYAPUNOV STABILITY OF COMMENSURATE FRACTIONAL ORDER SYSTEMS: A PHYSICAL INTERPRETA-

TION

Technical Publication. DETC2015-46189

Jean-Claude Trigeassou, University of Bordeaux, Talence, France, Nezha Maamri, University of Poitiers, Poitiers, France, Alain Oustaloup, University of Bordeaux, Talence, France

ON THE FRACTIONAL MODELLING OF THE DIFFUSIVE INTERFACE

Technical Publication. DETC2015-46027

Nezha Maamri, Massinissa Tari, University of Poitiers, Poitiers, France, Jean-Claude Trigeassou, IMS/Bordeaux, Talence, France

MR-4 Robot/Machine Dynamics and Control

MR-4-2 DESIGN AND CONTROL METHODS

Level 2, Hynes CC, Room 206 2:00pm - 3:00pm

Session Chair: Joo H. Kim, New York University, Brooklyn, NY, United States

Session Co-Chair: Oscar Altuzarra, University of the Basque Country, Vizcaya, Spain

DEGREE-OF-FREEDOM-BASED INSTANTANEOUS ENERGETIC COST OF ROBOTIC BIPED GAIT WITH BENCHMARKING IMPLICATIONS

Technical Publication. DETC2015-47712

Dustyn Roberts, Joseph Quacinella, Joo H. Kim, New York University, Brooklyn, NY, United States

MODELING AND DYNAMIC PARAMETER IDENTIFICATION OF THE SCHUNK POWERBALL ROBOTIC ARM

Technical Publication. DETC2015-47703

Amirhossein H. Memar, Ehsan T Esfahani, State University of New York at Buffalo, Buffalo, NY, United States

ROBUST DESIGN OF SOUNDS IN MECHANICAL MECHANISMS

Technical Publication. DETC2015-46441

Annemette Bøgedal Jensen, Natasja Munch, Søren Nygaard Pedersen, Thomas J. Howard, Technical University of Denmark, Lyngby, Denmark

MR-5 Theoretical and Computational Kinematics (A.T. Yang Symposium)

MR-5-2 PROPERTIES OF MOTION

Level 2, Hynes CC, Room 202 2:00pm – 3:00pm

Session Chair: Andreas Mueller, Johannes Kepler University, Linz, Austria

Session Co-Chair: Samuli Piiipponen, University of Tampere, Tampere, Finland

PRINCIPLES OF TRANSFERENCE IN THEORETICAL KINEMATICS

Technical Publication. DETC2015-47624

Jin Seob Kim, Gregory S. Chirikjian, The Johns Hopkins University, Baltimore, MD, United States

A CLOSED-FORM LOWER BOUND ON THE ALLOWABLE MOTION FOR AN ELLIPSOIDAL BODY AND ENVIRONMENT

Technical Publication. DETC2015-47351

Qianli Ma, Gregory S. Chirikjian, The Johns Hopkins University, Baltimore, MD, United States

CARTAN'S CONNECTION, FIBER BUNDLES AND QUATERNIONS IN KINEMATICS AND DYNAMICS CALCULATIONS

Technical Publication. DETC2015-46758

Diego Colón, University of São Paulo, São Paulo, Brazil

MR-6

Compliant Mechanisms and Micro/Nano Mechanisms (A. Midha Symposium)

MR-6-5 COMPLIANT MECHANISMS INTERACTIVE III CONTINUED AND AWARDS

Level 2, Hynes CC, Room 210 2:00pm – 3:00pm

Session Chair: Guangbo Hao, University College Cork, Cork, Ireland

Session Co-Chair: Shikui Chen, State University of New York at Stony Brook, Stony Brook, NY, United States

MR-8 Novel Mechanisms, Robots and Applications

MR-8-5 HANDS AND END EFFECTORS

Level 2, Hynes CC, Room 204 2:00pm – 3:00pm

Session Chair: Lionel Birglen, Polytechnique Montreal, Montreal, QC, Canada

Session Co-Chair: Guowu Wei, King's College London, London, United Kingdom

UNDERACTUATED FINGER CLOSING MOTION CONTROL USING DUAL DRIVE ACTUATION

Technical Publication. DETC2015-46626

Jean-Michel Boucher, Lionel Birglen, Polytechnique Montreal, Montreal, QC, Canada

DESIGN OF A SOFT MULTI-DEGREE OF FREEDOM TOOL POSITIONER WITH VARIABLE STIFFNESS INTEGRATING MOLDED AIR MUSCLES ACTUATION, GRANULAR JAMMING AND DIELECTRIC ELASTOMER SENSING

Technical Publication. DETC2015-47877

Guillaume Bouliane-Blais, Jean-Sébastien Plante, Université De Sherbrooke, Sherbrooke, QC, Canada

METAMORPHIC HAND BASED GRASP CONSTRAINT AND AFFORDANCE

Technical Publication. DETC2015-46726

Guowu Wei, Jie Sun, Xinsheng Zhang, King's College London, London, United Kingdom, Dirk Pensky, Festo Didactic GmbH & Co., Stuttgart, Germany, Justus Piater, University of Innsbruck, Innsbruck, Austria, Jian Dai, Kings College-London, London, United Kingdom

MR-9
Mobile Robots and Cable-Driven Systems

MR-9-2
DESIGN AND ANALYSIS OF MOBILE ROBOTS

Level 2, Hynes CC, Room 203 2:00pm – 3:00pm

Session Chair: Stephen Canfield, Tennessee Tech, Cookeville, TN, United States

Session Co-Chair: Shramana Ghosh, University of California, Irvine, Irvine, CA, United States

KINEMATIC ANALYSIS OF A MOBILE ROBOT PERFORMING MANUFACTURING TASKS ON NON-PLANAR SURFACES

Technical Publication. DETC2015-47637

Joshua Qualls, Stephen Canfield, Tristan Hill, Alexander Shibakov, Tennessee Tech, Cookeville, TN, United States

DESIGN OF A PASSIVELY-ADAPTIVE THREE DEGREE-OF-FREEDOM MULTI-LEGGED ROBOT WITH UNDERACTUATED LEGS

Technical Publication. DETC2015-47867

Oren Y. Kanner, Nicolas Rojas, Aaron Dollar, Yale University, New Haven, CT, United States

OPTIMAL DESIGN OF STAIR-CLIMBING MOBILE ROBOT THROUGH KINETOSTATIC OPTIMIZATION

Technical Publication. DETC2015-46346

Chen Yan, Fang Feng, Tian Jin University, Tianjin, China

MNS-9
Emerging Topics in Micro and Nanosystems

MNS-9-1
EMERGING TOPICS IN MICRO- AND NANOSYSTEMS I

Level 3, Hynes CC, Room 307 2:00pm – 3:00pm

Session Chair: Dumitru Caruntu, University of Texas Pan American, Edinburg, TX, United States

Session Co-Chair: Irene Fassi, Institute of Industrial Technologies and Automation, Milano, Milano, Italy

CASIMIR EFFECT ON SIMULTANEOUS RESONANCES OF ELECTROSTATICALLY ACTUATED MEMS RESONATORS

Technical Publication. DETC2015-46802

Dumitru Caruntu, Christian Reyes, University of Texas Pan American, Edinburg, TX, United States

DESIGN OF MINIATURE ELECTROMAGNETIC INDUCTION TYPE MEMS GENERATORS WITH MULTILAYER CERAMIC CIRCUIT

Technical Publication. DETC2015-46958

Minami Takato, Hiroaki Endo, Yuji Yokozeki, Kazuaki Maezumi, Ken Saito, Fumio Uchikoba, Nihon University, Funabashi, Japan

CAN MICRO-CHIRAL CELLULAR STRUCTURES BE AUXETIC?

Technical Publication. DETC2015-47771

Kaveh Samadikhah, Giulia Lanzara, University of Rome, Rome, Italy

MIRROR INTEGRATION PROCESS FOR HIGH PRECISION, LIGHTWEIGHT X-RAY OPTICS

Technical Publication. DETC2015-47893

Michael Biskach, Stinger Ghaffarian Technologies, Inc., Greenbelt, MD, United States, William W. Zhang, Timo T. Saha, NASA Goddard Space Flight Center, Greenbelt, MD, United States, James R. Mazzarella, Ryan S. McClelland, Jason A. Niemeyer, Mark J. Schofield, Stinger Ghaffarian Technologies, Inc., Greenbelt, MD, United States, Kai W. Chan, University of Maryland-Baltimore County, Baltimore, MD, United States

REDUCING STRESS CONCENTRATION IN RF MEMS

SWITCH BY OPTIMIZING SERPETINE SPRING DESIGN

Technical Publication. DETC2015-48101

Reid Byron, Pezhman A. Hassanpour, Loyola Marymount University, Los Angeles, CA, United States

**MSNDC-5/VIB-5
Nonlinear Dynamical Systems and Phenomena**
**MSNDC-5-8/VIB-5-8
FRACTIONAL ORDER SYSTEMS**

Level 3, Hynes CC, Room 304 2:00pm – 3:00pm

Session Chair: Stefano Lenci, Polytechnic University of Marche, Ancona, Italy

Session Co-Chair: Masaharu Kuroda, University of Hyogo, Himeji, Japan

ADAPTIVE SYNCHRONIZATION OF A FRACTIONAL-ORDER COMPLEX T SYSTEM WITH A RANDOM PARAMETER

Technical Publication. DETC2015-46220

Xiaojun Liu, Ling Hong, Xi'an Jiaotong University, Xi'an, China

VIBRATION CONTROL EXPERIMENT USING FRACTIONAL PID FEEDBACK

Technical Presentation Only. DETC2015-46399

Masaharu Kuroda, Hiroki Matsubuchi, Naoki Yoshitani, University of Hyogo, Himeji, Hyogo, Japan

STOCHASTIC RESONANCE OF BISTABLE DUFFING OSCILLATOR FOR LARGE-PARAMETER SIGNALS

Technical Publication. DETC2015-47208

Zhi Hui Lai, Yong Gang Leng, Sheng Bo Fan, Tianjin University, Tianjin, China

**MSNDC-8/VIB-8
Dynamics of Non-Smooth Systems, Contact, and**
Impact
**MSNDC-8-2/VIB-8-2
MODELING AND ANALYSIS II**

Level 3, Hynes CC, Room 300 2:00pm – 3:00pm

Session Chair: James Gibert, Clarkson University, Potsdam, NY, United States

Session Co-Chair: Harry Dankowicz, University of Illinois, Urbana, IL, United States

FINDING PERIODIC SOLUTIONS OF FORCED SYSTEMS WITH LOCAL NONLINEARITIES: A MIXED SHOOTING HARMONIC BALANCE METHOD

Technical Publication. DETC2015-47461

Frederic Schreyer, Remco Leine, University of Stuttgart, Stuttgart, Germany

MULTI RIGID-BODY CONTACT DYNAMICS WITH REGULARIZED FRICTION

Technical Publication. DETC2015-47814

Farnood Gholami, Mostafa Nasri, Jozsef Kovecses, McGill University, Montreal, QC, Canada

MODELING MICRO GROUND VEHICLE MOBILITY ON FIBULAR MATERIAL

Technical Presentation Only. DETC2015-48097

Adam Ryason, Rudranarayan Mukherjee, Jet Propulsion Laboratory, Pasadena, CA, United States

**MSNDC-16
Modeling and Formulation of Multibody Systems**
**MSNDC-16-3
MODELING AND FORMULATION OF MULTIBODY SYSTEMS III**

Level 3, Hynes CC, Room 303 2:00pm – 3:00pm

Session Chair: Jozsef Kovecses, McGill University, Montreal, QC, Canada

Session Co-Chair: Antonio M. Recuero, University of Illinois at Chicago, Chicago, IL, United States

FORMULATIONS OF VISCOELASTIC CONSTITUTIVE LAWS FOR BEAMS IN FLEXIBLE MULTIBODY DYNAMICS

Technical Publication. DETC2015-47233

Olivier Bauchau, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong, Zijing Lao, University of Michigan-Shanghai Jiao Tong University Joint Institute, Shanghai, China, Joachim Linn, Fraunhofer ITWM, Kaiserslautern, Germany

MODELING AND SIMULATION OF ASTEROID CAPTURE USING A DEFORMABLE MEMBRANE CAPTURE DEVICE

Technical Publication. DETC2015-47840

Håvard Fjær Grip, Miguel San Martin, Abhinandan Jain, Bob Balaram, Jonathan Cameron, Steven Myint, Jet Propulsion Laboratory, Pasadena, CA, United States

ANCF MODELING OF LEAF SPRINGS

Technical Presentation Only. DETC2015-47896

Zuqing Yu, Harbin Institute of Technology, Brian Tinsley, University of Illinois at Chicago, Chicago, IL, United States, Yiguan Liu, Nanjing Agricultural University, Nanjing, China, Ahmed A. Shabana, University of Illinois at Chicago, Chicago, IL, United States

**MSNDC-17
Biomechanics**

**MSNDC-17-3
BIOMECHANICS III**

Level 3, Hynes CC, Room 310 2:00pm - 3:00pm

Session Chair: Ryan S. McGinnis, MC10, Inc., Cambridge, MA, United States

Session Co-Chair: John Bruzzo, Lappeenranta University of Technology, Lappeenranta, Finland

A SIMPLE MECHANICAL MODEL FOR SIMULATING CROSS - COUNTRY SKIING PROPULSIVE FORCE

Technical Publication. DETC2015-46454

John Bruzzo, Lappeenranta University of Technology, Lappeenranta, Finland, Arend L. Schwab, Delft University, Delft, Netherlands, Aki Mikkola, Antti Valkeapää, Lappeenranta University of Technology, Lappeenranta, Finland, Olli Ohtonen, Vesa Linnamo, Jyväskylä University, Jyväskylä, Finland

WEARABLE INERTIAL SENSOR FOR AGILITY RUN PERFORMANCE ASSESSMENT

Technical Presentation Only. DETC2015-46815

Ryan S. McGinnis, MC10, Inc., Cambridge, MA, United States, Stephen M. Cain, Steven P. Davidson, Rachel V. Vitali, Scott C. McLean, Noel Perkins, University of Michigan, Ann Arbor, MI, United States

STEERING FEEL OPTIMIZATION FOR STEERING SYSTEMS USING MODEL-BASED CONTROL

Technical Publication. DETC2015-47282

Naser Mehrabi, John McPhee, University of Waterloo, Waterloo, ON, Canada

**PTG-5
Gear Manufacturing**

**PTG-5-1
GEAR MANUFACTURING**

Level 1, Hynes CC, Room 108 2:00pm - 3:00pm

Session Chair: Jean-Pierre De Vaujany, INSA Lyon, Villeurbanne, France

Session Co-Chair: Florian Hübner, RWTH Aachen University, Aachen, Germany

CALCULATION MODEL OF INTERNAL GEAR SKIVING WITH PINION-TYPE CUTTER HAVING RUN-OUT AND PITCH ERROR

Technical Publication. DETC2015-46402

Tomokazu Tachikawa, Nobuaki Kurita, Aisin Seiki Co.,Ltd., Kariya, Japan, Morimasa Nakamura, Daisuke Iba, Ichiro Moriwaki, Kyoto Institute Of Technology, Kyoto, Japan

KINEMATICS MODEL FOR TOOTH-SKIPPED GEAR HONING

Technical Publication. DETC2015-46682

Bo Yu, Jiachun Lin, Zhaoyao, Beijing University of Technology, Beijing, China

DESIGN OF A RAPID INSPECTION MACHINE FOR AUTOMOTIVE GEARS BASED ON GEAR INTEGRATED ERROR

Technical Publication. DETC2015-46744

Xiaoyi Wang, Zhaoyao Shi, Jiachun Lin, Beijing University of Technology, Beijing, China, Jiangsheng Liu, Harbin Measuring & Cutting Tool Group Co. Ltd., Harbin, China

COMPARISON OF SIMULATIONS AND EXPERIMENTS OF LOADED SPIRAL BEVEL GEARS BEHAVIOR

Technical Publication. DETC2015-47421

Joel Teixeira-Alves, Jean-Pierre De Vaujany, Michele Guingand, INSA Lyon, Villeurbanne, France

DEVELOPMENT OF A CUTTING FORCE MODEL FOR GENERATING GEAR GRINDING

Technical Publication. DETC2015-47424

Florian Hübner, Fritz Klocke, Christian Brecher, Christoph Löpenhaus, RWTH Aachen University, Aachen, Germany

**MSNDC-4/VIB-4
Experiments in Dynamical Systems****MSNDC-4-1/VIB-4-1
EXPERIMENTS IN DYNAMICAL SYSTEMS I**

Level 3, Hynes CC, Room 306 2:00pm – 3:00pm

Session Chair: Brian F. Feeny, Michigan State University, East Lansing, MI, United States

