



ASME[®] 2020 IDETC-CIE

International Design Engineering Technical
Conferences & Computers and Information in
Engineering Conference

CONFERENCE
Aug 17–19, 2020

Virtual, Online

Program

<https://event.asme.org/IDETC-CIE>



ASME[®] 2020 IDETC-CIE

IDETC/CIE 2020 Chairs' Welcome

Andreas Müller

General Conference Chair
Johannes Kepler University Linz

Jim Schmiedeler

Technical Program Chair
University of Notre Dame

On behalf of the ASME Design Engineering Division (DED) and the Computers and Information in Engineering Division (CIE), we welcome you to the 2020 ASME International Design Engineering Technical Conferences & Computers and Information Engineering Conference (IDETC/CIE). We hope you find the IDETC/CIE professionally, academically and socially rewarding.

The 2020 IDETC/CIE consists of the following 11 conferences organized by the respective Technical Committees of the DED and CIE.

- 22nd International Conference on Advanced Vehicle Technologies (AVT)
- 40th Computers and Information in Engineering Conference (CIE)
- 46th Design Automation Conference (DAC)
- 17th International Conference on Design Education (DEC)
- 25th Design for Manufacturing and the Life Cycle Conference (DFMLC)
- 32nd International Conference on Design Theory and Methodology (DTM)
- 44th Mechanisms and Robotics Conference (MR)
- 14th International Conference on Micro- and Nanosystems (MNS)
- 16th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC)
- 32nd Conference on Mechanical Vibration and Noise (VIB)
- 24th Reliability, Stress Analysis and Failure Prevention Conference (RSAFP)

The 2020 IDETC/CIE is unlike any in the history of the conference because of the COVID-19 pandemic. As a research community, we collectively send our condolences to all those who have been impacted by this disease and our wholehearted admiration and appreciation for all those who have fought and continue to fight it on the front lines. The personal isolation that has come with the pandemic for so many is a stark reminder of the importance of the communal aspects the conference and the broader IDETC/CIE research community. Perhaps this year more than ever, it is critical for us to get together, as far as we are able to within the restrictions of safety and other logistics, to talk about recent technical advances, to hear from leaders in our fields, and to celebrate the accomplishments of our award-winning colleagues. This year's conference will be unlike any in the past, and we hope unlike any in the future. Despite all the constraints imposed by the pandemic, a total of 725 submissions out of which 668 have been selected for presentation, and we expect the rich intellectual tradition and welcoming atmosphere of IDETC/CIE to still shine through. As we look forward to a time when the conference will not be thus constrained, we likewise look at this year as an opportunity to identify innovations that we might carry forward to further improve future conferences. After all, challenging constraints can often lead to the most novel designs!

The success of the conference is a consequence of the hard work of the conference chairs, program chairs and their symposium organizers who conducted the review process under the typical time constraints that were only compounded by the veil of uncertainty accompanying the pandemic. We are most grateful to all these individuals and to the many authors and reviewers who continue to make this forum for exchange of ideas possible through their research and critical evaluations. While the networking opportunities may be different this year, we hope that you will still be able to take full advantage of your time interacting with colleagues and personally thanking them for their contributions. More than anything, we hope you enjoy the 2020 IDETC/CIE and that you find the overall experience rewarding.



Virtual IDETC.CIE 2020 Schedule at a Glance

Day 1 (August 17th)

Sessions (All times in US EDT)	1	2	3	4	5	6	7	8	9	10	11
10:00am -11:20am	MR Technical	DTM Technical	DAC Technical	RSAFP Technical	VIB Technical	CIE Technical	MNS Keynote	DEC Technical	MSNDC Technical	DFMLC Technical	AVT Technical
11:20am - 11:35am	Break										
11:35am - 12:55pm	MR Technical	DTM Technical	DAC Keynote	RSAFP Technical	VIB Technical	CIE Keynote Panel	MNS Technical	DEC Technical	MSNDC Technical	DFMLC Technical	AVT Technical
12:55pm - 1:10pm	Break										
1:10pm - 2:30pm	MR Technical	DTM Technical	DAC Technical	DAC Technical	VIB Technical	CIE Technical	MNS Technical	DEC Technical	MSNDC Technical	DFMLC Technical	AVT Technical
2:30pm - 2:45pm	Break										
2:45pm - 4:05pm	MR Technical	DTM Technical	DAC Technical	DAC Technical	VIB Technical	CIE Technical	MNS Technical	DEC Technical	MSNDC Keynote	DFMLC Technical	AVT Technical
4:05pm - 4:20pm	Break										
4:20pm - 5:20pm	MR Technical	DTM Technical	DAC Technical	DAC Technical	VIB Keynote	CIE Technical	MNS Technical	DEC Technical	MSNDC Technical	DFMLC Keynote	AVT Technical

Day 2 (August 18th)

Sessions (All times in US EDT)	1	2	3	4	5	6	7	8	9	10	11
10:00am -11:20am	MR Technical	DTM Technical	DAC Technical	DAC Technical	VIB Technical	CIE Awards and Keynote	MNS Technical		MSNDC Keynote	DFMLC Technical	AVT Milliken Lecture
11:20am - 11:35am	Break										
11:35am - 12:55pm	MR Technical	DTM Technical	DAC Technical	DAC Technical	VIB Technical	CIE Manufacturing Panel	MNS Technical		MSNDC Technical	DFMLC Technical	AVT Technical
12:55pm - 1:10pm	Break										
1:10pm - 2:30pm	MR Technical		DAC Technical	DAC Technical	VIB Technical	CIE Technical	CIE Technical	MSNDC Technical	MSNDC Technical	DFMLC Technical	
2:30pm - 2:45pm	Break										
2:45pm - 4:05pm	MR Technical		DAC Technical		VIB Technical	CIE Technical	CIE Technical	MSNDC Technical	MSNDC Technical	DFMLC Committee Meeting	
4:05pm - 4:20pm	Break										
4:20pm - 5:20pm	MR Technical		DAC Technical	DAC Technical	VIB Keynote	CIE Technical	CIE Panel	MSNDC Technical	MSNDC Technical	DFMLC Technical	

Day 3 (August 19th)

Sessions (All times in US EDT)	1	2	3	4	5	6	7	8	9	10
10:00am -11:20am	Essay Competition	MR Technical	DAC Technical	DAC Technical		CIE Technical	CIE Technical		MSNDC Technical	
11:20am - 11:35am	Break									
11:35am - 12:55pm	DED/CIE Joint Session: NSF EDSE Program Overview	MR Technical	DAC Technical			CIE Technical			MSNDC Technical	
12:55pm - 1:10pm	Break									
1:10pm - 2:30pm	Workshop: Let Us Use Instinct More in Engineering	MR Technical	DAC Technical	Workshop: Modelling for periodic simulation of diurnal cycle in attic space		CIE Technical	Workshop: Navigating Conferences: Successful Collaboration and CoAuthorship	Workshop: Motion Design Using a Novel Robot Kit and a Mechanism Design app	MSNDC Technical	Workshop: Introduction to resilience modeling in fmdtools
2:30pm - 2:45pm		Break				Break			Break	
2:45pm - 4:05pm		MR Technical	DAC Technical			CIE Posters			Student Activity	
4:05pm - 4:20pm		Break				Break				
4:20pm - 5:20pm			DAC Technical			VIB Keynote			CIE Technical	



IDETC/CIE 2020 Virtual Conference Session Schedule
August 17th

Session	Time (US EDT)
MR-1-1 Mechanisms Synthesis & Analysis	10:00am - 11:20am
DTM Human Behavior in Design	
DAC 6-1: Design for Additive Manufacturing	
RSAFP in Design Methods and Analyses	
VIB Conference 1	
CIE Artificial Intelligence and Machine Learning in Design and Manufacturing	
MNS Keynote	
DEC 1-1 Implementation, Assessment and Research Methods Across the Curriculum	
MSNDC - 1.1 - Computational methods	
DFMLC 2-1: Design for Sustainable Manufacturing	
DFMLC 2-1: Design for Sustainable Manufacturing	
AVT-1/2-01: Vehicle Dynamics and Controls & Tire-Terrain Interaction	
MR-1-2 Mechanisms Synthesis & Analysis	
DTM Creativity and Ideation	
DAC 21: Keynote	
RSAFP Design with and Failure Analyses of Polymer, Composite, Additive Manufactured and Meta Materials	
VIB Conference 2	
Keynote Panel - CIE Perspectives	
MNS-2, Dynamics of MEMS and NEMS	
DEC 1-2 Implementation, Assessment and Research Methods Across the Curriculum	
MSNDC - 1.2 - Computational methods	
DFMLC 3-2: Lifecycle Impact Assessment in Product & Process Design	
AVT-7/8-01: Intelligent and Military Vehicles	
MR-4-1 Origami-Based Engineering Design	1:10pm - 2:30pm
DTM Prototyping, Design Representation, Engineering for Global Development, and Biologically Inspired Design	
DAC 11-1: Engineering for Global Development	
DAC 18-1: Simulation-Based Design Under Uncertainty	
VIB Conference 3	
CIE Design, Simulation and Optimization for Additive Manufacturing	
MNS-3, Bio MEMS/NEMS	
DEC 1-3 Implementation, Assessment and Research Methods Across the Curriculum	
MSNDC - 1.3 - Computational methods	
DFMLC 3-1: Design-Based Decision Making	
AVT-4-01: Vehicle Safety and Ergonomics	
MR-4-2 Origami-Based Engineering Design	2:45pm - 4:05pm
DTM Design of Complex Systems & Big Data	
DAC 2-1: Artificial Intelligence and Machine Learning	
DAC 8-1: Design for Resilience and Failure Recovery	
VIB Conference 4	
CIE Design, Simulation and Optimization for Additive Manufacturing	
MNS-4, Micro/Nano Robotics and Manufacturing	
DEC 1-4 Implementation, Assessment and Research Methods Across the Curriculum	
MSNDC Keynote Lecture	
DFMLC 5-1: Design for Manufacturing and Assembly	
AVT-5/6-01: Powertrain and Light Vehicles Design	