Session Co-Chair: Venkat Ramakrishnan, Fiat Chrysler Automobiles, Auburn Hills, MI, United States

EXPERIMENTAL STUDY ON COMPLEX MODES OF AN END DAMPED CONTINUOUS BEAM

Technical Publication. DETC2015-46210

Xing Xing, Michigan State University, Lansing, MI, United States, Brian F. Feeny, Michigan State University, East Lansing, MI, United States

ON THE COMPARISON BETWEEN DISPLACEMENT MODAL TESTING AND STRAIN MODAL TESTING

Technical Publication. DETC2015-46347

Emiliano Mucchi, Giorgio Dalpiaz, University Of Ferrara, Ferrara, Italy

EXPERIMENTAL MODAL ANALYSIS OF TIBIAL AND FEMORAL BONES OF AN OX: A COMPARISON WITH HUMAN FE MODELS

Technical Publication. DETC2015-46555

Hesam Hoursan, Mohammad Taghi Ahmadian, Sharif University of Technology, Tehran, Iran

**MSNDC-11/VIB-11
Control and Adaptive Structures****MSNDC-11-2/VIB-11-2
CONTROL AND ADAPTIVE STRUCTURES II**

Level 3, Hynes CC, Room 302

2:00pm – 3:00pm

WAVELET PSO-BASED LQR ALGORITHM FOR OPTIMAL STRUCTURAL CONTROL USING ACTIVE TUNED MASS DAMPERS

Technical Publication. DETC2015-46140

Mehdi Abdollahirad, Arcan Yanik, Unal Aldemir, Istanbul Technical University, Istanbul, Turkey

ROBUST POLE ASSIGNMENT FOR FRICITON INDUCED VIBRATION BASED ON RECEPTANCE METHOD

Student Competition Paper. DETC2015-47177

Yao Liang, Hiroshi Yamura, Tokyo Institute of Technology, Tokyo, Japan, Huajiang Ouyang, University of Liverpool, Liverpool, United Kingdom

MSNDC-14/VIB-14
Emerging Frontiers in Dynamical Systems

MSNDC-14-1/VIB-14-1
EMERGING FRONTIERS IN DYNAMICAL SYSTEMS I

Level 3, Hynes CC, Room 305 2:00pm – 3:00pm

Session Chair: Paul C. P. Chao, National Chiao Tung University, Hsinchu, Taiwan

Session Co-Chair: Brian Mann, Duke University, Durham, NC, United States

EFFECTS OF MIS-POSITIONING A NEW CUFFLESS BLOOD PRESSURE SENSOR AND OPTIMAL DESIGN VIA A 3D FLUID-SOLID-ELECTRIC FINITE ELEMENT MODEL

Technical Publication. DETC2015-47305

Tse-Yi Tu, Yung-Hua Kao, Paul C. P. Chao, Durgesh Samadhiya, National Chiao Tung University, Hsinchu City, Taiwan

MODELING HEART RATE DYNAMICS IN RESPONSE TO CHANGES IN EXERCISE INTENSITY

Student Competition Paper. DETC2015-47587

Michael J. Mazzoleni, Duke University, Durham, NC, United States, Claudio Battaglini, University of North Carolina at Chapel Hill, Chapel Hill, NC, United States, Brian Mann, Duke University, Durham, NC, United States

ANSYS SIMULATION OF IMPACT REDUCTION WITH FLUID-FILLED INTERCONNECTED BUBBLE ARRAYS

Technical Publication. DETC2015-47905

Rajeev Kumar, Brian Dennis, Bo Yang, University of Texas at Arlington, Arlington, TX, United States, Wei Carrigan, Muthu B.J. Wijesundara, UTA Research Institute, Fort Worth, TX, United States

VIB-15
Wave Propagation and Acoustics

VIB-15-2
WAVE PROPAGATION AND ACOUSTICS II

Level 3, Hynes CC, Room 301 2:00pm – 3:00pm

Session Chair: Mahmoud Hussein, University of Colorado, Boulder, CO, United States

Session Co-Chair: Michael J. Leamy, Georgia Tech, Atlanta, GA, United States

NUMERICAL AND EXPERIMENTAL STUDY OF FLEXURAL WAVE BAND GAPS OF PERIODICAL LOCALLY-RESONANT BEAMS WITH SUSPENDED SEPARATED FORCE AND MOMENT RESONATORS

Technical Publication. DETC2015-46033

Hangyuan Lv, Xi'an Jiaotong University, Xi'an, China, Micheal Y Wang, National University of Singapore, Singapore, Singapore

REVERSIBLE PASSIVE BANDGAP RECONFIGURATION USING AN EXCITATION DEPENDENT ON-SITE RESTORING FORCE

Technical Publication. DETC2015-46805

Brian P. Bernard, Kim Arvidsson, Schreiner University, Kerrville, TX, United States

NUMERICAL RESEARCH OF MULTI-SCALE COUPLING SIMULATION ON ROTARY PRESSURE EXCHANGER AND PIPE SYSTEM

Student Competition Paper. DETC2015-48017

Zheng Cao, Jian-Qiang Deng, Kai Liu, Xi'an Jiaotong University, Xi'an, China

AVT-6
Advances in Light Vehicles Design

AVT-6-2
ADVANCES IN LIGHT VEHICLE DESIGN II

Level 3, Hynes CC, Room 308 3:30pm – 5:10pm

Session Chair: Alberto Doria, University of Padova, Padova, Italy

Session Co-Chair: Beshah Ayalew, Clemson University, Greenville, SC, United States

A REVIEW OF ANTI-LOCK BRAKING SYSTEM CONFIGURATION FOR TWO-WHEELED VEHICLE

Technical Publication. DETC2015-47319

Liangyao Yu, Shuhao Huo, Xiaohui Liu, Xiaoxue Liu, Tsinghua University, Beijing, China

DEVELOPMENT OF A SERVOHYDRAULIC ROLLER TEST BENCH FOR INDOOR EVALUATION OF THE VIBRATIONAL COMFORT OF BICYCLE COMPONENTS

Technical Publication. DETC2015-47824

Nicola Petrone, Francesco Trabacchin, University of Padova, Padova, Italy, Fausto Panizzolo, Harvard University, Cambridge, MA, United States

MULTI-LEVEL OPTIMIZATION METHOD FOR VEHICLE BODY IN CONCEPTUAL DESIGN

Technical Publication. DETC2015-48034

Wenbin Hou, Dalian University of Technology, Dalian City, China, Chunlai Shan, Hongzhe Zhang, Dalian University of technology, Dalian, Liaoning, China

AVT-7

Advances in Military and Commercial Ground Vehicle Design

AVT-7-1

ADVANCES IN MILITARY AND COMMERCIAL GROUND VEHICLE DESIGN

Level 3, Hynes CC, Room 309

3:30pm – 5:10pm

Session Chair: Jeremy Gray, U.S. Army RDECOM-TARDEC, Clarkston, MI, United States

Session Co-Chair: Thomas Indinger, Technical University of Munich, Garching bei München, Germany, Xiaobo Yang, Oshkosh Corporation, Oshkosh, WI, United States

BLAST MITIGATION SEAT ANALYSIS: ASSESSMENT OF THE EFFECT OF PERSONAL PROTECTIVE EQUIPMENT ON THE 5TH PERCENTILE FEMALE ANTHROPO-MORPHIC TEST DEVICE PERFORMANCE IN DROP TOWER EVALUATIONS

Technical Publication. DETC2015-46342

Kelly Bosch, Katrina Harris, David Clark, Risa Scherer, TARDEC, Warren, MI, United States, Joseph Melotik, NAVAIR, Patuxent River, MD, United States

THE EFFECTS OF SOLDIER GEAR ENCUMBRANCE ON RESTRAINTS IN A FRONTAL CRASH ENVIRONMENT

Technical Publication. DETC2015-46367

Sebastian Karwaczynski, U.S. ARMY TARDEC, Warren, MI, United States, Ryan Hoover, CAPE, Westfield, IN, United States, Chris Jessup, Kyle Paulson, IMMI, Westfield, IN, United States

RELAXATION LENGTH REVIEW AND TIME CONSTANT ANALYSIS FOR AGILE TIRE DYNAMICS CONTROL

Technical Publication. DETC2015-46798

Vladimir Vantsevich, The University of Alabama at Birmingham, Hoover, AL, United States, Jeremy Gray, U.S. Army RDECOM-TARDEC, Clarkston, MI, United States

EXPERIMENTAL AND NUMERICAL INVESTIGATION OF AUTOMOTIVE AERODYNAMICS USING DRIVER MODEL

Technical Publication. DETC2015-47805

Lu Miao, Steffen Mack, Thomas Indinger, Technical University of Munich, Garching bei München, Germany

TRANSMISSION EFFICIENCY RESEARCH OF MULTI-RANGE HYDRO-MECHANICAL CVT

Technical Publication. DETC2015-48078

Zhang Mingzhu, Zhou Zhili, Xu Liyou, Henan University of Science and Technology, Luoyang, China

AMS/SEIKM/CAPPD: Design, Simulation and

Optimization for Additive Manufacturing

CIE-11-5

DESIGN AND SIMULATION FOR AM - III

Level 3, Hynes CC, Room 313 3:30pm - 5:10pm

Session Chair: Seung Ki Moon, Nanyang Technological University, Singapore, Singapore

Session Co-Chair: Chi Zhou, University at Buffalo, Buffalo, NY, United States

THE ADDITIVE MANUFACTURING PROCESS SETTING FEASIBLE SPACE EXPLORATION AND ASSOCIATION WITH VARIABLE PRODUCT PLATFORM DESIGN

Technical Publication. DETC2015-46665

Xiling Yao, Seung Ki Moon, Nanyang Technological University, Singapore, Singapore, Guijun Bi, Singapore Institute of Manufacturing Technology, Singapore, Singapore

INVESTIGATION OF SEPARATION FORCE FOR BOTTOM-UP STEREOLITHOGRAPHY PROCESS FROM MECHANICS PERSPECTIVE

Technical Publication. DETC2015-47673

Hang Ye, Sonjoy Das, Chi Zhou, University at Buffalo, Buffalo, NY, United States

A VIRTUAL REALITY APPLICATION FOR ADDITIVE MANUFACTURING PROCESS TRAINING

Technical Publication. DETC2015-47807

Alex Renner, Joseph Holub, Gabe Evans, Shubang Sridhar, Eliot Winer, Iowa State University, Ames, IA, United States

SYSTEMATIC DIMENSIONAL CALIBRATION PROCESS FOR 3D PRINTED PARTS IN SELECTIVE LASER SINTERING SLS

Technical Publication. DETC2015-47983

Sangho Ha, Hweeyoung Han, Daeil Kwon, Namhun Kim, Ulsan National Institute of Science and Technology, Ulsan, Republic of Korea, Hyeonnam Kim, Kyujong Park, Hyunshik Shin, Cheolwoong Hwang, GM Korea Company, Incheon, Republic of Korea

TENSILE PROPERTIES OF INKJET 3D PRINTED PARTS: CRITICAL PROCESS PARAMETERS AND THEIR EFFICIENT ANALYSIS

Technical Publication. DETC2015-48024

Jochen Mueller, ETH Zurich, Zurich, Switzerland, Shi En Kim, California Institute of Technology, Pasadena, CA, United States, Kristina Shea, Chiara Daraio, ETH Zürich, Zurich, Switzerland

CIE-17

CAPPD/AMS: Human Modeling: Methods and Applications in Engineering

CIE-17-3

CAPPD/AMS: HUMAN MODELING AND SIMULATION II

Level 3, Hynes CC, Room 311 3:30pm - 5:10pm

Session Chair: Yujiang Xiang, University of Alaska-Fairbanks, Fairbanks, AK, United States

Session Co-Chair: Zhipeng Lei, Texas Technology University, Lubbock, TX, United States

HUMAN FACIAL SOFT TISSUE THICKNESS AND MECHANICAL PROPERTIES: A LITERATURE REVIEW

Technical Publication. DETC2015-46363

Ming Xu, James Yang, Texas Technology University, Lubbock, TX, United States

CONTACT PRESSURE SENSITIVITY ANALYSIS WITH STRAP LOCATION, FRICTION, AND HEADFORM MATERIAL PROPERTY

Technical Publication. DETC2015-46465

Ming Xu, James Yang, Texas Technology University, Lubbock, TX, United States

THREE-DIMENSIONAL TOOTH SEGMENTATION BY INTEGRATING MULTIPLE RAY-SUM IMAGES FROM CBCT DATA

Technical Publication. DETC2015-47197

Alessandro Paoli, Armando V. Razionale, Sandro Barone, University of Pisa, Pisa, Italy

MESH GENERATION WITH A STANDARDIZED HEAD-FORM FOR CFD SIMULATIONS OF PARTICLE ASPIRATION

Technical Publication. DETC2015-47205

Zhipeng Lei, James Yang, Texas Technology University, Lubbock, TX, United States

A NOVEL METHODOLOGY FOR THE CREATION OF CUSTOMIZED ERUPTION GUIDANCE APPLIANCES

Technical Publication. DETC2015-47232

Jacopo Tilli, Alessandro Paoli, Armando V. Razionale, Sandro Barone, University of Pisa, Pisa, Italy

CIE-31 SEIKM PANEL: Research Trends and Gaps in Systems Engineering and Knowledge Management

CIE-31-1 RESEARCH TRENDS AND GAPS IN SYSTEMS ENGINEERING

Level 3, Hynes CC, Room 312

3:30pm – 5:10pm

DFMLC-2 Sustainable Design and Manufacturing

DFMLC-2-2 SUSTAINABLE DESIGN AND MANUFACTURING

Level 1, Hynes CC, Room 209

3:30pm-5:10pm

Session Chair: Deborah Thurston, University of Illinois – Urbana-Champaign, Champaign, IL, United States

Session Co-Chair: Marco Mandolini

USABILITY DEMONSTRATION OF THE G.EN.ESI ECO-DESIGN PLATFORM: THE COOKER HOOD CASE STUDY

Technical Publication. DETC2015-46361

Michele Germani, Marco Mandolini, Marco Marconi, Marta Rossi,

Università Politecnica delle Marche, Ancona, Italy

USING BIG DATA TO MINIMIZE UNCERTAINTY EFFECTS IN ADAPTABLE PRODUCT DESIGN

Technical Publication. DETC2015-46475

Hamid Afshari, Qingjin Peng, University of Manitoba, Winnipeg, MB, Canada

QUALITATIVE DATA ANALYSIS IN PRODUCT DEVELOPMENT: AN EXPLORATION OF CLOSED-LOOP THINKING IN PRODUCT REQUIREMENTS

Technical Publication. DETC2015-47099

Christoph Velte, University of Bayreuth, Bayreuth, Germany, Steffen Butzer, Fraunhofer Institute for Manufacturing Engineering and Automation, Bayreuth, Germany, Rolf Steinhilper, University of Bayreuth, Bayreuth, Germany

DFMLC-6 Design for Additive Manufacturing

DFMLC-6-1 DESIGN FOR ADDITIVE MANUFACTURING

Level 1, Hynes CC, Room 105

3:30pm – 5:10pm

Session Chair: Conrad Tucker, Pennsylvania State University, State College, PA, United States

Session Co-Chair: Douglas L. Van Bossuyt, Colorado School of Mines, Golden, CO, United States

ADDITIVE MANUFACTURING TECHNOLOGY POTENTIAL: A CLEANER MANUFACTURING ALTERNATIVE

Technical Publication. DETC2015-46075

Babak Kianian, Tobias C Larsson, Blekinge Institute of Technology, Karlskrona, Sweden

TRANSFER PRINTING OF STRETCHABLE ELECTRONICS ON CONFORMAL SURFACES

Technical Publication. DETC2015-46093

Apoorv Sharma, Rahul Rai, University at Buffalo, Buffalo, NY, United

States

DISTRIBUTED ADDITIVE MANUFACTURING - CONCEPT FOR THE APPLICATION OF JT (ISO 14306) AS DOWN-STREAM PROCESS FORMAT

Technical Publication. DETC2015-47418

Marco Grimm, Alexander Christ, Reiner Anderl, Technische Universität Darmstadt, Darmstadt, Germany

MANUFACTURING FUNCTIONALLY GRADIENT MATERIAL OBJECTS WITH AN OFF THE SHELF 3D PRINTER: CHALLENGES AND SOLUTIONS

Technical Publication. DETC2015-47841

Anthony Garland, Georges Fadel, Clemson University, Clemson, SC, United States

LATTICE STRUCTURE GENERATION AND OPTIMIZATION USING DEFORMABLE IMPLICIT SURFACES FOR ADDITIVE MANUFACTURING

Technical Publication. DETC2015-46565

Erhan Arisoy, Suraj Musuvathy, Lucia Mirabella, Edward Slavin, Siemens Corporate Technology, Princeton, NJ, United States

**DFMLC-7
Design for Quality, Reliability, and Cost**

**DFMLC-7-1
DESIGN FOR QUALITY, RELIABILITY, AND COST**

Level 1, Hynes CC, Room 107 3:30pm – 5:10pm

Session Chair: Marcos Esterman, Rochester Institute of Technology, Rochester, NY, United States

Session Co-Chair: Theodor Freiheit, University of Calgary, Calgary, AB, Canada

UNEVEN PRELOAD FOR IMPROVING MOTION STRAIGHTNESS IN CLOSED HYDROSTATIC GUIDEWAYS

Technical Publication. DETC2015-46577

Jun Zha, Qian Jia, HD Cong, YL Chen, Xi'an Jiaotong University, Xi'an, China

PRECISION PREDICTION MODEL AND EXPERIMENTAL VERIFICATION OF HYDROSTATIC BEARING-ROTOR SYSTEM OF ULTRA-PRECISION MACHINE TOOLS

Technical Publication. DETC2015-46588

Qian Jia, Jun Zha, C. X. Zhang, Y. L. Chen, Xi'an Jiaotong University, Xi'an, China

OPTIMIZATION OF SURFACE ROUGHNESS IN TURNING OF TI-6AL-4V USING RESPONSE SURFACE METHODOLOGY AND TLBO

Technical Publication. DETC2015-47123

Neelesh K. Sahu, Atul B. Andhare, Visvesvaraya National Institute of Technology, Nagpur, India

SIMULATED AND EXPERIMENTAL VERIFICATION OF CMM FEATURE FITTING ALGORITHMS

Technical Publication. DETC2015-46515

Prashant Mohan, Jami Shah, Joseph Davidson, Arizona State University, Tempe, AZ, United States

OPTIMAL ALLOCATION OF WORKER HOURS TO COMPETING DESIGN PROJECTS TO MEET VALUE GROWTH TARGETS

Technical Publication. DETC2015-47818

Theodor Freiheit, University Of Calgary, Calgary, AB, Canada

**MESA-11
Mechatronics and Embedded Systems for Energy Systems**

**MESA-11-1
MECHATRONICS AND EMBEDDED SYSTEMS FOR ENERGY AND AMBIENT INTELLIGENCE**

Level 1, Hynes CC, Room 111 2:00pm-3:00pm

Session Chair: Primo Zingaretti, Università Politecnica delle Marche,

Ancona, Italy

ENERGY HARVESTING SMART FLOOR FOR INDOOR PEOPLE LOCALIZATION AND TRACKING

Technical Publication. DETC2015-47200

Emanuele Frontoni, Marco Contigiani, Università Politecnica delle Marche, Ancona, Italy, Andrea Gatto, Università di Modena e Reggio Emilia, Modena, Italy, Adriano Mancini, Primo Zingaretti, Università Politecnica delle Marche, Ancona, Italy, Elena Bassoli, Università Di Modena e Reggio Emilia, Modena, Italy

A COMPLIANT MECHANISM DESIGN FOR REFRESH-ABLE BRAILLE DISPLAY USING SHAPE MEMORY ALLOY

Technical Publication. DETC2015-47468

Pulkit Sapra, Ankit Kumar Parsurampur, Dhruv Gupta, Suman Muralikrishnan, Mayank Raj, Akash Anand, Vinit Darda, Rohan Paul, M Balakrishnan, P.V.M. Rao, Indian Institute of Technology Delhi, New Delhi, India

MESA-16 Robotics and Mobile Machines

MESA-16-2 ROBOTICS AND VIRTUAL PROTOTYPING IN MECHANTRONIC SYSTEMS AND MOBILE MACHINES

Level 1, Hynes CC, Room 109

3:30pm – 5:10pm

Session Chair: Toyomi Fujita, Tohoku Institute of Technology, Sendai, Japan

Session Co-Chair: Maura Mengoni, Università Politecnica delle Marche, Ancona, Italy

A MULTI-OBJECTIVE PATH PLANNING ALGORITHM FOR MOBILE ROBOTS BASED ON CELLULAR AUTOMATA

Technical Publication. DETC2015-46960

Yousef Naranjani, Jian-Qiao Sun, University Of California, Merced, Merced, CA, United States

DYNAMIC MODELLING AND ANALYSIS OF AN ARTICU-

LATED ROBOTIC LEG

Technical Publication. DETC2015-47140

Mariapaola D'Imperio, Ferdinando Cannella, Luca Carbonari, Nahian Rahman, Darwin G. Caldwell, Istituto Italiano di Tecnologia, Genova, Italia-Genova-Liguria, Italy

DEVELOPMENT OF A QUADRUPED TRACKED MOBILE ROBOT

Technical Publication. DETC2015-47982

Toyomi Fujita, Yuichi Tsuchiya, Tohoku Institute of Technology, Sendai, Japan

DEVELOPMENT OF A MULTIMODAL FEEDBACK DEVICE FOR UPPER LIMB REHABILITATION

Technical Publication. DETC2015-46304

Margherita Peruzzini, Maura Mengoni, Matteo Lualè, Università Politecnica delle Marche, Ancona, Italy

MESA-17 Sensors and Actuators

MESA-17-2 DESIGN AND DEVELOPMENT OF SENSOR AND ACTUATORS

Level 1, Hynes CC, Room 110

3:30pm – 5:10pm

Session Chair: Boren Li, Virginia Polytechnic Institute and State University, Blacksburg, VA, United States

Session Co-Chair: Veronica Marin, University of Toronto, Toronto, ON, Canada

DEVELOPMENT OF A NOVEL PNEUMATIC ARTIFICIAL MUSCLES ACTUATOR EMBEDDED BACKBONE USING 3D-PRINTER FOR LINEAR MOTION

Technical Publication. DETC2015-47209

Hyuk Jin Lee, Baek Chul Kim, Ja Choon Koo, Sungkyunkwan University, Suwon, Republic of Korea

DEVELOPMENT OF A BIOMIMETIC VIBROTACTILE

SENSOR FOR DYNAMIC DEFORMATION WITH AN ARRAY OF POLYMER STRUCTURES

Technical Publication. DETC2015-47213

Jae Young Choi, Baek Chul Kim, Ja Choon Koo, Sungkyunkwan University, Suwon, Republic of Korea

DESIGN AND CALIBRATION OF A 3D HIGH-RESOLUTION SURFACE PROFILING SYSTEM USING PHOTOMETRIC STEREO

Technical Publication. DETC2015-47734

Boren Li, Tomonari Furukawa, Virginia Tech, Blacksburg, VA, United States

DESIGNING PROJECTION PATTERNS FOR 3D STRUCTURED-LIGHT SENSORS

Technical Publication. DETC2015-47760

Veronica Marin, Goldie Nejat, University of Toronto, Toronto, ON, Canada

DESIGN OF A DURABLE AIR-MUSCLE WITH INTEGRATED SENSOR FOR SOFT ROBOTICS

Technical Publication. DETC2015-47872

Geneviève Miron, Jean-Sébastien Plante, Université De Sherbrooke, Sherbrooke, QC, Canada

MESA-18
Small Unmanned Aerial Vehicle Technologies and Applications

MESA-18-2
DEVELOPMENTS IN SUAV: FROM PAYLOAD TO SAFETY

Level 1, Hynes CC, Room 111 3:30pm – 5:10pm

Session Chair: Pinhas Ben-Tzvi, The George Washington University, Washington, DC, United States

Session Co-Chair: Önder Halis Bettemir, Carnegie Mellon University / Inonu University, Pittsburgh, PA, United States

UAV-BASED WIRELESS TELEMETRY SYSTEM FOR

THE ESTIMATION OF SHIP AIR WAKE PATTERNS

Technical Publication. DETC2015-46656

Anil Kumar, Pinhas Ben-Tzvi, Murray Snyder, The George Washington University, Washington, DC, United States

HAPTIC INTERFACE OF DATA-DRONE OPERATION CONSIDERING HUMAN OPERATOR'S FORCE SENSITIVITY

Technical Publication. DETC2015-46695

Niloufar Irannejad, YangQuan Chen, University of California Merced, Merced, CA, United States, Jiakai Huang, Nanjing Institute of Technology, Nanjing, China

QUALITY AND SAFETY ASSURANCE OF RAILWAY TRACKS BY UAV

Technical Publication. DETC2015-47537

Önder Halis Bettemir, Carnegie Mellon University / Inonu University, Pittsburgh, PA, United States

MODELING AND HARDWARE-IN-THE-LOOP SIMULATION OF POWER-SPLIT DEVICE FOR HYBRID ELECTRIC VEHICLES

Technical Publication. DETC2015-46187

Shreyash Joshi, Tesla Motors, Fremont, CA, United States, Bo Chen, Michigan Technological University, Houghton, MI, United States

MR-4
Robot/Machine Dynamics and Control

MR-4-3
VARIABLE TOPOLOGY, PNEUMATIC AND SOFT SYSTEMS

Level 2, Hynes CC, Room 204 3:30pm – 5:10pm

Session Chair: Damien Chablat, CNRS, Nantes, France

Session Co-Chair: Kuan-Lun Hsu, Tennessee Technological University, Cookeville, TN, United States

DYNAMIC ANALYSIS OF A PLANAR MECHANISM WITH

VARIABLE TOPOLOGY

Technical Publication. DETC2015-46271

Peter Malak, Philip Voglewede, Marquette University, Milwaukee, WI, United States

REFINED THEORETICAL MODELING OF A NEW-GENERATION PRESSURE-OPERATED SOFT SNAKE

Technical Publication. DETC2015-47515

Ming Luo, Yixiao Pan, Weijia Tao, Fuchen Chen, Erik H. Skorina, Cagdas Onal, Worcester Polytechnic Institute, Worcester, MA, United States

MODELING AND ADAPTIVE ROBUST POSTURE CONTROL OF 3-RPS PNEUMATIC PARALLEL PLATFORM

Technical Publication. DETC2015-46427

Ce Shang, Guoliang Tao, He Zuo, Zhejiang University, Hangzhou, China, Deyuan Meng, China University of Mining and Technology, Xuzhou, China

MR-7**Medical and Rehabilitation Robotics****MR-7-3****DESIGN PRINCIPLES AND MODELS**

Level 2, Hynes CC, Room 210

3:30pm – 5:10pm

Session Chair: Carl Nelson, University of Nebraska – Lincoln, Lincoln, NE, United States

Session Co-Chair: Conor Walsh, Harvard University, Cambridge, MA, United States

FORCE TRANSFER CHARACTERIZATION OF A SOFT EXOSUIT FOR GAIT ASSISTANCE

Technical Publication. DETC2015-47871

Brendan Quinlivan, Harvard University, Cambridge, MA, United States, Alan Asbeck, Diana Wagner, Wyss Institute for Biologically Inspired Engineering, Boston, MA, United States, Tommaso Ranzani, Sheila Russo, Conor Walsh, Harvard University, Cambridge, MA, United States

TOOL-TISSUE FORCE ESTIMATION FOR A 3-DOF ROBOTIC SURGICAL GRASPER

Technical Publication. DETC2015-46344

Baoliang Zhao, Carl Nelson, University of Nebraska – Lincoln, Lincoln, NE, United States

DYNAMIC PERFORMANCE ANALYSIS OF MINIMALLY ACTUATED 4-BAR LINKAGES FOR UPPER LIMB REHABILITATION

Technical Publication. DETC2015-46828

Evagoras Xydias, University of Cyprus, Nicosia, Cyprus, Andreas Mueller, Johannes Kepler University, Linz, Austria

MR-8**Novel Mechanisms, Robots and Applications****MR-8-4****NOVEL MECHANISMS**

Level 2, Hynes CC, Room 202

3:30pm – 5:10pm

Session Chair: Philip Voglewede, Marquette University, Milwaukee, WI, United States

Session Co-Chair: Win-Bin Shieh, Ming Chi University of Technology, New Taipei, Taiwan

DEVELOPMENT OF A NOVEL COUPLING MECHANISM FOR MODULAR SELF-RECONFIGURABLE MOBILE ROBOTS

Technical Publication. DETC2015-46659

Wael Saab, Pinhas Ben-Tzvi, The George Washington University, Washington, DC, United States

KINEMATIC ANALYSIS OF A MECHANISM WITH DUAL REMOTE CENTRE OF MOTION AND ITS POTENTIAL APPLICATION

Technical Publication. DETC2015-47118

Guochao Bai, Heriot-Watt University, Edinburgh, United Kingdom, Peng Qi, Kaspar Althoefer, King's College London, London, United Kingdom, Duanling Li, BUPT, Beijing, China, Xianwen Kong, Heriot-Watt University, Edinburgh, Scotland, Jian Dai, King's College

London, London, United Kingdom

GRAVITY BALANCING OF A SPATIAL ARTICULATED MANIPULATOR BASED ON A NEW SPRING MECHANISM

Technical Publication. DETC2015-47033

Win-Bin Shieh, Ben-Shiou Chou, Ming Chi University of Technology, New Taipei, Taiwan

DESIGN METHOD OF 6-DOF PARALLEL MANIPULATORS BY INVESTIGATING THE INCIDENCE RELATION BETWEEN INPUTS AND OUTPUTS

Technical Publication. DETC2015-47986

Yi Yue, Feng Gao, Baochen Wei, Yi Dong, Shanghai Jiao Tong University, Shanghai, China, Hongnian Yu, Bournemouth University, Bournemouth, United Kingdom

A NEW CONCEPT TO FORM ARC CYLINDERS TO PARABOLIC TROUGHS USING OPTIMAL FORCES

Technical Publication. DETC2015-46144

Lifang Li, Bin Guo, Zongquan Deng, Pengzhen Guo, Harbin Institute of Technology, Harbin, China

**MR-9
Mobile Robots and Cable-Driven Systems**

**MR-9-3
CABLE-DRIVEN SYSTEMS**

Level 2, Hynes CC, Room 203 3:30pm – 5:10pm

Session Chair: Alice Agogino, University of California Berkeley, Berkeley, CA, United States

Session Co-Chair: Sunil Agrawal, Columbia University, New York, NY, United States

TENSION-EFFICIENT CABLE-DRIVEN ROBOT DESIGN USING PARTICLE SWARM OPTIMIZATION

Technical Publication. DETC2015-46837

Joshua Bryson, University of Delaware, Aberdeen, MD, United

States, Sunil Agrawal, Columbia University, New York, NY, United States

USING RANDOMIZED ALGORITHMS TO QUANTIFY UNCERTAINTY IN THE OPTIMAL DESIGN OF CABLE-DRIVEN MANIPULATORS

Technical Publication. DETC2015-46842

Joshua Bryson, University of Delaware, Aberdeen, MD, United States, Sunil Agrawal, Columbia University, New York, NY, United States

COMBINATORIAL METHOD FOR CHECKING STABILITY IN TENSEGRITY STRUCTURES

Technical Publication. DETC2015-47143

Daniel Cahan, Offer Shai, Tel Aviv University, Ramat Aviv, Israel

TRAJECTORY GENERATION FOR THREE-DEGREE-OF-FREEDOM CABLE-SUSPENDED PARALLEL ROBOTS BASED ON ANALYTICAL INTEGRATION OF THE DYNAMIC EQUATIONS

Technical Publication. DETC2015-46369

Xiaoling Jiang, Clement Gosselin, Universite Laval, Quebec, QC, Canada

MECHANISM DESIGN AND SIMULATION OF THE ULTRA SPINE, A TENSEGRITY ROBOT

Technical Publication. DETC2015-47583

Andrew P. Sabelhaus, Hao Ji, Patrick Hylton, Yakshu Madaan, ChanWoo Yang, University of California Berkeley, Berkeley, CA, United States, Jeffrey Friesen, University of California San Diego, La Jolla, CA, United States, Vytas SunSpiral, Stinger Ghaffarian Technologies, Intelligent Robotics Group, Moffett Field, CA, United States, Alice Agogino, University of California Berkeley, Berkeley, CA, United States

**MSNDC-5/VIB-5
Nonlinear Dynamical Systems and Phenomena**

**MSNDC-5-9/VIB-5-9
VIBRATION ABSORBERS**

Level 3, Hynes CC, Room 304

3:30pm – 5:10pm

Session Chair: Giuseppe Habib, University of Liege, Liege, Belgium

Session Co-Chair: J.M. Balthazar, Sao Paulo State University, Sao Paulo, Brazil

STUDY OF TARGETED ENERGY TRANSFER INSIDE 3D ACOUSTIC CAVITY BY TWO NONLINEAR MEMBRANE ABSORBERS

Technical Publication. DETC2015-46227

Jianwang Shao, Xian Wu, Tongji University, Shanghai, China, Bruno Cochelin, Ecole Centrale Marseille, Marseille, France