MR-1-3 Mechanism Synthesis and Analysis	4:20pm - 5:20pm
DTM Design Decision-Making	
DAC 9-1: Design of Complex Systems	
DAC 14-1: Metamodel-Based Design Optimization	
VIB Conference Keynote 1	
CIE Computer-Aided Product and Process Development	
MNS-7, MEMS/NEMS Neural and Digital Computing	
MNS-8, Flexible MEMS/NEMS	
MNS-7, MEMS/NEMS Neural and Digital Computing	
MNS-8, Flexible MEMS/NEMS	
DEC 1-5 Implementation, Assessment and Research Methods Across the Curriculum	
MSNDC - 8.1 - Optimization	
DFMLC Keynote	
AVT-6-01: Light Vehicle Design	
August 18th	
Session	Time (US EDT)
MR-6-1 Medial and Rehabilitation Robotics	10:00am - 11:20am
DTM Entrepreneurship & Teams in Design	
DAC 20-1: Computational Design for Biomedical Applications	
DAC 18-2: Simulation-Based Design Under Uncertainty	
VIB Conference 5	
CIE Awards and Keynote	
MNS-5, Functional Materials and Surface Engineering	
MSNDC Keynote Lecture	
DFMLC 6-1: Design for Additive Manufacturing	
AVT Milliken Lecture	
MR-6-2 and MR-7-1 Medical, Rehabilitation, and Other Novel Mechanisms & Robots	11:35am - 12:55pm
DTM New & Emerging Trends in Design	
DAC 14-2: Metamodel-Based Design Optimization	
DAC 7-1: Design for Market Systems	
VIB Conference 6	
CIE Smart Manufacturing Panel	
MNS-6, MEMS Sensors and Actuators	
MSNDC 2.1 - Flexible multibody systems	
DFMLC 12 Special Session: Design Tool Showcase	
AVT-6-02 & AVT-7-01: Light Vehicle and Military Vehicle Design	
MR-8-1 Novel Mechanisms, Robots, and Applications	1:10pm - 2:30pm
DAC 3-1: Data-Driven Design	
DAC 10-1: Design of Engineering Materials and Structures	
VIB Conference 7	
CIE Human Modeling-Methods and Applications in Engineering	
CIE Artificial Intelligence and Machine Learning in Design and Manufacturing	
MSNDC - 1.6 - Computational methods	
MSNDC 3.1 - Vehicles and control	
DFMLC 9-1: Design for Smart & Sustainable Communities & DFMLC 4-1: Design for Supply Chains & End-Of-Life Recovery	
MR-8-2 Novel Mechanisms, Robots, and Applications	2:45pm - 4:05pm
DAC 11-2: Engineering for Global Development	
VIB Conference 8	
CIE Complex Systems Engineering and Design	
CIE Methods, Processes and Strategies for Technology	
MSNDC 1.5 - Computational methods	
MSNDC 4.1 - Structures	
DFMLC Technical Committee Meeting	