A PRINCIPLE OF SIMILARITY FOR NONLINEAR VIBRATION ABSORBERS

Technical Publication. DETC2015-46759

Giuseppe Habib, Gaetan Kerschen, University Of Liège, Liege, Belgium

MSNDC-8/VIB-8 Dynamics of Non-Smooth Systems, Contact, and Impact

MSNDC-8-3/VIB-8-3 DESIGN AND SIMULATION

Level 3, Hynes CC, Room 300

3:30pm – 5:10pm

Session Chair: Harry Dankowicz, University Of Illinois, Urbana, IL, United States

Session Co-Chair: Dan Negrut, University of Wisconsin – Madison, Madison, WI, United States

THE WAVE FINITE ELEMENT METHOD APPLIED TO A ONE-DIMENSIONAL LINEAR ELASTODYNAMIC PROBLEM WITH UNILATERAL CONSTRAINTS

Technical Publication. DETC2015-46919

Carlos Yoong, Anders Thorin, Mathias Legrand, McGill University, Montreal, QC, Canada

DESIGNING ENERGY DISSIPATION PROPERTIES VIA THERMAL SPRAY COATINGS

Technical Presentation Only. DETC2015-47446

Matthew Brake, Aaron Hall, Sandia National Laboratories, Albuquerque, NM, United States

DYNAMIC CHARACTERISTICS OF CYLINDERS' JOINT SURFACES CONSIDERING FRICTION AND ELASTIC-PLASTIC DEFORMATION BASED ON FRACTAL THEORY

Technical Publication. DETC2015-48015

Xiaopeng Li, Li Jiasheng, Shujun Li, Shichao Xiu, Northeastern University, Shenyang, China

MSNDC-16 Modeling and Formulation of Multibody Systems

MSNDC-16-4 MODELING AND FORMULATION OF MULTIBODY SYSTEMS IV

Level 3, Hynes CC, Room 303

3:30pm – 5:10pm

Session Chair: Ahmed A. Shabana, University of Illinois, Chicago, IL, United States

Session Co-Chair: Dan Negrut, University of Wisconsin – Madison, Madison, WI, United States

THREE-DIMENSIONAL PLATE THEORY FOR FLEXIBLE MULTIBODY DYNAMICS

Technical Publication. DETC2015-47249

Olivier Bauchau, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong, Shilei Han, Shanghai Jiao Tong University, Shanghai, Shanghai, China

TAILORED MODELING OF A VEHICLE POWER LIFT-GATE AVOIDING EXPLICIT DEFINITION OF BODY-FIXED REFERENCE FRAMES

Technical Publication. DETC2015-47524

Andreas Mueller, Johannes Kepler, Linz, Austria, Krystof P. Jankowski, Magna Closures of America, Novi, MI, United States

SOLUTION TO THREE-DIMENSIONAL INDETERMINATE CONTACT AND IMPACT WITH FRICTION USING RIGID BODY CONSTRAINTS

Technical Publication. DETC2015-47910

Adrian Rodriguez, Clovis Research, Arlington, TX, United States, Abhishek Chatterjee, Alan Bowling, University of Texas at Arlington, Arlington, TX, United States

EFFICIENT AND ROBUST IMPLEMENTATION OF THE TLISMNI METHOD

Technical Publication. DETC2015-48105

Ahmed Aboubakr, Ahmed A. Shabana, University of Illinois, Chicago, IL, United States

THREE DIMENSIONAL NONLINEAR SHELL THEORY FOR FLEXIBLE MULTIBODY DYNAMICS

Technical Publication. DETC2015-47163

Shilei Han, Shanghai Jiao Tong University, Shanghai, China, Olivier Bauchau, Hong Kong University of Science and Technology, Hong Kong, China

**MSNDC-17
Biomechanics**

**MSNDC-17-4
BIOMECHANICS IV**

Level 3, Hynes CC, Room 310 3:30pm – 5:10pm

Session Chair: Wilma K. Olson, Rutgers the State University of New Jersey, Piscataway, NJ, United States

Session Co-Chair: Soheil Fatehiboroujeni, University of California, Merced, Merced, CA, United States

A BIOMECHANICAL APPROACH TO DIAGNOSIS AND MONITORING OF PARKINSON’S DISEASE

Technical Publication. DETC2015-46781

Vrutangkumar Shah, Indian Institute of Technology Gandhinagar, Ahmedabad, India, Sachin Goyal, University of California, Merced, Merced, CA, United States, Harish Palanthandalam-Madapusi, Indian Institute of Technology Gandhinagar, Motera, India

PRINCIPLES OF DNA LOOPING

Technical Presentation Only. DETC2015-46523

Wilma K. Olson, Pamela J. Perez, Rutgers the State University of New Jersey, Piscataway, NJ, United States

A METHOD FOR IDENTIFICATION OF THE CONSTITUTIVE LAW OF BIOLOGICAL FILAMENTS FROM THEIR DYNAMIC EQUILIBRIA

Technical Publication. DETC2015-46776

Soheil Fatehiboroujeni, Sachin Goyal, Apostol Gramada, University of California, Merced, Merced, CA, United States

THE DYNAMICS OF DNA SUPERCOILING: A BROWNIAN DYNAMICS STUDY

Student Competition Paper. DETC2015-47444

Ivenso Ikenna, Todd Lillian, Texas Technology University, Lubbock, TX, United States

RECONSTRUCTING DNA SUPERCOIL DYNAMICS

Technical Presentation Only. DETC2015-47616

Saeed Babamohammadi, Ikenna D. Ivenso, Todd Lillian, Texas Technology University, Lubbock, TX, United States

**PTG-6
Lubrication and Efficiency**

**PTG-6-1
LUBRICATION AND EFFICIENCY**

Level 1, Hynes CC, Room 108 3:30pm – 5:10pm

Session Chair: David Talbot, The Ohio State University, Columbus, OH, United States

Session Co-Chair: Sheng Li, Wright State University, Dayton, OH, United States

A COMPUTATIONAL STUDY ON THE MECHANICAL POWER LOSS OF A SPUR GEAR PAIR UNDER THE

THERMAL TRIBO-DYNAMIC CONDITION

Technical Publication. DETC2015-46034

Sheng Li, Wright State University, Dayton, OH, United States

INFLUENCE OF GREASE CHARACTERISTICS ON GEAR FRICTION LOSS

Technical Publication. DETC2015-46549

Yoichi Matsumoto, Oriental Motor Co., Ltd., Tsuchiura-shi, Japan,
Haruo Houjoh, Tokyo Institute of Technology, Yokohama, Japan

EFFECT OF THE SHAPE OF INLET OIL-SUPPLY LAYER ON STARVED LUBRICATION PERFORMANCE OF A CYCLOID DRIVE

Technical Publication. DETC2015-46730

Caichao Zhu, Zhangdong Sun, Huaiju Liu, Chaosheng Song, Zufeng Li, Zi Wang, Chongqing University, China, Chongqing, China

POSSIBILITY OF SELF VACUUMING OF A GEARBOX FOR REDUCING WINDAGE LOSS

Technical Publication. DETC2015-47257

Haruo Houjoh, Shigeki Matsumura, Tokyo Institute of Technology, Yokohama 227, Japan, Takeshi Iino, Tokyo Institute of Technology, Yokohama, Japan

A MODEL TO PREDICT POCKETING POWER LOSSES IN SPIRAL BEVEL GEARS

Technical Publication. DETC2015-47344

Erdem Erkilic, David Talbot, Ahmet Kahraman, Ohio State University, Columbus, OH, United States

**MSNDC-4/VIB-4
Experiments in Dynamical Systems****MSNDC-4-2/VIB-4-2
EXPERIMENTS IN DYNAMICAL SYSTEMS II**

Level 3, Hynes CC, Room 306

3:30pm – 5:10pm

Session Chair: Nicholas Vlajic, National Institute of Standards and Technology, Gaithersburg, MD, United States

Session Co-Chair: Guilhem Michon, ISAE, Toulouse, France

DYNAMIC MODELS FOR IMAGE PROCESSING

Technical Publication. DETC2015-47398

Adrien Goeller, Jean-Luc Dion, SUPMECA – LISMMA, Saint Ouen, France, Bernard Roux, Vannier-Kinoptik, Antony, France, Thierry Soriano, SUPMECA, La Garde, France

INVESTIGATION OF VARIATION IN SENSITIVITY OF FORCE TRANSDUCERS UNDER SINE-SWEEP CALIBRATIONS

Technical Publication. DETC2015-47820

Nicholas Vlajic, Ako Chijioko, National Institute of Standards and Technology, Gaithersburg, MD, United States

EVERYDAY LIFE QUANTIFICATION USING MDFA: HEART HEALTH MONITORING AND STRUCTURAL HEALTH MONITORING

Technical Publication. DETC2015-48018

Toru Yazawa, Tokyo Metropolitan University, Hachioji, Japan

**MSNDC-11/VIB-11
Control and Adaptive Structures****MSNDC-11-3/VIB-11-3
CONTROL AND ADAPTIVE STRUCTURES III**

Level 3, Hynes CC, Room 302

3:30pm – 5:10pm

Session Chair: Mircea Teodorescu, University of California Santa Cruz, Santa Cruz, CA, United States

Session Co-Chair: Mohammad Poursina, University of Arizona, Tucson, AZ, United States

A DISCRETIZED OPTIMIZATION STRATEGY FOR REST-TO-REST MANEUVERS OF OVERHEAD CRANES CONSIDERING THE EFFECT OF DAMPING

Technical Publication. DETC2015-46250

Khaled Alghanim, Khaled Alhazza, Kuwait University, Kuwait City, Kuwait, Ziyad Masoud, German Jordanian University, Amman, Jordan

COMPUTED TORQUE CONTROL OF ARTICULATED MULTIBODY SYSTEMS IN THE GENERALIZED DIVIDE AND CONQUER ALGORITHM FRAMEWORK

Student Competition Paper. DETC2015-46853

Cameron Kingsley, Mohammad Poursina, University of Arizona, Tucson, AZ, United States

AN EMERGENCY TRACKING CONTROLLER DESIGN FOR A MANIPULATOR AFTER ITS ACTUATOR FAILURE

Technical Publication. DETC2015-47304

Elzbieta Jarzebowska, Adam Szewczyk, Warsaw University of Technology, Warsaw, Poland

DISCRETE TIME FINITE ELEMENT TRANSFER MATRIX METHOD DEVELOPMENT FOR MODELING AND DE-CENTRALIZED CONTROL

Technical Publication. DETC2015-47812

Nick Cramer, University of California, Santa Cruz, CA, United States, Sean Swei, NASA Ames Research Center, Mountain View, CA, United States, Mircea Teodorescu, University of California Santa Cruz, Santa Cruz, CA, United States, Kenneth Cheung, NASA Ames Research Center, Mountain View, CA, United States

FLEXOELECTRIC ACTUATION AND VIBRATION CONTROL OF RING SHELLS

Student Competition Paper. DETC2015-47994

B.L. Deng, Huiyu Li, Hornsen Tzou, Zhejiang University, Hangzhou, China

**MSNDC-14/VIB-14
Emerging Frontiers in Dynamical Systems**

**MSNDC-14-2/VIB-14-2
EMERGING FRONTIERS IN DYNAMICAL SYSTEMS II**

Level 3, Hynes CC, Room 305

3:30pm – 5:10pm

Session Chair: Stephanos Theodossiades, Loughborough University, Loughborough, United Kingdom

Session Co-Chair: Bogdan I. Epureanu, University of Michigan, Ann Arbor, MI, United States

APPLICATION OF NONLINEAR VIBRATION ABSORBERS TO THE CONTROL OF PISTON SECONDARY MOTION IN INTERNAL COMBUSTION ENGINES

Technical Publication. DETC2015-47410

Nader Dolatabadi, Stephanos Theodossiades, Steve J. Rothberg, Loughborough University, Loughborough, United Kingdom

EXPERIMENTALLY VALIDATED NONLINEAR ELECTRO-HYDROELASTIC EULER-BERNOULLI-MORISON MODEL FOR MACRO-FIBER COMPOSITES WITH DIFFERENT ASPECT RATIOS

Student Competition Paper. DETC2015-47773

Shima Shahab, Alper Erturk, Georgia Institute of Technology, Atlanta, GA, United States

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ALHAZZA	KHALED	VIB-11-1 VIB-11-3
ALI	HESSEIN	MR-1-1
ALIAS	CYRIL	CIE-3-1
ALIOLI	MATTIA	MSNDC-15-2
ALLEN	JANET	CIE-20-1 DAC-3-1 DAC-9-3 DTM-5-1 DTM-5-2
ALLEN	MATTHEW	MSNDC-5-2 VIB-6-2
ALLEYNE	ANDREW	AVT-1-1
ALLISON	JAMES	DAC-9-3 DAC-12-1
ALLOTTA	BENEDETTO	MR-7-2 MR-9-1
ALMESTIRI	SALEH	MR-1-6
ALQASIMI	AHMAD	MR-6-3
AL-SHUDEIFAT	MOHAMMAD	VIB-9-2
ALTAMMAR	HUSSAIN	VIB-16-3
ALTHOEFER	KASPAR	MR-7-4 MR-8-4
ALTUZARRA	OSCAR	MR-4-1 MR-6-3
ALVARADO	JORGE	VIB-3-3
ALY	MOHAMED	DAC-1-1
ALZAHIRANI	MAHMOUD	VIB-16-1
AMANO	RYO	DFMLC-10-2
AMERI	FARHAD	CIE-11-3 CIE-22-1
AMETA	GAURAV	CIE-11-4
AMIN	SAFAA	MESA-2-1
AMON	CRISTINA H.	DAC-4-2
ANAGNOSTAKIS	DIMITRIOS	CIE-4-1
ANAND	AKASH	MESA-11-1
ANAPAGADDI	RAVIKIRAN	DAC-9-3

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ANDERL	REINER	CIE-2-1 DFMLC-5-1 DFMLC-6-1
ANDERSON	JEFFERY	AVT-1-1
ANDERSON	KURT	MSNDC-15-3
ANDERSSON	KJELL	DAC-13-2 DEC-2-1
ANDHARE	ATUL B.	DFMLC-7-1
ANDRÉ	HUGO	VIB-7-2
ANDULKAR	MAYUR	MR-3-2
ANGELES	JORGE	AVT-1-2 MR-2-1 MSNDC-10-1
ANGELICO	BRUNO A.	VIB-7-4
ANSARI	M.H.	VIB-9-3
ANTONIK	MARGARET	DAC-9-2
ANWER	NABIL	CIE-2-1
AOYAMA	HIDEKI	CIE-13-2
AOYAMA	KAZUHIRO	CIE-19-1
APLEY	D.	DAC-9-2 DAC-13-2
AQUINO SHLUZAS	LAUREN	BIOMED-7-3
ARADAG	SELIN	CIE-1-1
ARAI	KOHEI	CIE-19-1
ARAI	YASUO	PTG-4-2
ARAILOPOULOS	ALEXANDROS	VIB-14-2
ARAKELIAN	VIGEN	MR-1-4
ARDEH	HAMID	MSNDC-5-2
ARELEKATTI	V. N. MURTHY	MR-7-5
ARENA	ANDREA	MNS-1-1 VIB-2-4
AREVALO	ARPYS	MNS-1-2
ARIKAWA	KEISUKE	MR-7-1
ARINEZ	JORGE	CIE-10-1
ARISAWA	HIDENORI	PTG-9-1
ARISOY	ERHAN	DFMLC-6-1
ARLITT	RYAN	DAC-2-1 DTM-2-1 DTM-5-1
ARMAND	JASON	VIB-6-1
ARMSTRONG	JESSICA	DTM-13-1
ARNOLD	DAVID P.	MNS-1-3
ARPAK	ASLI	DEC-2-1
ARTONI	ALESSIO	PTG-1-1
ARVIDSSON	KIM	VIB-15-2
ASADI	SAEED	VIB-7-3
ASBECK	ALAN	MR-7-3
ASHIDA	KIWAMU	MSNDC-5-7
ASHOK	PRADEEPKUMAR	AVT-5-2 MR-8-6
ASKARI	HASSAN	VIB-2-1
ATTARI	MINA	MESA-13-1
ATTIA	HELMI	DAC-1-1
AUSTIN-BRENNEMAN	JESSE	DAC-3-1
AVERDUNG	CHRISTOPH	CIE-4-1
AVITABLE	PETER	VIB-16-3
AWTAR	SHORYA	MR-6-1
AYALEW	BESHAH	AVT-1-1
AYLI	ULKU ECE	CIE-1-1
AYUB	AHMAD	VIB-2-2
AZARM	SHAPOUR	CIE-1-1
BAALSRUD HAUGE	JANNICKE	CIE-26-1
BABAMOHAMMADI	SAEED	MSNDC-17-4
BABKOOR	MOHAMMED	DEC-10-1
BACHRATHY	DANIEL	MSNDC-12-2
BACKLUND	PETER B.	DAC-8-1
BAE	JONG-JIN	AVT-2-1
BAGIVALU PRASANNA	PRATHEEK	MR-6-3
BAGUET	SEBASTIEN	VIB-7-4
BAI	GUOCHAO	MR-8-4
BAI	LU	MESA-8-7
BAI	RUIYU	MR-6-1
BAILINI	ALESSANDRO	AVT-4-1
BAJAJ	ANIL	MNS-1-1
BAJAJ	NIKHIL	MNS-1-3
BAK	JEONGAE	MR-1-5
BAKIOGLU	MEHMET	VIB-11-1
BAKIS	CHARLES E.	VIB-9-1
BAKSHI	SOOVADEEP	PTG-9-2
BALACHANDRAN	BALAKUMAR	MSNDC-15-2
BALAKRISHNAN	M.H.	MESA-11-1
BALARAM	BOB	MSNDC-16-3
BALLARD	ZACH C.	MR-10-5
BALLO	FEDERICO	AVT-2-1
BALSAMO	ALESSIO	DFMLC-3-2 DTM-7-1