MR-2-2 Theoretical & Computational Kinematics	4:20pm - 5:20pm
DAC 3-2/DAC 13-1: Data-Driven Design and Human-Centered Design	
DAC 5-1: Sustainable Energy Systems and Sustainable Design	
VIB Conference Keynote 2	
CIE Uncertainty Quantification in Simulation and Model Verification & Validation	
CIE COVID-19 and the Next Generation Engineering	
MSNDC 3.2 - Vehicles and control	
MSNDC - 7.1 - Smart structures	
DFMLC 1-1: Design for Innovative Products & Processes	
August 19th	
Session	Time (US EDT)
Student Design Essay Competition	10:00am - 11:20am
MR-3-1 Compliant Mechanisms	
DAC 15-1: Multi-objective Optimization and Sensitivity Analysis	
DAC 12-1/DAC 17-1: Geometric Modeling and Algorithms for Design for Manufacturing/Platform Architecture and Product Family Design	
CIE Design, Simulation and Optimization for Additive Manufacturing	
CIE Virtual Environments and Design Visualization	
MSNDC - 6.1 - Biomechanics	
DED/CIE joint session: NSF Program Overview: A Vision for Design Research	11:35am - 12:55pm
MR-3-2 Compliant Mechanisms	
DAC 2-2: Artificial Intelligence and Machine Learning	
CIE Systems Engineering and Smart Manufacturing Informatics	
MSNDC - 5.1 - Nonlinear dynamics	
Workshop 1: Let Us Use Instinct More in Engineering	1:10pm - 5:20pm
MR-5-1 Motion Planning, Dynamics, and Control	1:10pm - 2:30pm
DAC 6-2: Design for Additive Manufacturing	
Workshop 2: Modelling for periodic simulation of diurnal cycle in attic space	1:10pm - 5:20pm
CIE Cyber-Physical Systems	1:10pm - 2:30pm
Workshop 3: Navigating Conferences: Successful Collaboration and CoAuthorship	1:10pm - 5:20pm
Workshop 4: Motion Design Using a Novel Robot Kit and a Mechanism Design app	1:10pm - 5:20pm
MSNDC 4.3 - Structures	1:10pm - 2:30pm
Workshop 5: Introduction to resilience modeling in fmdtools	1:10pm - 5:20pm
MR-2-1 Theoretical & Computational Kinematics	2:45pm - 4:05pm
DAC 10-2: Design of Engineering Materials and Structures	
CIE Poster Session	
Student Activity	
DAC 16-1: Multidisciplinary Design Optimization	4:20pm - 5:20pm
VIB Conference Keynote 3	
CIE Human Modeling and Simulation in Engineering	



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22nd International Conference on Advanced Vehicle Technologies (AVT)

The Vehicle Design Committee (VDC) promotes innovative analytical, computational, and experimental investigations in the dynamics, control, and design of full vehicle systems, subsystems, and components. With the increasing demands on driving safety and autonomy, the human-vehicle interaction, advanced driver assistance systems, and connected vehicles are also included in the topics addressed by VDC. Our members perform fundamental and applied research, and implement technology for light/heavy vehicle design, modeling and validation.

The VDC is pleased to welcome you to the 22nd International Conference on Advanced Vehicle Technologies held as a part of the 2020 ASME-IDETC/CIE. This year the AVT conference will consist of 8 symposia for a total of 10 sessions in the area of: Ground Vehicles Dynamics and Controls; Modelling and Testing Tire-Terrain Interaction; Methods for Ground Vehicle Systems Design; Ground Vehicle Safety and Ergonomics; Vehicle Electrification and Powertrain Design; Light Vehicles Design; Military and Commercial Ground Vehicle Design; Intelligent Vehicles. We sincerely appreciate the time and services of these symposium organizers.

This Year The VDC is especially honored to host Dr. David Gorsich, Chief Scientist, U.S. Army Ground Vehicle Systems Center for the William Milliken Lecture, which is entitled "Statistics in Vehicle Design".

A Best Paper Award and a Student Best Paper Award (for papers authored and submitted by student as the primary author) are awarded for conference papers that best exemplify the research advances in ground vehicle engineering based on peer reviews and award committee's ranking. Each Best Paper Award consists of a \$500 cash prize per paper.

The VDC presents the 2020 AVT Best Paper Award to: Hongan Xu, David Clark, Marlin Zeis, Mike Hill, Tony Zambito for their paper entitled "Development of a Multi-Dof Tuned Dynamic Absorber for Reducing Hand Vibrations on an Off-Highway Vehicle"

The VDC presents the 2020 AVT Student Best Paper Award to: Henrique de Carvalho Pinheiro, Francesco Russo, Lorenzo Sisca, Alessandro Messana, Davide De Cupis, Alessandro Ferraris, Andrea Giancarlo Airale, Massimiliana Carello for their paper entitled "Active Aerodynamics Through Active Body Control: Modelling and Static Simulator Validation".

We truly hope that this year's AVT Conference will provide you with an exciting, enriching, and rewarding experience!



Alberto Doria

Conference Chair



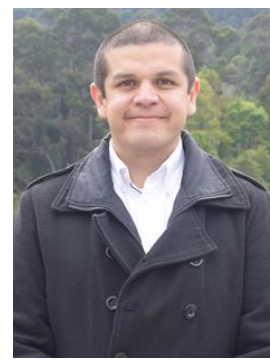
Liangyao Yu

Conference Co-Chair



Costin Untaroiu

Conference Program Chair



Luis Munoz

Conference Program Co-Chair



40th Computers & Information in Engineering Division Conference (CIE)

Greetings!

The Computers and Information in Engineering Division of ASME welcomes all IDETC/CIE Conference participants to the 40th Annual Computers and Information in Engineering Conference (CIE). The CIE conference is a premier gathering and international exchange of technical, scientific, and application knowledge related to the theory and practice of computing to support engineering activities. It provides a forum for researchers, practitioners, educators, and students from industry, academia, and government research labs to share their latest findings and challenges with the broader research community, foster collaborations, and build a sustainable research and education community.