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BALTHAZAR	J.M.	MSNDC-5-3 VIB-9-4
BALTHAZAR	JOSÉ M.	VIB-7-4
BAMIDURO	OLUWAKAYODE	AM3D
BANERJEE	ASHIS	CIE-22-1
BANICA	MARIAN	CIE-26-1
BANI-HANI	MUATH	VIB-2-3
BANNEROT	RICHARD	DEC-3-1
BANNO	TAKAHIKO	PTG-9-1
BANSOD	NILESH	PTG-9-2
BAO	HEYUN	PTG-3-2 PTG-3-3 PTG-3-4
BAO	QIFANG	DTM-12-1
BAO	RUIXIN	AVT-2-2
BAPAT	SUSHRUT G.	MR-6-3
BAOERSAD	JAVAD	VIB-16-3
BARARI	AHMAD	CIE-11-2 CIE-11-4 VIB-2-2
BARATTIN	DANIELA	CIE-11-4
BARBADILLO	MONICA	MESA-8-9
BARGER	MCCALL	DAC-7-1
BARON	LUC	MR-2-1
BAR-ON	YOTAM	MNS-1-2
BARONE	SANDRO	CIE-17-3 DAC-11-1
BARTKOWIAK	TOMASZ	MR-2-3
BARTON	WILLIAM	PTG-3-1
BAS	GAMZE S.	RASFP-4-1
BASESKI	IGOR	DAC-17-2
BASHFORD	GREG	BIOMED-7-2
BASHMAL	SALEM	MNS-1-1
BASHYAM	SANJAI	DEC-3-1
BASILE	VITO	MNS-4-1
BASSOLI	ELENA	MESA-11-1
BATRA	PULKIT	MESA-17-1
BATTAGLINI	CLAUDIO	VIB-14-1
BATTARRA	MATTIA	PTG-3-1
BATTIATO	ILENIA	CIE-11-3
BAUCHAU	OLIVIER	MSNDC-16-1 MSNDC-16-3 MSNDC-16-4
BAUZA	MARCIN	AM3D
BAYLY	PHILLIP	MSNDC-5-1 VIB-15-1
BAYRAK	ALPARSLAN EMRAH	DAC-10-1 DAC-13-1
BAZZAN	GIORGIO	MR-10-1
BEAMAN	JOSEPH	AM3D
BEAULIER	ALEX J.	CIE-11-3
BECK	DENNIS	DEC-2-1
BECK	J. CHRISTOPHER	DAC-4-2
BECCOQUERELLE	SAMUEL	PTG-3-1
BEHANDISH	MORAD	CIE-4-1
BEHDAD	SARA	DAC-3-2 DAC-16-1 DAC-18-1 DFMLC-3-2 DFMLC-8-1 DFMLC-10-1
BEKHRADI	ALBORZ	DAC-16-1
BÉLANGER DESBIENS	ALEXANDRE	MESA-16-1
BELARDINELLI	PIERPAOLO	MSNDC-5-6
BELLANTONE	VINCENZO	MNS-5-1
BELLAREDJ	MOHAMMED	MNS-1-1
BELZILE	BRUNO	MR-1-4
BEN-TZVI	PINHAS	MESA-18-2 MR-7-5 MR-8-4 MR-9-1
BERBYUK	VIKTOR	MSNDC-10-4 PTG-9-1 VIB-7-3
BERGMAN	LAWRENCE	MSNDC-5-2 VIB-9-4
BERNARD	BRIAN P.	VIB-15-2
BERRYMAN	BRENNAN	BIOMED-7-1
BERSENBRUEGGE	JAN	CIE-4-2
BESHARAT SHAFIEI	SOMAYEH	MR-3-2
BESSETTE	AMANDA	DEC-1-1
BETHAVOLU	ARUN K.	DFMLC-1-1
BETTAYEB	MAAMAR	MESA-8-4
BETTÉMIR	ÖNDER HALIS	MESA-18-2
BEUTH	JACK	AM3D
BEZZO	NICOLA	MESA-6-1
BHAGAT	AJINKYA	AVT-4-1
BHAMRA	TRACY	DFMLC-12-2
BHAPKAR	SAURABH	MR-1-2
BHASIN	ABHINAV K.	DTM-4-1
BHATTACHARYA	AMIT	MSNDC-17-2
BHOWMICK	SANKHA	DEC-5-1
BI	GUIJUN	AM3D CIE-11-5
BI	SHUSHENG	MR-2-3
BI	YOUYI	DAC-3-1

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BIAN	XIANG	CIE-6-1
BIERBACH	MAXIM	AVT-3-1
BILTON	AMY	DAC-4-2
BIN BAHARUDIN	EZRAL	MSNDC-10-2
BIRGLEN	LIONEL	MR-1-4 MR-1-6 MR-8-1 MR-8-5
BISKACH	MICHAEL	MNS-9-1
BJÖRKLUND	STEFAN	PTG-4-1
BLANCO	ERIC	DFMLC-5-1
BLESSING	LUCIËNNE	DTM-2-1
BLOCKMANS	BART	PTG-3-2
BLÜMEL	FLORIAN	CIE-4-1
BOARDMAN	BETH	MR-3-2
BODDIFORD	ANDREW	MR-8-6
BOEHLER	QUENTIN	MR-6-3
BOGUSKI	BRIAN	PTG-4-1
BOLTON	J. STUART	VIB-15-1
BONNEY	MATTHEW	VIB-6-1 VIB-6-3
BOOTH	JORAN	DTM-2-2 DTM-4-1
BORAZJANI	IMAN	VIB-2-3
BORDEGONI	MONICA	CIE-13-1 CIE-24-1 CIE-24-2
BORN	WERNER	DEC-10-1
BORRA	CHAITANYA	MNS-1-3
BOSCH	KELLY	AVT-7-1
BOSWELL	BRIAN	RASFP-4-1
BOUALEM	BILAL	MR-3-3
BOUCHER	JEAN-MICHEL	MR-8-5
BOULIANE-BLAIS	GUILAUME	MR-8-5
BOURDON	ADELINE	VIB-7-2
BOWDEN	ANTON	BIOMED-5-1 BIOMED-7-3
BOWEN	LANDEN	MR-10-1 MR-10-6
BOWLING	ALAN	MSNDC-16-4
BOYD	DEVON	DAC-18-1
BOZORGIRAD	MIR ABBAS	CIE-19-1
BRAGHIN	FRANCESCO	AVT-1-1 AVT-1-3 AVT-2-2
BRAKE	MATTHEW	MSNDC-8-3 VIB-6-1
BRAS	BERT	DFMLC-12-2
BRASIL	REYOLANDO M.L.R.F	VIB-9-4
BRASIL	REYOLANDO M.L.R.F.L	MSNDC-5-3
BRECHA	ROBERT	DFMLC-10-1
BREMER	CHRISTIAN	CIE-4-1 PTG-5-1
BRENNAN	BOB	MESA-9-2
BREZHNEVA	OLGA	VIB-3-2
BRINK	ADAM	VIB-6-1
BROUWER	D.M.	MR-6-1
BROWN	DANIEL	VIB-6-2
BRUCK	HUGH	MR-8-2
BRUTON	JARED	MR-6-1
BRUYAS	ARNAUD	AM3D
BRUYERE	JEROME	PTG-3-1 PTG-3-2
BRUZZO	JOHN	MSNDC-17-3
BRYDEN	KENNETH "MARK"	DAC-7-1
BRYSON	JOSHUA	MR-9-3
BUCHER	IZHAK	MSNDC-5-3
BUENO	ATILA M.	MSNDC-12-1
BURNAP	ALEX	DTM-13-1
BURNETT	SANDRA H.	MNS-2-1
BUSKOHL	PHILIP R.	MR-10-1
BUTZER	STEFFEN	DFMLC-2-2
BYAS	ERNESTO	MNS-1-2
BYRON	REID	MNS-9-1
C S	SURAU	AM3D
CADE	WILLIE	DFMLC-3-2
CAGAN	JONATHAN	CIE-24-2 DTM-5-1 DTM-7-1
CAHAN	DANIEL	MR-9-3
CAI	CHANGWANG	MR-1-5
CAI	KEQIAN	MR-10-5
CAI	NIANCHUN	MESA-8-2
CAI	WEI	MESA-8-4
CAIN	STEPHEN M.	MSNDC-17-3
CAITI	ANDREA	MR-9-1
CALDWELL	BENJAMIN W.	DTM-2-2
CALDWELL	DARWIN G.	MESA-16-2
CALLEGARI	MASSIMO	MESA-16-1
CAMBURN	BRADLEY	DTM-2-1
CAMERON	JONATHAN	MSNDC-16-3

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CAMPA GOMEZ	FRANCISCO	MR-4-1 MR-6-3
CAMPBELL	MATT	DAC-2-1 DAC-9-2 DAC-11-1 DFMLC-5-1 DTM-4-1
		DTM-5-1 MR-1-3
CANFIELD	STEPHEN	MR-9-2 MR-11-1
CANGIOLI	FILIPPO	VIB-7-1 VIB-7-2
CANNELLA	FERDINANDO	MESA-16-2
CANSLER	ETHAN	DTM-12-1
CAO	DONGXING	VIB-2-2 VIB-9-3
CAO	JINGHUI	MESA-2-2
CAO	JUNYI	MESA-8-4 VIB-9-3
CAO	KE-CAI	MESA-8-8
CAO	PEI	DAC-8-1 VIB-16-2
CAO	YUE	CIE-19-1
CAO	ZHENG	VIB-15-2
CAPPELLERI	DAVID	AM3D MNS-4-1
CAPPELLINI	NICCOLO'	PTG-3-4
CARBONARI	LUCA	MESA-16-1 MESA-16-2
CARBONE	JOHN	CIE-22-1
CARBONI	BIAGIO	MSNDC-5-7
CARDELLA	MONICA	DEC-2-1
CARDIN	MICHEL-ALEXANDRE	DTM-5-2
CARLSON	CASSANDRA	BIOMED-5-1
CARO	STEPHANE	MR-3-1
CARPENTER	TRENTON	MSNDC-15-2
CARRICATO	MARCO	MR-3-4
CARRIGAN	WEI	MR-7-4 VIB-14-1
CARROLL	ROBIN	MNS-1-3
CARSTENSEN	JOSEPHINE	DAC-9-1
CARTER	MATTHEW D.	DFMLC-12-2
CARULLI	MARINA	CIE-24-2
CARUNTU	DUMITRU	MNS-2-1 MNS-9-1 VIB-2-1
CARVALHO	MAIRA B.	CIE-26-1
CARVALHO	PAULO	BIOMED-7-2
CASALOTTI	ARNALDO	MSNDC-5-9
CASH	TAMSIN N.	MR-10-5
CASTRO	ARNOLDO	MSNDC-10-5
CASTRO	CARLOS	MR-10-1 MR-10-4
CASTRO	CARLOS L.	MSNDC-5-4
CAVALIERI	LORENZO	CIE-24-2
CAVALINI JR.	ALDEMIR AP	VIB-7-1
CELEBIOGLU	KUTAY	CIE-1-1
CENCI	ANNALISA	MESA-2-1
CETINTURK	HUSEYIN	CIE-1-1
CHABBERT	FRÉDÉRIQUE	DAC-16-1
CHABLAT	DAMIEN	MR-3-1 MR-3-3
CHADUVULA	SIVA	DFMLC-3-1
CHAGDES	JAMES	MSNDC-17-2
CHAI	TAN	VIB-13-3
CHAMPNEYS	ALAN	MSNDC-8-1
CHAN	JOSEPH YAU KEI	AM3D
CHAN	KAI W.	MNS-9-1
CHANDRASEKHAR	AADITYA	CIE-11-1
CHANG	AILIAN	MESA-8-7
CHANG	GUO-EN	BIOMED-7-1
CHANG	JEN-YUAN (JAMES)	MESA-17-1
CHANG	MING	MESA-3-1
CHANG	QING	AM3D CIE-10-1
CHANG	SHAN	PTG-8-1
CHANG	XIAOCONG	MNS-6-1
CHAO	JANET	MNS-6-1
CHAO	PAUL C. P.	VIB-14-1
CHAO	XIULI	DAC-16-1
CHAPRON	MATTHIEU	PTG-3-1
CHARDONNET	JEAN-REMY	CIE-24-1
CHATTERJEE	ABHISHEK	MSNDC-16-4
CHATTERTON	STEVEN	VIB-7-1 VIB-7-2
CHAUDHRY	ZAFFIR	VIB-7-3
CHAVAN	ROSHAN	VIB-2-5
CHEBANOV	DMITRIY	MSNDC-5-5
CHELI	FEDERICO	AVT-1-3 AVT-2-2
CHEMBRAMMEL	PRAMOD	BIOMED-5-1
CHEN	ANTHONY	MESA-8-8
CHEN	BINBIN	MESA-8-5
CHEN	BINGKUI	PTG-1-1

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CHEN	BOXIAO	DAC-16-1
CHEN	BRIAN	MESA-17-1
CHEN	FUCHEN	MR-4-3
CHEN	GENLIANG	MR-4-1 MR-8-1
CHEN	GONG	BIOMED-5-1
CHEN	GUIMIN	MR-6-1
CHEN	HAN	CIE-11-1
CHEN	HONG BIN	RASFP-2-1
CHEN	HONGFANG	PTG-3-2
CHEN	HUAWEI	DFMLC-1-1
CHEN	LIHUA	VIB-2-4
CHEN	LISHA	MR-6-3
CHEN	RUIRUI	CIE-19-1
CHEN	SHENGMIN	MNS-1-4
CHEN	SHIKUI	AM3D DAC-9-1
CHEN	SHISHI	DAC-13-2
CHEN	SHUBIN	VIB-9-5
CHEN	TIAN	DEC-1-1
CHEN	WEN	DAC-9-1 DAC-9-2 DAC-13-2 DTM-13-1
		MESA-8-4
CHEN	XIAOXIN	MSNDC-5-1
CHEN	YAN	MR-10-3 MR-10-5 VIB-7-3
CHEN	YANG	DTM-5-2
CHEN	YANGOUAN	MESA-8-1 MESA-8-2 MESA-8-4 MESA-8-5
		MESA-8-6 MESA-8-8 MESA-8-9 MESA-18-2
CHEN	YIFAN	CIE-24-2
CHEN	YINONG	MR-3-4
CHEN	YL	DFMLC-7-1
CHENG	CHIH-CHUN	VIB-3-1
CHENG	CHUN	VIB-16-1
CHENG	GEORGE	DAC-12-1
CHENG	HARRY H.	MESA-3-1 MESA-7-1 MESA-13-1 MESA-16-1
CHENG	WEN-NAN	VIB-3-1
CHENG	YUHUA	MESA-8-4
CHEONG	HYUNMIN	DAC-10-1
CHERNOW	BARBARA	AVT-4-1
CHESTER	FREDERICK M.	VIB-3-3
CHEUNG	ADRIAN	DAC-10-1
CHEUNG	KENNETH	VIB-11-3
CHEVALLIER	GAEL	VIB-6-1 VIB-6-2
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CHHEDA	DHIRAL	MR-8-6
CHIDDARWAR	SHITAL	MR-3-2
CHIJIOKE	AKO	VIB-4-2
CHIRIKJIAN	GREGORY	MR-2-1
CHIRIKJIAN	GREGORY S.	CIE-11-3 MR-5-2 MR-8-6
CHISCI	LUIGI	MR-9-1
CHIU	FELIX	DTM-5-1
CHIU	GEORGE	MNS-1-3
CHO	HYUNKYOO	DAC-17-1 DAC-17-3
CHOI	JAE YOUNG	MESA-17-2
CHOI	JONGSOO	MNS-7-1
CHOI	JUN-KI	DFMLC-10-1
CHOI	KYUNG	DAC-17-1 DAC-17-3
CHOI	SANGSU	CIE-11-4
CHOI	SEUNG-KYUM	CIE-11-1 DAC-17-3 VIB-16-1
CHOMYSZAK	STEPHEN	MR-11-1
CHOU	BEN-SHIOU	MR-8-4
CHOU	YU-CHENG	MESA-3-1
CHOWDHURY	SAGAR	MNS-4-1
CHOWDHURY	SOUMA	CIE-19-2 DAC-12-1
CHRIST	ALEXANDER	DFMLC-6-1
CHRISTENSEN	KEITH	MESA-8-8
CHU	CHIH-HSING	CIE-14-1
CHU	TIANSHU	DFMLC-3-1
CHUANG	CHING-HUNG	DAC-14-1
CHURCHWELL	RAYMOND	AM3D MR-7-4
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CLAEYS	MAXENCE	MSNDC-5-7
CLARK	ALEX	AM3D CIE-4-1
CLARK	DAVID	AVT-7-1
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CLUZEL	FRANCOIS	DAC-16-1
COCHELIN	BRUNO	MSNDC-5-9
COCRON	PETER	AVT-3-1
COHEN	ELIAD	MR-8-3
COLE	BRIAN	AM3D
COLOMBO	EDOARDO FILIPPO	DAC-5-1
COLOMBO	GIORGIO	CIE-4-2
COLÓN	DIEGO	MR-5-2 VIB-7-4
COLTON	MARK	MR-6-1
COMOTTI	CLAUDIO	CIE-17-1
CONG	HD	DFMLC-7-1
CONTI	ROBERTO	MR-7-2 VIB-7-1
CONTIGIANI	MARCO	MESA-11-1
CONTRACTOR	NOSHIR S.	DTM-13-1
CONTRERAS	ULYSSES	MSNDC-15-1
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COOKSEY	K. DANIEL	DTM-5-3
COOLEY	CHRISTOPHER	PTG-2-1
COOLEY	CHRISTOPHER G.	VIB-2-1 VIB-2-5
CORDEN	TOM	VIB-13-2
CORINALDI	DAVID	MESA-16-1
COSTA	JOAO	MSNDC-17-1
COSTANZI	RICCARDO	MR-9-1
COUTRIS	NICOLE	AM3D
COVARRUBIAS	MARIO	CIE-24-1
COWLES	MARY KATHRYN	DAC-17-3
CRAIG	CONOR	CIE-4-1
CRAMER	NICK	MNS-6-1 VIB-11-3
CRAWFORD	RICH	DTM-2-1
CUGINI	UMBERTO	CIE-13-1 CIE-24-1 CIE-24-2
CUI	JIE	MESA-8-7
CUI	MINGJIAN	DAC-4-1
CUI	XIAOLONG	DAC-17-3
CULPEPPER	MARTIN L.	MR-10-6
CUNHA	LORENA	DFMLC-3-1
CURI	SEBASTIAN	MESA-18-1
CUTKOSKY	MARK	MR-3-2
CZEGLÉDI	DÁVID	MESA-10-1
D'ADAMIO	PIERLUCA	MSNDC-10-4
DADRAS	SARA	MESA-8-9
DAGMAN	ANDREAS	CIE-3-1
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DEAN	ROBERT	MNS-1-2
DEB	ANINDYA	MSNDC-10-2
DEBAO	WEI	MESA-7-1

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DEKA	ANGSHUMAN	DFMLC-10-1
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DELAURENTIS	DANIEL	CIE-19-2
DELLA ROSSA	FABIO	AVT-4-1
DEMAINE	ERIK D.	MR-10-3
DEMIREL	GIZEM	CIE-1-1
DENES	TAKACS	MSNDC-10-3 MSNDC-12-1
DENG	B.L.	VIB-11-3
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DENG	SHIGUANG	DAC-3-2
DENG	ZONGQUAN	MR-8-4
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DENNIS	BRIAN	VIB-14-1
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DHULIA	JAYAVARDHAN	DFMLC-5-1
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DI GIRONIMO	GIUSEPPE	DFMLC-3-2 DTM-7-1
DI GREGORIO	RAFFAELE	MR-4-1
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DONG	CHUNZHI	DFMLC-1-1
DONG	GUANG	VIB-3-2
DONG	HUI	MR-2-1
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DU	ZHIJIANG	MR-2-1
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DUAN	HAIBIN	MESA-18-1
DUAN	ZHIXIANG	MR-2-4
DUBOIS	PIERRE-OLIVIER	MR-8-1
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DUTTA	DEBASISH	CIE-20-1			
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EBADI	KAMAK	MESA-9-2			
EDDY	DOUGLAS C.	CIE-11-3			
EDDY	JOHN P.	DAC-8-1			
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ENDO	HIROAKI	MNS-9-1			
ENGLAND	ROGER	AM3D			
EPUREANU	BOGDAN I.	VIB-2-1			
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FAN	TAOSHA	MR-2-1			
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FANG	MAUREEN	AM3D			
FANG	NICHOLAS	DAC-9-3			
FANG	SHENGNAN	AVT-5-1	PTG-9-1		
FANG	YUEFA	MR-2-4			
FANKEM	STEVE	AVT-1-1			
FANNI	MOHAMED	MESA-16-1			
FANTACCI	CLAUDIO	MR-9-1			
FAREL	ROMAIN	DAC-16-1	DFMLC-10-1		
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FENG	YI	VIB-7-2			
FENG	YUQIANG	PTG-1-1			
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FERGUSON	SCOTT	DAC-3-1	DAC-5-1	DAC-9-2	DTM-12-1

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FISHER	FRANK	VIB-9-6			
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GAO	LIANG	DAC-12-1			
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GEIST	BRUCE	VIB-13-1
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GENDREAU	ELIZABETH	DTM-1-1
GENTZSCH	WOLFGANG	CIE-6-1
GERDES	JOHN	AM3D DAC-15-2 MR-8-2
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GILLESPIE	JOHN	MR-8-3
GILMAN	CHARLES R.	DFMLC-1-1
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GLEAN	ALDO	VIB-9-2
GOBBI	MASSIMILIANO	AVT-2-1 AVT-4-1
GODFREY	DONALD	AM3D
GOELLER	ADRIEN	VIB-4-2
GOH	CHUNG HYUN	CIE-20-1
GÖHLER	SIMON MORITZ	DTM-5-3
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GONZALEZ	RICHARD	DEC-5-1 DTM-13-1
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GORSICH	DAVID	DAC-17-1
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GRAY	JEREMY	AVT-7-1
GREANEY	P. ALEX	DAC-2-1
GREEN	ITZHAK	VIB-7-3
GREEN	JEFFREY S.	VIB-7-4
GREEN	MATTHEW G.	DTM-2-2
GREENE	MELISSA	DAC-18-1
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GROENEWEGEN	MARCO	MR-7-1
GROSS	JOHANN	VIB-6-3
GROSS	JOHANNES	MSNDC-16-2
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GU	YU	DAC-9-1
GUAGLIANO	MARIO	AVT-4-1
GUANGHU	YE	AVT-1-1
GUCWA	KEVIN J.	MESA-3-1 MESA-13-1
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GUO	BIN	MR-8-4
GUO	HUI	PTG-1-1
GUO	PENGZHEN	MR-8-4
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GUPTA	SATYANDRA	MR-8-2
GUROCAK	HAKAN	CIE-4-2
GURU	KHURSHID A	MR-3-2
GURURAJA RAO	LAKSHMI	DAC-9-3 DAC-12-1
H. MEMAR	AMIRHOSSEIN	MR-4-2
HA	SANGHO	CIE-11-5
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HABIB	GIUSEPPE	MSNDC-5-9
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HADDAD	JEFFREY M.	MSNDC-17-2
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HAN	HWEEYOUNG	CIE-11-5
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HASHIMURA	SHINJI	PTG-4-1
HASSANPOUR	PEZHMAN A.	MNS-9-1
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HAUSLADEN	JÜRGEN	MESA-7-1
HAWKES	ELLIOT	MR-3-2
HAWKS	JEFF	BIOMED-7-2
HAWKS	JEFFREY	MR-6-1
HAYES	CAROLINE	CIE-24-1
HE	FAYANG	PTG-3-2
HE	LIJUAN	CIE-7-1
HE	QICHANG	CIE-4-1
HE	XIANGWEI	MR-2-2
HE	XU	MNS-7-1
HE	YUHUA	CIE-9-1
HEATH	MICHAEL L.	DAC-7-2
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HEIKKILÄ	TAPIO	MESA-9-2
HEIKKINEN	JANNE	VIB-9-1
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MCCARTHY	J. MICHAEL	MR-1-1 MR-1-2 MR-2-3 MR-6-3
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MELANZ	DANIEL	MSNDC-10-1
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MENG	DEYUAN	MR-4-3
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NAKASHIMA	HIROTAKA	DFMLC-1-1
NAKAYA	KAZUMASA	MR-10-7
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NANAYAKKARA	SURANGA	DEC-2-1
NANDA	ADITYA	MSNDC-5-4
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NASSEF	ASHRAF	DAC-1-1 DAC-4-2
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NICOLSEN	BRYNNE	MSNDC-15-1
NIE	ZHENGWEI	AM3D
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PENG	QINGJIN	DFMLC-1-1 DFMLC-2-2 DFMLC-3-1 DFMLC-5-1
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QI	PENG	MR-7-4 MR-8-4
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QIAN	BINSEN	MESA-16-1
QIAN	XIAOPING	DAC-9-1
QIAN	YOUHUA	MNS-1-4
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QU	MENG	AM3D
QU	SHUHUI	DFMLC-3-1
QU	YUFENG	MR-2-3
QUACINELLA	JOSEPH	MR-4-2
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QUINLIVAN	BRENDAN	MR-7-3
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RAO	RAMESH R.	MESA-2-2
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REN	JUN	VIB-2-3

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ROCHA	RODRIGO TUMOLIN	MSNDC-5-3 VIB-9-4
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ROMERO	JULIAN	CIE-17-2 MR-10-4
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RONG	YIMING	CIE-13-2
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SADRI	MEHRAN	MSNDC-5-5
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SALVO	JOSEPH	CIE-22-1	SHAI	OFFER	MR-2-1 MR-9-3
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SAMADIKHAH	KAVEH	MNS-9-1	SHAN	CHUNLAI	AVT-6-2
SAN MARTIN	MIGUEL	MSNDC-16-3	SHANG	CE	MR-4-3
SANAEI	ROOZBEH	DAC-15-1	SHAO	JIANWANG	MSNDC-5-9
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SAPRA	PULKIT	MESA-11-1	SHARP	CHRIS	DAC-4-1
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SCHUETZE	OLIVER	VIB-3-2	SHINODA	JUNICHI	CIE-17-2 MR-10-4
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SMITH	RACHEL	AM3D				SULLIVAN	MELANI	DAC-6-1						
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SMITH	WILLIAM	MSNDC-10-1				SUN	BOHUA	DAC-1-1						
SNAILER	BRANDON	CIE-17-1				SUN	GUOHUA	PTG-1-1						
SNG	KAREN HUI EN	DTM-2-1				SUN	HONGGUANG	MESA-8-7						
SNYDER	MURRAY	MESA-18-2				SUN	JIAN-QIAO	VIB-3-2	MESA-16-2					
SOBCZAK	MARCIN	CIE-2-2				SUN	JIE	MR-8-5						
SOH	GIM SONG	MR-3-3	MR-9-1			SUN	JINFENG	VIB-2-3						
SOHMSHETTY	RAJ	DAC-2-1				SUN	JINMING	MSNDC-17-1						
SONAWALE	KAUSTUBH	MR-1-1				SUN	WEI	VIB-3-1						
SONG	CHAOSHENG	PTG-6-1				SUN	XUAN	DAC-13-2						
SONG	CHAOYANG	DTM-12-1				SUN	YE	CIE-14-1	RASFP-1-1					
SONG	HAIJUN	PTG-9-1				SUN	YUANZHANG	DAC-4-1						
SONG	JIAN	AVT-1-1	AVT-5-1	PTG-9-1		SUN	ZHANGDONG	PTG-6-1						
SONG	WEI	DAC-17-1				SUNDARARAMAN	PRITHIVIRAJ	DAC-7-2						
SONG	WENPING	MNS-6-1				SUNDRAM	JUGESH	MR-1-3						
SONG	XUBIN	AVT-5-1				SUNSPIRAL	VYAS	MR-9-3						
SONG	YU	CIE-10-1				SURACE	ROSSELLA	MNS-5-1						
SOBRAMANAY	PREGASSEN	MNS-1-2				SURESH	KRISHNAN	AM3D	CIE-6-1	CIE-11-1	CIE-11-2	DAC-3-2		
SOPANEN	JUSSI	AVT-5-1	MSNDC-10-2	VIB-3-1	VIB-9-1	SWEI	SEAN	VIB-11-3						
SORIA	NICOLAS	CIE-19-2				SYZRANTSEV	VLADIMIR N.	PTG-9-2						
SORIANO	THIERRY	VIB-4-2				SZEWCZYK	ADAM	VIB-11-3						
SOUTO	ANTONIO PEDRO	MSNDC-17-1				TACHI	TOMOHIRO	MR-10-3						
SPADACCINI	CHRIS	DAC-9-3				TACHIKAWA	TOMOKAZU	PTG-5-1						
SPEEDIE	JAMIE	CIE-4-1				TAGUCHI	TOSHIAKI	PTG-9-1						
SPERO	ERIC	DAC-15-2				TAI	YUZHUO	AVT-5-1	PTG-9-1					
SPRINGSTEEN	KARA	MR-10-1				TAKAI	SHUN	DFMLC-3-2						
SREEDHARA	VIJAY SARTHY MYSORE	DFMLC-5-2				TAKAMI	KUYA	AVT-3-2						
SRIDHAR	SHUBANG	CIE-11-5				TAKAMI	KUYA	VIB-13-2						
SRIRAM	ANIRUDH R.	DEC-2-1				TAKATO	MINAMI	MNS-9-1						
SRIVASTAVA	JAYESH	DTM-7-1				TAKEBE	HITOSHI	PTG-4-1						
STACK	CAITLIN R.	DAC-8-1				TAKITA	YOSHIHIRO	MR-8-3						
STAHL	KARSTEN	PTG-2-2				TALBOT	DAVID	PTG-6-1	PTG-8-1					
STANESCU	IOANA ANDREEA	CIE-26-1				TALIMI	MARYAM	RASFP-2-1						
STANKOVIC	TINO	CIE-11-2				TALPASANU	ILIE	MR-11-1						
STARK	BRANDON	MESA-8-9				TAMAROZZI	TOMMASO	PTG-3-2						
STARKEY	ELIZABETH	DEC-1-1				TAMAS	PETER	MESA-10-1						
STEAGER	EDWARD	MNS-4-1				TAMER	AYKUT	VIB-7-5						
STEFAN	ANTONIU	CIE-26-1				TAMILSELVAN	PRASANNA	DAC-6-1						
STEFFEN	VALDER	MSNDC-5-4	VIB-7-1			TAMOR	MICHAEL	DAC-16-1						
STEFFEN RENZ	JULIAN	DTM-8-1				TAMURA	ATSUTAKA	CIE-17-1	PTG-4-2					
STEGALL	PAUL	MR-2-4	MR-8-3			TAN	DAN	VIB-9-6						
STEGER	RYAN	MR-7-1				TANAKA	EIICHIROU	PTG-4-1						
STEINHILPER	ROLF	DFMLC-2-1	DFMLC-2-2			TANAKA	MASAYUKI	AM3D						
STEINTHORSSON	ASTHOR	MR-6-3				TANG	JIONG	DAC-8-1	VIB-3-1	VIB-9-2	VIB-16-2			
STENDER	MERTEN	VIB-6-3				TANG	XINXIN	CIE-2-2						
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STENSTRÖM	WIKTOR	PTG-4-1				TANNER	JORDAN	MR-7-1						
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STÉPHAN	CYRILLE	MSNDC-8-1				TAO	GUOLIANG	MR-4-3						
STEPHENSON	KATHERINE	BIOMED-7-3				TAO	JING	DFMLC-3-1	DFMLC-10-2					
STERLING	JOHN	VIB-9-2				TAO	WEIJIA	MR-4-3						
STERN	OLIVER	CIE-4-1				TARABORRELLI	LUCA	AVT-6-1						
STEUBEN	JOHN	CIE-5-1	DFMLC-2-1			TARI	MASSINISSA	MESA-8-10						
STÖCKLI	FRITZ	DEC-1-1	DTM-4-1			TARTIBU	L. K.	DAC-1-1						
STONE	ROBERT	DTM-2-1	DTM-5-1	DTM-13-1		TASORA	ALESSANDRO	MSNDC-10-1						