The conference is organized around the four Technical Committees (TCs) of the CIE Division, under the TC leadership teams:

- Advanced Modeling and Simulation (AMS)
 - Krishnanand Kaipa, Chair
 - Seung-Kum Choi, Vice Chair
- Computer Aided Product and Process Design (CAPPD)
 - Chiradeep Sen, Chair
 - Tsz Ho Kwok, Vice Chair
- Systems Engineering and Information Knowledge Management (SEIKM)
 - Bryan O'Halloran, Chair
 - Yan Lu, Vice Chair
- Virtual Environments and Systems (VES)
 - Andrea Vitali, Chair
 - Marina Carulli, Vice Chair

This year, we are pleased to report that there are 79 accepted papers and technical presentations submitted through 18 technical sessions covering the following topics:

- Advanced Modeling and Simulation (AMS)
- Computer-Aided Product and Process Development (CAPPD)
- Virtual Environments and System (VES)
- Systems Engineering, Information and Knowledge Management (SEIKM)
- AMS: Simulation in Advanced Manufacturing
- AMS/SEIKM/CAPPD: Design, Simulation and Optimization for Additive Manufacturing
- AMS: Inverse Problems in Science and Engineering
- AMS: Human Modeling and Simulation in Engineering
- AMS: Uncertainty Quantification in Simulation and Model Verification & Validation
- AMS: Cyber-Physical Systems
- AMS: Material Characterization Methods and Applications
- CAPPD: Motivation and Emotion
- CAPPD: Human Modeling-Methods and Applications in Engineering



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- SEIKM: Artificial Intelligence and Machine Learning in Design and Manufacturing
- SEIKM: Knowledge Capture, Reuse, and Management
- SEIKM: Smart Manufacturing Informatics
- SEIKM: Complex Systems Engineering and Design
- SEIKM: Systems Engineering
- VES: Methods, Processes and Strategies for Technology
- VES: Methods, Processes and Strategies for User Interface

In addition to the technical presentations, we have panels of leading experts from industry, government and academia to discuss frontier issues in CIE, and perspectives on how CIE has evolved in the past 40 years. We would also like to invite you to attend the virtual graduate student poster session, where our young colleagues will give presentations about their latest passions. We also have a special symposium “Video Presentation Exhibit: Visualization and Virtual Demonstration of Prototypes and Simulations”, where you can see the demonstrations of the latest modeling, simulation, and visualization software tools that researchers recently developed.

At this conference, we will present the conference best paper awards and the CIE Division awards: Research Excellence award, Leadership award, Young Engineer award, Distinguished Service award, and Best Dissertation awards. This year’s *Research Excellence Award* will be presented to Professor Joshua Summers from Clemson University; *Leadership Award* will be presented to Mr. Krishna Bodanapu from CYIENT; *Young Engineer Award* to Dr. John Steuben of US Naval Research Laboratory; *Distinguished Service Award* to Dr. Yan Wang from Georgia Institute of Technology, and *Best Dissertation Awards* to Dr. Siva Chaitanya Chaduvula and Dr. Yongzhe Li.

This year’s CIE Best Conference Paper will be presented to Anh Tran, Mike Eldred, Scott McCann, and Yan Wang for their paper titled “srMO-BO-3GP: A sequential regularized multi-objective constrained Bayesian optimization for design applications”.

The best paper awards from the technical committees will be presented to the following authors:

1. AMS best paper award to Yaqi Zhang, Vadim Shapiro, and Paul Witherell for their paper “Scalable Thermal Simulation of Powder Bed Fusion”.
2. CAPPD best paper award to Vishnu Aishwaryan Subra Mani, Nathaniel Goldfarb, and Gregory S. Fischer for their paper “Design Development and Characterization of a Wrap Spring Clutch/Brake Mechanism as a Knee Joint for an Assistive Exoskeleton”.
3. SEIKM best paper award to Abheek Chatterjee, Richard Malak, and Astrid Layton for their paper “Exploring System of Systems Resilience vs. Affordability Trade-Space using a Bio-Inspired Metric”.
4. VES best paper award to Alex Altieri, Silvia Ceccacci, Abudukaiyoumu Talipu, and Maura Mengoni for their paper titled “A Low-Cost Motion Analysis System Based on RGB Cameras to Support Ergonomic Risk Assessment in Real Workspaces”.



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Please join us to honor our distinguished colleagues and celebrate their achievements.

We would like to use this opportunity to thank our symposium organizers, including Marc Halpern, Korhan Sevenler, Pingfeng Wang, Yan Wang, Byeng D. Youn, Chao Hu, Zhimin Xi, Imre Horvath, Po Ting Lin, Douglas Van Bossuyt, Tsz-Ho Kwok, Sudarsan Rachuri, Shuichi Fukuda, Krishnanand N. Kaipa, Ravi Burla, Brian Dennis, Athanasios Iliopoulos, John Michopoulos, Valeria Krzhizhanovskaya, Anh Tran, Gaurav Ameta, Bjorn Johansson, Krishnan Suresh, Paul Witherell, Seung Ki Moon, Namhun Kim, Alok Sutradhar, James Yang, Yujiang Xiang, Xianlian Alex Zhou, Chiradeep San, Yayue Pan, Chi Zhou, Caterina Rizzi, Monica Bordegoni, Keiichi Watanuki, Giorgio Colombo, Zhenghui Sha, Bryan O'Halloran, Ashis Banerjee, David Jensen, Yan Lu, Ying Liu, Douglas Allaire, David Jensen, Ian Grosse, Farhad Ameri, Chris Hoyle, Serm Kulvatunyou, Marina Carulli, Andrea Vitali, Atif Mahboob, Yunbo Zhang, Christian Lopez Bencosme for their efforts and hard work in paper review coordination and recommendation. We would like to thank all reviewers for their time to provide valuable feedback and help maintain high standards and improve the quality of the conference. Last but not the least, we thank all authors for submitting and sharing their latest work to shape the research directions in this community.

Again, we thank you for your participation in the various activities of our community.



Jitesh Panchal

Conference Chair



Mahesh Mani

Conference Program Chair



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46th Design Automation Conference (DAC)

Dear Colleagues,

On behalf of the DAC Executive Committee, welcome to the 46th ASME Design Automation Conference (DAC)!

The COVID-19 pandemic has had a profound impact on our conference and on each of us in the DAC community this year. While we continue to navigate through these difficult times, we are particularly proud that our community has proved itself to be resilient, and despite the challenges, the dedicated efforts by each of us in the community have ensured that this year's conference will be another successful and impactful one. Here I would like to provide you with few highlights of the conference.

The DAC technical program spanning the breadth and depth of design automation research, and after a rigorous peer review process, 118 papers in 21 active research areas were accepted (an approximate acceptance rate of 80%). These papers will be presented in 30 technical sessions from Monday August 17 to Wednesday August 19.

Complementing our technical sessions, we will host the keynote session, titled "*Toward predictive digital twins: From physics-based modeling to scientific machine learning*," featuring our invited Keynote Speaker, Dr. Karen Wilcox from The University of Texas at Austin. Complementing the keynote speech by Dr. Wilcox, we will have lightning talks offered by several of our rising stars in the Design Automation community. The keynote will be followed by a panel Q&A where the audience can interact with the speakers for in-depth discussion on the emergent topic of predictive digital twins. We will also be presenting the DAC Award winners and announcing the DAC Best Paper Award at the beginning of the keynote.

Also, please join us for our DAC committee meeting on Tuesday. We look forward to having our community come together, meet old friends, and make new ones.

From the accepted papers, ten were identified as "Papers of Distinction." These papers are listed below (ordered by paper number and including the assigned session):

- IDETC2020-22113: "Efficient Parametric Optimization for Expensive Single Objective Problems," by Jonathan M. Weaver-Rosen and Richard Malak
- IDETC2020-22116: "An Approach to Bayesian Optimization for Design Feasibility Check on Discontinuous Black-Box Functions," by Arpan Biswas and Chris Hoyle
- IDETC2020-22135: "A Sequential Calibration and Validation Framework for Model Parameter Updating and Bias Correction," by Chen Jiang, Yixuan Liu, Zhen Hu, Zissimos P. Mourelatos, David Gorsich and Paramsothy Jayakumar
- IDETC2020-22153: "Stochastic Stackelberg Games for Agent-Driven Robust Design," by Sean Rismiller, Jon Cagan and Chris McComb
- IDETC2020-22201: "Mission Mobility Reliability Analysis of Off-Road Ground Vehicles," by Yixuan Liu, Chen Jiang, Zhen Hu, Zissimos P. Mourelatos, Yan Fu, David Gorsich, Paramsothy Jayakumar and Monica Majcher
- IDETC2020-22235: "Computational Design of Compositionally Graded Alloys for Property Monotonicity," by Tanner Kirk, Richard Malak and Raymundo Arroyave
- IDETC2020-22318: "A Model Predictive Control-Based Energy Management Strategy Considering Electric Vehicle Battery Thermal and Cabin Climate Control," by Yuanzhi Liu and Jie Zhang



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- DETC2020-22595: “Data-Driven Multiscale Topology Optimization Using Multi-Response Latent Variable Gaussian Process,” by Liwei Wang, Siyu Tao, Ping Zhu and Wei Chen
- IDETC2020-22681: “Metaset: An Automated Data Selection Method for Scalable Data-Driven Design of Metamaterials” by Yu-Chin Chan, Faez Ahmed, Liwei Wang, and Wei Chen
- IDETC2020-22695: “A Novel Two-Stage Design Framework for 2d Spatial Packing of Interconnected Components,” Satya R. T. Peddada, Kai A. James and James T. Allison.