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TAYLOR	KATHERINE A.	DAC-3-2
TAYLOR	MICHAEL	MSNDC-10-1
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TEHRANI	MOHAMMAD	AVT-5-1
TEIXEIRA-ALVES	JOEL	PTG-5-1
TEJADO	INES	MESA-8-2
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THAI	PHUONG THAO	MR-10-4 MR-10-7
THAKUR	ADITYA	CIE-14-1
THAKUR	AJAY D.	MNS-4-1
THAKUR	ATUL	MNS-4-1
THEISEN	CONNOR	MR-7-4
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THOMAS	KATHERINE M.	VIB-2-3
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TIAN	LULU	MESA-8-4
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TOH	CHRISTINE	DTM-2-1 DTM-8-1
TOKURA	SUNAO	MR-10-7
TOLBERT	DELEAN	DEC-2-1
TOLLEFSON	TRAVIS	MNS-6-1
TOLOU	NIMA	MNS-5-1 MR-6-1
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TRÄCHTLER	ANSGAR	CIE-4-2
TRAGHELLA	DANIELE	DAC-11-1
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TRINKLE	JEFFREY	MSNDC-15-1
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TURKKAN	OMER ANIL	MR-11-1
TURKSEVEN	MELIH	MR-7-4
TURLEY	CURTIS	MESA-7-1
TURNER	CAMERON	CIE-2-1 CIE-5-1 CIE-17-2 DFMLC-2-1
TUSSET	ANGELO MARCELO	MSNDC-5-3 VIB-9-4
TWEDT	MAX	BIOMED-7-2
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UCHIDA	HIROSHI	MR-10-2
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UEDA	JUN	MR-7-4
UEDA	KAZUTAKA	CIE-13-1
UEHARA	RYUHEI	MR-10-7
UNAL	MEHMET	DAC-13-1
UNDERHILL	STEVEN A.	AM3D
UNTAROIU	COSTIN	AVT-3-2
VAIA	RICHARD A.	MR-10-1
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WANG	CHUNJIAN	AVT-1-1
WANG	CHUNYANG	MESA-8-2
WANG	CHU-YI	DFMLC-1-1
WANG	DELUN	MR-1-1
WANG	FENGXIANG	DAC-12-1
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WANG	JIALIANG	RASFP-2-1
WANG	JIANHONG	MESA-8-2
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WANG	MICHEAL Y	VIB-15-2
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WANG	QING	DFMLC-3-1
WANG	QUAN	VIB-2-3
WANG	RONGQIAO	RASFP-1-1
WANG	RUO-QIAN	DAC-3-2
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WANG	SHUYU	MNS-2-1 MNS-7-1
WANG	THOMAS D.	MNS-7-1
WANG	WEI	MR-1-1 VIB-9-3
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WANG	XUNWEI	PTG-1-1
WANG	YAN	CIE-2-2 CIE-7-1 CIE-9-1
WANG	YANRONG	RASFP-2-1
WANG	YAWEN	PTG-1-1
WANG	YONG	MESA-8-2
WANG	YONGXING	MSNDC-16-2
WANG	ZEQUN	DAC-17-3
WANG	ZHIZHONG	AVT-1-1
WANG	ZHU	DAC-1-1
WANG	ZI	PTG-6-1
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WARREN	GORDON	DAC-13-1
WARREN	HAYDEN S.	MR-10-5
WARTZACK	SANDRO	CIE-2-1 CIE-14-1
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WATMAN	DANIEL	AVT-3-2
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WEBSTER	RUSTIN	CIE-4-1
WEHR	CHRISTIAN	DEC-10-1
WEI	BAOCHEN	MR-8-4
WEI	CHENG	MSNDC-16-1
WEI	DASHENG	RASFP-2-1
WEI	GUOWU	MR-8-5
WEI	JUN	AM3D
WEI	QIONG	VIB-2-3
WEI	YIHENG	MESA-8-2
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WEISSBURG	MARC	DFMLC-12-2
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WEN	WEI	PTG-4-2
WEN	YONGLU	DAC-1-1
WENDRICH	ROBERT	CIE-4-2
WENGER	PHILIPPE	MR-3-1
WESTERMANN	HANS	DFMLC-2-1
WESTRICH	JEFFREY	AM3D
WETHERTON	BLAKE	MNS-1-3
WHEELER	CHARLES M.	MR-10-6
WHITZER	MICHAEL	MR-8-2
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WILBANKS	J. JUSTIN	VIB-13-1
WILCOX	ERIC W.	MR-10-6
WILCZYNSKI	JOHN	AM3D
WILEDEN	JACK	CIE-11-3
WILLIAMS	CHRISTOPHER	AM3D DEC-3-1 DEC-9-1
WILLIAMS	DUSTIN L.	BIOMED-7-3
WILLIAMS	PAUL T.	DEC-5-1
WILLIAMS	ROBERT	MR-11-1
WILSON	CRYSTAL	CIE-2-2
WILSON	KATE	MSNDC-5-1
WIMMER	STEPHANIE	CIE-10-1
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WOJCIECHOWSKI	JAKUB	MESA-9-2 MESA-13-1
WOLFE	JAMES	DFMLC-2-1
WONG	DAVID S.H.	AM3D
WONG	DENISE	MNS-4-1
WONG	I. AMY	DAC-4-2
WONG	NATHAN	MESA-3-1
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WU	DAZHONG	CIE-6-1
WU	GUANGQIANG	AVT-1-1
WU	HAOTIAN	AVT-5-2
WU	HUYAO	AVT-3-2
WU	KAI	RASFP-1-1
WU	LIYAN	PTG-8-1
WU	LUSHEN	DFMLC-1-1
WU	MENG	MESA-8-2
WU	QILIANG	MSNDC-5-1
WU	RUIQIN	MSNDC-5-3
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WU	YUQIAN	RASFP-2-1
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XIE	SHENG QUAN	MESA-2-1 MESA-2-2
XIE	YINQIAN	AVT-5-2
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XU	YONGFENG	VIB-16-2	YODO	NITA	DAC-6-1
XU	YUFENG	MESA-8-6	YOKOZEKI	YUJI	MNS-9-1
XUE	DINGYU	MESA-8-7	YOO	DAVID	VIB-3-1
XUE	JIAN	VIB-2-4	YOONG	CARLOS	MSNDC-8-3
XUE	SONG	PTG-4-1	YOSHITANI	NAOKI	MSNDC-5-8
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Y.ELMEKKAWY	TAREK	DFMLC-5-1 DFMLC-10-1	YOUNG	ADAM P.	DEC-5-1
YABUNO	HIROSHI	MSNDC-5-5 MSNDC-5-7	YOUNG	HONG-TSU	MNS-2-1
YADAV	PRAVEEN	CIE-6-1	YOUNIS	MOHAMMAD	MNS-1-1 MNS-1-2 MNS-1-3 MNS-1-4
YAMABE	MASASHI	MR-10-7	YU	BIN	MESA-18-1
YAMAMOTO	YASUYUKI	MSNDC-5-5	YU	BO	MR-10-7 MSNDC-5-6 PTG-5-1
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YAMASAKI	MASAHIKO	PTG-4-2	YU	HAIDONG	MR-4-1
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ZHANG	YUNQING	AVT-2-2
ZHANG	ZENGHU	MESA-18-1
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EXHIBITION

This years expo includes more than 30 exhibitors from industry. To be entered into the drawing for a 3D printer, make sure you visit each booth and have your exhibitor passport stamped accordingly. Winner will be announced during the Exhibitor and Sponsor Reception on Tuesday evening.

EXHIBIT HALL HOURS

Exhibits will be displayed during the following hours in the Exhibit Hall C, Level 2:

MONDAY, AUGUST 3

10:50am – 5:00pm

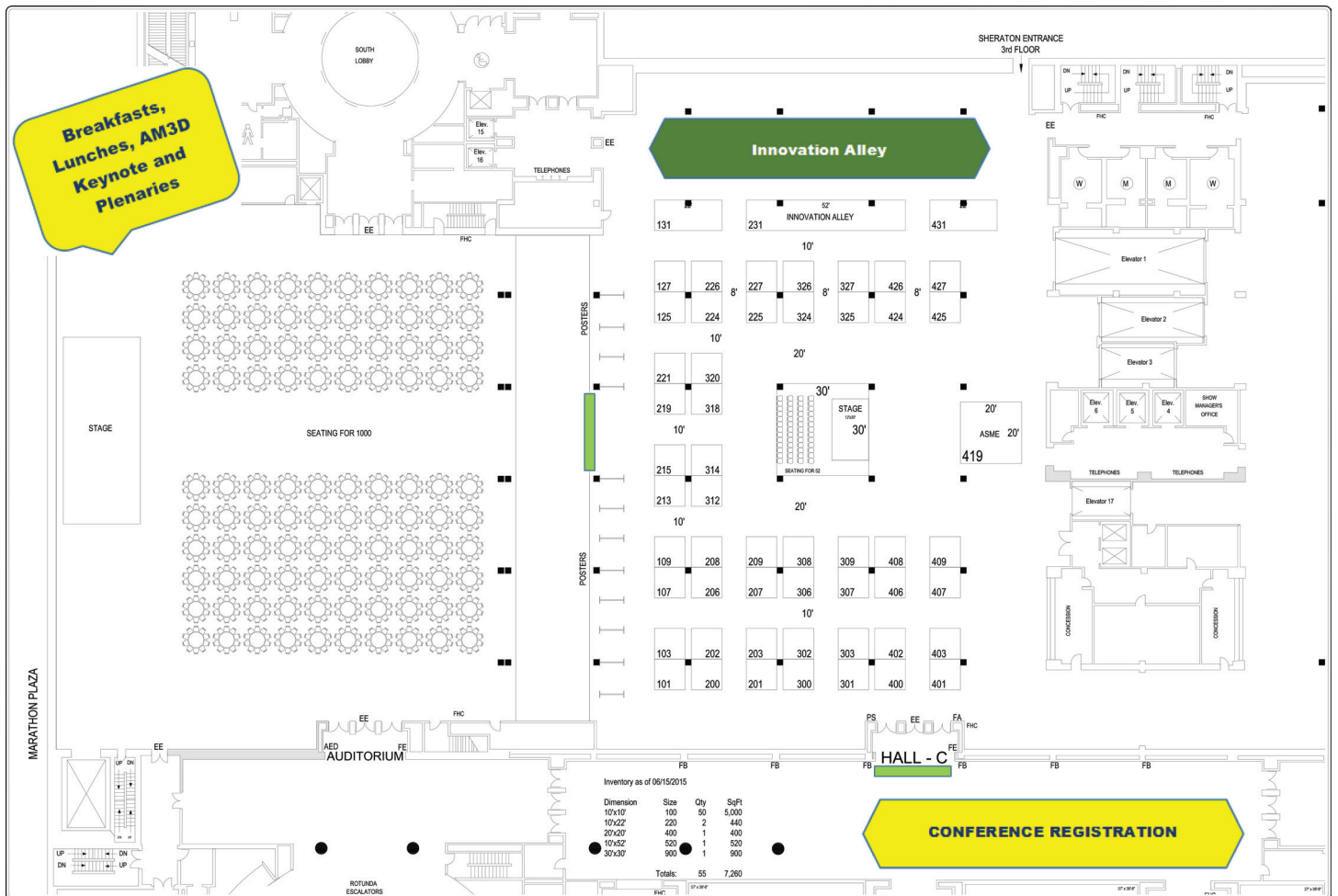
TUESDAY, AUGUST 4

11:00am – 8:00pm **including Sponsors & Exhibitors Reception*

WEDNESDAY, AUGUST 5

11:00am – 3:00pm

EXHIBITOR MAP



EXHIBITORS



Additive Manufacturing of New England is a job shop supplying metal 3D parts to customers in a variety of industries. We operate a 3D Systems ProX 300 metal printer with a build capacity of 9.8 x 9.8 x 11.8 inches. We have the capability of running various materials and can source materials not readily available at our shop.

At Additive, you don't need to choose among price, quality, and on-time delivery. When you order a part, you can expect it to be of exceptional quality, have a competitive price, and be delivered on the date that was promised. Contact us today and see how Additive Manufacturing of New England can play a role in building your business.



Offering traditional and advanced manufacturing services, including DMLS, SLA, SLS, FDM, Polyjet, CNC, Urethane Castings, Injection Molding and a variety of finishing processes. In business since 2009, we're ITAR certified provide outstanding service and competitive pricing. **(BOOTH 107)**



Arcam provides cost-efficient Additive Manufacturing solutions for production of metal components. Arcam's Electron Beam Melting (EBM®) technology offers design freedom combined with excellent material properties and high productivity. Through our solutions orientation Arcam is an innovative partner for advanced manufacturing, primarily in the aerospace and medical industries.

Arcam provides Electron Beam Melting systems through Arcam AB in Sweden, powder metals through AP&C in Canada and implant contract manufacturing through DiSanto in the U.S. The company is listed on Nasdaq Stockholm and the Head Office is located in Mölndal, Sweden. **(BOOTH 401)**



ASME helps the global engineering community develop solutions to real world challenges. Founded in 1880 as the American Society of Mechanical Engineers, ASME is a not-for-profit professional organization that enables collaboration, knowledge sharing and skill development across all engineering disciplines, while promoting the vital role of the engineer in society. ASME codes and standards, publications, conferences, continuing education and professional development programs provide a foundation for advancing technical knowledge and a safer world. **(BOOTH 419)**



CADD Edge offers a complete suite of solutions to address the evolving demands of today's engineers. We concentrate on business benefits and provide advanced technological tools that are competitively priced and effective at making organizations highly efficient and innovative. We are a certified value-added reseller of SOLIDWORKS, Stratasys 3D Printers, Anark and Omnify PLM Software. **(BOOTH 201)**



Capture 3D is a leader in innovative non-contact metrology solutions that optimize 3D scanning, inspection, and reverse engineering applications for product development, manufacturing, and production. Our advanced technology and intelligent software quickly obtains accurate full part geometry to rapidly solve engineering issues, prevent future problems, eliminate costs/iterations, while improving quality. **(BOOTH 424)**



Citim AM, Inc. is an additive manufacturing service provider located in Kennesaw, Georgia. The company produces prototypes and small batch series for aerospace, automotive, motor sports, lifestyle products and many more. Complete services are offered so our customers may benefit from full spectrum of services: design, additive manufacturing with EOS and SLM Solutions equipment, CNC machining, assembling, measurement and documentation.

In addition, our German facility (Citim GmbH) offers an extended service portfolio: additive layer manufacturing of plastic parts (PolyJet, SLS), casting technologies for plastic and metal components and tool making.

We focus on highest quality. Naturally all processes run accredited to the ISO 9001:2008 quality assurance standard. By using additive and traditional technologies – we suit our customers' needs. For more information visit our website. **(BOOTH 209)**



Concept Laser is the global leader in the design and manufacture of powderbed-based laser metal additive manufacturing systems. With its patented metal laser melting technology, the company is involved in many sectors of industry. Our global client base includes customers in the aerospace, aviation, national laboratories, automotive, medical, dental and jewelry segments.

We are focused on continuous improvement of our parameters, build strategies, and the materials themselves, as well as researching novel materials and applications. We offer a full line of materials covering aluminum and titanium alloys, stainless and hot work steels, nickel-based super alloys, and copper alloys, with many more in development. **(BOOTHS 309, 408)**



EnvisionTEC is a leading global provider of professional grade 3D printing solutions across a wide variety of markets. Since 1999, Envision-TEC equipment has been known for delivering high precision, surface quality and functionality

as well as the ability to use a wide range of materials.

(BOOTH 206)



Formlabs is reinventing 3D printing with the Form 1+, a high-resolution stereolithographic desktop 3D printer for makers, engineers, designers, and artists. The Form 1+ uses a

precisely-guided laser to cure liquid resin, offering unprecedented resolution and print-quality. Powerful, intuitive, and affordable, the Form 1+ 3D printer is setting the standard in professional desktop 3D printing. Formlabs also develops its own suite of high-performance materials, as well as our intuitive, powerful 3D-printing software, Preform. **(BOOTHS 407, 409)**



As one of the first Metal Additive Manufacturing (3D Printing) service providers in the country, GPI Prototype & Manufacturing Services Inc. has the expertise to take our clients from early

prototyping all the way to finished, small run manufacturing. Specializing in Direct Metal Laser Melting (DMLM), GPI produces prototypes and end-use parts with complex geometries not possible with traditional machining. Our engineers and consultants work with clients ranging from Fortune 500 companies in the medical, aerospace and defense industries to students in university laboratories. Dedicated to maintaining cutting edge technology, GPI helps our clients rethink and revolutionize the way their parts are designed and manufactured.

To further ensure the highest quality parts, GPI is pleased to be ISO 9001:2008, ISO 13485:2003, and AS9100:2009 Rev-C certified as well as ITAR registered. **(BOOTH 224)**



HAPTION designs, manufactures and sells haptic devices with professional quality, suited to the needs of its customers, both industrial and academic. We extended our standard product line by introducing:

Entry point product Virtuose 3D and 6D

Desktop, with the same quality than the well know product Virtuose 6D Scale 1 system extend the touch capabilities to a large room.