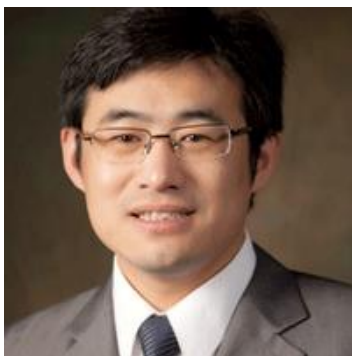
Authors from our community will present these and many other excellent papers throughout the conference. We encourage you to support your colleagues by attending the presentations and joining in the discourse!

Last but surely not least, organizing the conference requires the assistance of a number of individuals. We are particularly grateful to all session organizers and paper review coordinators:

Faez Ahmed, Janet K. Allen, James Allison, Jesse Austin-Breneman, A. Emrah Bayrak, Morad Behandish, Amy Bilton, Mark Bryden, Alex Burnap, Matt Campbell, Skikui Chen, Wei Chen, Seung-Kyum Choi, Souma Chowdhury, Charlotte deVries, Guang Dong, Xiaoping Du, Bryony DuPont, Georges Fadel, Scott Ferguson, Wentao Fu, Yan Fu, Mark Fuge, Diego Garzon-Alvarado, BP Gautham, Dipanjan Ghosh, Paul Grogan, James Guest, John Hall, Joshua Hamel, Daniel Herber, Babak Heydari, Steven Hoffenson, Chris Hoyle, Chao Hu, Zhen Hu, Horea Ilies, David Jensen, Nathan Johnson, Ritesh Khire, Ikjin Lee, Kemper Lewis, Mian Li, Po Ting Lin, Xingchen Liu, Matt Lynch, Nordica MacCarthy, Erin MacDonald, Christopher Mattson, Ali Mehmani, Nicholas Meisel Bryan Mesmer, Zhenjun Ming, Farrokh Mistree, Seung Ki Moon, Beshoy Morkos, Zissimos, Mourelatos, Saigopal Nelaturi, Julian Norato, Andrew Olewnik, Philip Odonkor, Jitesh Panchal, Matt Parkinson, David Pierce, Max Yi Ren, Rahul Renu, Carolyn Seepersad, Daniel Selva, Kristina Shea, Tim Simpson, Eun Suk Suh, Cassandra Telenko, Andres Tovar, Conrad Tucker, Cameron Turner, Christopher Vermillion, Krishna Vijayaragharan, Liping Wang, Pingfeng Wang, Yan Wang, Zequn Wang, Katie Whitefoot, Christopher Williams, Natasha Wright, Zhimin Xi, Hongyi Xu, Nita Yodo, Fiona Zhao, Jie Zhang, and Yuqin Zhou

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

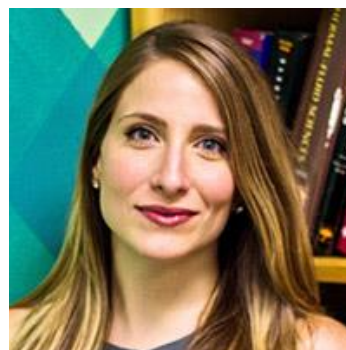
Thank you,



Conference Chair

Pingfeng Wang

University of Illinois At Urbana-Champaign



Program Chair

Bryony DuPont

Oregon State University



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17th International Conference on Design Education (DEC)

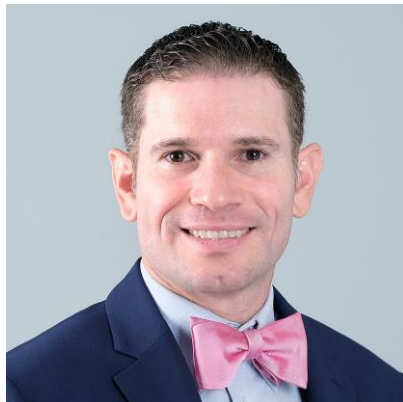
On behalf of the Design Education Committee, we welcome you to the 17th annual International Conference on Design Education. The focus of this conference is on design education among educators, practitioners, and researchers.

This year's DEC Program consists of four technical symposia – (DEC-1) *Implementation, Assessment and Research Methods Across the Curriculum*, (DEC-3) *Diversity and Inclusion in Design Education*, (DEC-4) *Short Papers: Work in progress*, and (DEC-5) *Other Topics*. The short-paper sessions will include two “work in-progress” presentations and provide ample opportunity for discussion with the presenters to give feedback on emerging design education research. Refer to the conference Technical Program for the times and locations of the technical sessions.

The Best Paper for the 2020 DEC Conference is DETC2020-19435 “*Best Fits and Dark Horses: Can Design Teams Tell the Difference?*” by Daniel Henderson, Thomas Booth, Kathryn Jablokow, and Neeraj Sonalkar.