(BOOTH 202)



Hoeganaes Corporation, a world leader in the development of metal powders, has been the driving force behind the growth in the Powder Metallurgy industry for over 65 years. Hoeganaes

has fueled that growth with successive waves of technology, now expanding the use of metal powders to include Additive Manufacturing applications. **(BOOTHS 318 and 320)**



As one of the world's fastest growing companies, we offer opportunities for our employees to grow with us, personally and professionally. Through a variety of benefits and programs, employees can meaningfully engage with our business, products,

and community. Among other programs to support mental, physical, and financial wellbeing, Keurig employees have the opportunity to expand their business knowledge through development programs, give back to their community with paid volunteer hours, and become owners of the company through our employee stock purchase plan. We're committed to offering thoughtful and thought-provoking opportunities for employees to grow their careers with us. It is only with passionate and exceptional employees that we will deliver the next generation of disruptive innovation. At Keurig, we are what our imagination brews. **(BOOTHS 213, 215, 312 and 314)**



The MATLAB and Simulink product families are fundamental applied math and computational tools adopted by more than 5000 universities and colleges. MathWorks products help prepare students for careers in industry, where the tools

are widely used for data analysis, mathematical modeling, and algorithm development in collaborative research and new product development. **(Booth 325)**



MBD360 LLC offers leading-edge Model-Based Enterprise (MBE), 3D

Model-Based Definition (MBD), PMI, and 3D Model-Based Business Process Training and Consulting. We help our clients replace traditional engineering drawings with 3D solid model data in their Technical Data Packages (TDPs) and in their workflow, improving quality and productivity, reducing cost, and decreasing time to market. Our goal is to help our clients compete in the competitive global economy and achieve the highest quality and productivity.

Advanced Dimensional Management LLC offers leading-edge Training and Consulting in Geometric Dimensioning and Tolerancing (GD&T), PMI, Tolerance Analysis, Dimensional Management, Engineering Standards, Print Reading, Design Quality and related topics. We are experts in ASME and ISO standards. We teach ASME-based courses and ISO-based courses to companies worldwide. We help our clients understand and optimize their GD&T and apply Dimensional Management principles to their work internally and in their supply chain. Get it Right™!

Sherwood, Oregon www.mbd360.com **(BOOTH 225)**



MakerBot, a subsidiary of Stratasys, Ltd. (NASDAQ: SSYS), is a global leader in desktop 3D printing. Founded in 2009, MakerBot has built the largest installed base of desktop 3D printers sold to innovative and industry-leading customers worldwide, including engineers, architects, designers, educators and consumers. MakerBot's 3D Ecosystem drives accessibility and rapid adoption of 3D printing. **(BOOTH 308)**



Marking Systems is a premiere manufacturing specializing in both screen and digital printing of UL/CSA labels, Warning/Caution labels, Nameplates, Graphic Overlays, Membrane Switches, Bar Code labels, Insulators, Gaskets, Foams and much more for Top OEM companies. Customers include National Instruments, Abbott Labs, Toshiba, KCI, ABB, Fujitsu.

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- Printing (Digital, Screen-print)
- Cold Embossing
- Lamination
- Doming
- Precision Cutting
- Quality assurance
- Fulfillment/Stocking Programs

www.markingsystems.com **(BOOTH 207)**



Mercer Consumer and ASME have partnered for over 55 years to help members face their futures with confidence by delivering quality benefit plans tailored to today's most common financial challenges. Plans include: Life Insurance, Disability Insurance, Professional Liability Insurance and many more.



MSC Software makes products that enable engineers to validate and optimize their designs using virtual prototypes. Customers in almost every part of manufacturing use our software to complement, and in some cases even replace the physical prototype "build and test" process that has traditionally been used in product design. **(BOOTH 300)**



Ophir-Spiricon, a global leader in precision laser measurement equipment and a Newport Corporation brand, has more than 30 years of product innovation including Ophir power meters and sensors, Photon scanning slit and goniometric far-field profilers, and Spiricon camera-based laser beam profiling systems, serving manufacturing, medical, military, and scientific research industries throughout the world. **(BOOTH 324)**



Polytec is the world's leading manufacturer of high precision, laser-based vibration measurement systems. Whether your application is validating finite element models, modal analysis, imaging wave propagation, characterizing MEMS dynamics, studying energy harvesting transducers or developing medical imaging or surgical devices, or any of a huge range of other applications demanding high performance, wide dynamic range, fine spatial resolution, 3-D data or an extensive bandwidth, Polytec has the solution for you! **(BOOTH 302)**



Rapid focuses on quick-turn PROTOTYPE sheet metal & machined parts. Rapid Sheet Metal quotes parts instantly with a free Solid-Works/Creo plug-in. Rapid Machining quotes machined & turned parts within 24 hours. All parts are shipped in days, not weeks. Other services include prototype wire harnesses & cables assemblies. www.rapidmanufacturing.com **(BOOTH 109)**



RePliiForm provides post processing solutions to the 3D Printing community to enhance the value of printed parts. Our copper and nickel electroplated coatings have well characterized mechanical properties so a metal clad composite is obtained that will have predictable increases in strength and stiffness. These coatings are effective EMI shields and reflectors, environmental barriers, and increase long term durability and dimensional stability. Our experience will guide you to the optimum coated product. www.RePliiFormInc.com **(BOOTH 403)**



Since 1940, Rigid-tex® has been the trusted name and the standard for deep textured metals. Family owned and operated for 75 years, Rigidized® Metals Corporation proudly produces Rigid-tex® metals in Buffalo, NY. From serving the war effort in the 1940s to providing solutions for transportation and aerospace today, Rigid-tex® metals can be found in a wide array of applications such as food processing, packaging and material handling, truck and trailer bodies, bumpers and steps, mezzanines, and catering vehicles. **(BOOTH 306)**



Rize Incorporated has developed a new 3D printer technology with a unique patent pending process. The resulting parts produce the following characteristics:

Homogeneous strength in X,Y and Z

Surface finish equal to Injection molded

Full color capabilities

Variable durometer

Easy support removal

Automatic file fixing software

The system will be a desktop solution that professionals can use in their office environment. **(BOOTH 425)**



SLM Solutions NA provides metal-based additive manufacturing systems that offer fast and flexible part production. With multi-laser options, open parameters, and closed-loop powder handling; Selective Laser Melting® systems (SLM® 125HL, SLM® 280HL, and

SLM® 500HL) are defining an industry gold standard for best-in-class recoating build speed and operational cost savings.

Link to: <http://www.slm-solutions.us>

(BOOTH 208)



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Tekna specializes in developing, designing and building integrated plasma systems for nanoparticle synthesis. Tekna also offers turn-key solutions through its customized powders, powder treatment services and integrated plasma systems for development and/or commercialisation. Tekna's powders are available in different advanced materials and particle size distributions, off-the-shelf, or on a custom basis, in small or large quantities. **(BOOTH 203)**



TriNet delivers HR outsourcing services that allow growing companies to do what they do best. Small to medium-sized businesses in technology, financial services, non-profits, and professional services use TriNet's all-in-one solution for human resources, benefits, payroll, workers' compensation, and strategic human capital services. **(BOOTHS 307, 408)**

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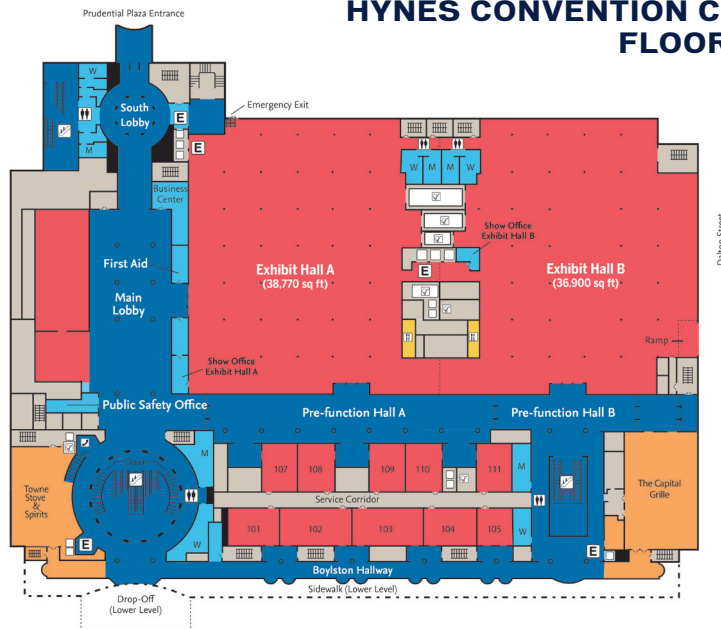
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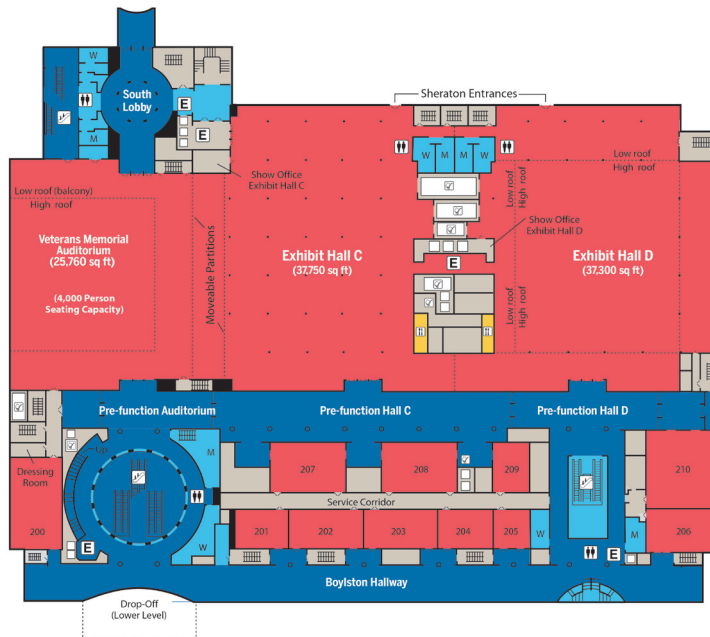
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The power to 3D print the future, today.



[COLOR + RUBBER + TRANSPARENT + RIGID]

Objet Connex3™ from Stratasys is the world's most versatile line of multi-material 3D printers. Connex3 3D Printers offer incomparably brilliant, consistent opaque and translucent colors - a wider array than any other system. And they're the only 3D printers that print flexible materials in a broad range of shore values. All with ultra-fine detail creating the most true-to-life modeling possible. Stratasys is the proven leader in multi-material 3D printing. **For the power to 3D print the future, visit Stratasys.com.**



 **Stratasys**
FOR A 3D WORLD™

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LaserCUSING® SYSTEMS FOR METAL ADDITIVE MANUFACTURING

CONCEPT LASER Advantages

Why Concept Laser systems are preferred in metal additive manufacturing:

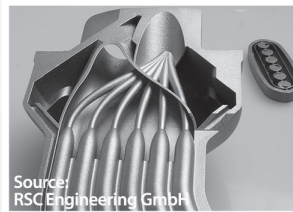
- Advanced Quality Management (QM)
 - Realtime Meltpool monitoring
 - Closed-loop recoater control
- Open parameter architecture
- Open source powder
- Patented safe material handling
- Systems for reactive and non-reactive metals



M2 CUSING SYSTEM
Build Vol. 10" x 10" x 11"
Single or Dual 200W
or 400W Laser

BUILD in:

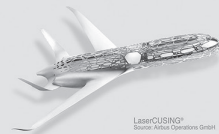
- Stainless Steels
- Aluminum Alloys
- Maraging Steel
- Titanium Alloys
- Nickel Based Alloys 718/625
- Cobalt Chrome Alloys



Source: RSC Engineering GmbH



Source: Airbus Operations GmbH



Source: Airbus Operations GmbH

DESIGN FOR Production

- Ultra light-weight parts
- Topological optimization
- Biologically inspired designs
- Part-count reduction
- Complex flow path and conformal cooling
- Engineered lattice and foam structures



X LINE 1000R & X LINE 2000R FOR PRODUCTION
Build Vol. up to 31" x 16" x 20"
Single or Dual 1kW Laser

PRODUCTION • FLEXIBILITY • PRECISION

CONCEPTLASER

Concept Laser is the global leader in the design and manufacture of powderbed-based laser metal additive manufacturing systems. With over 15 years of design production experience, Concept Laser has the right solution for your laser metal manufacturing needs.

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NOTES



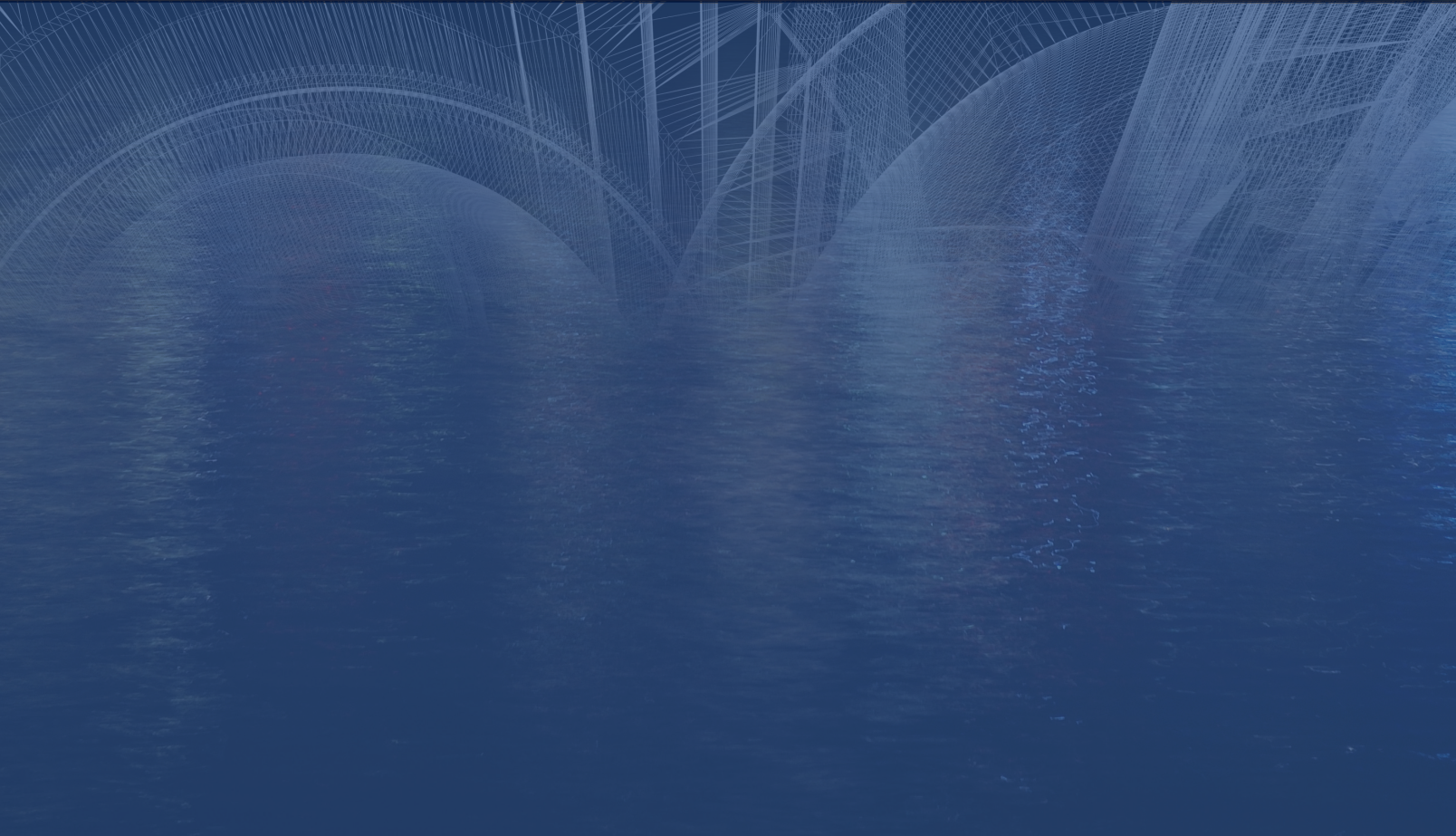
See you in 2016!

IDETC/CIE/AM3D 2016

August 21-24, 2016

CHARLOTTE, NC





**ADDITIVE MANUFACTURING
+ 3D PRINTING CONFERENCE & EXPO**

IDETC/CIE 2015

**INTERNATIONAL DESIGN ENGINEERING
TECHNICAL CONFERENCES &
COMPUTERS AND INFORMATION
IN ENGINEERING CONFERENCE**