We extend special appreciation to our technical session Review Coordinators: Andrew Olewnik, Beshoy Morkos, and Elizabeth Starkey. We also give our sincerest thanks to all the reviewers of technical papers; they have ensured the quality of this year's conference.

The DEC technical committee meeting will be posted in the Technical Program, at the meeting we present many of the DEC Awards and plan for next year's conference. Everyone is welcome to attend. Our meeting is streamlined to respect members' participation in other committees.



José E. Lugo

Conference Chair



Mohammad Fazelpour

Conference Program Chair



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25th 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 25th 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 33 technical papers and 6 technical presentations in 9 sessions, as follows:

- Design for Sustainable Manufacturing
- Design for Innovative Products & Processes
- Lifecycle Impact Assessment in Product & Process Design
- Design-Based Decision Making
- Design for Manufacturing and Assembly
- Design for Smart & Sustainable Communities
- Design for Additive Manufacturing
- Design for Supply Chains & End-of-Life Recovery
- Special Session: Design Tool Showcase

Additionally, we are pleased to feature a special panel session and a keynote lecture. The panel session, titled "1st Kos-Ishii Awardees Panel Session – Past, Current and Future Perspectives on DFMLC" will feature past DFMLC Kos-Ishii awardees examining the role of DFMLC in the current research and industry climate. For this year's keynote, Dr. Cihan Dagli, a Professor of Systems Engineering and Engineering Management and a Professor of Computer and Electrical Engineering at Missouri S&T, will offer his perspectives on "Meta-Architectures for Cyber Manufacturing Systems."

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 the DFMLC Special Session Chair, Junfeng Ma, and the paper review coordinators/co-coordinators for managing the papers through the review process:



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Michael Saidani, Hao Zhang, Steven Hoffensen, Astrid Layton, Macro Mandolini, Abigail Clarke-Sather, Soonjo Kwon, Amin Mirkouei, Sara Behdad, Yunbo Zhang, and Qing Wang. Your participation and hard work have made DFMLC a successful conference!

This year, we have a special session on “Design Tool Showcase” taking place. This session will feature new design tools developed by the members of the ASME Design community in both digital and physical forms. The showcase will be an open symposium with a select group of interactive displays.

The Kos Ishii-Toshiba and best paper awards will be presented during the DFMLC technical committee meeting. We invite the IDETC community to attend the awards ceremony to congratulate the award recipients and to participate in the technical committee meeting.

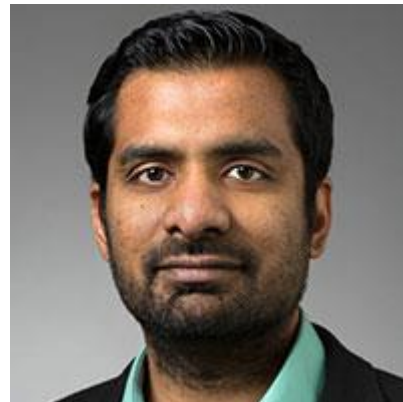
On behalf of the entire DFMLC community, we welcome you to the 25th Design for Manufacturing and the Life Cycle Conference.



Conference Chair

William Z. Bernstein

National Inst of Standards & Technology



Program Chair

Deverajan Ramanujan

Aarhus University



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32nd International Conference on Design Theory and Methodology (DTM)

On behalf of the ASME Design Theory and Methodology Committee, we would like to welcome you to the 32nd International Conference on Design Theory and Methodology (DTM). Our conference focuses on fundamental design theory and methodologies, and to apply them in an engineering context, with contributions provided by both researchers and practitioners. This 2020 DTM conference includes 46 technical papers and 11 technical presentations presented across the eleven topic areas below:

- Biologically Inspired Design
- Computation and Big Data in Design
- Creativity and Ideation
- Design and Engineering for Global Development
- Design Decision-Making
- Entrepreneurship and Teams in Design
- Human Behavior in Design
- Prototyping and Design Representation
- Trends and Technologies Impacting the Design Process
- User Centered Design
- New and Emerging Trends in Design Theory

We would like to thank the authors for submitting their research to the conference. There were 51 full length technical papers submitted to the DTM Conference for peer review, of which 46 were selected for publication in the conference proceedings. The paper review process is essential to the success of the conference, and this year we are indebted to an excellent group of reviewers for committing their time and considerable expertise. As always, this peer review process was successfully managed by several DTM Review Coordinators: Faez Ahmed, Jesse Austin-Breneman, Katherine Fu, Paul Grogan, Kosa Lambert-Goucher, Astrid Layton, Jonathan Maier, Nicholas Meisel, Jessica Menold, Chris McComb, Zhenguo Nie, Alison Olechowski, Daniel Selva, Jinjuan She, Li Shu, Carl Sorenson, Christine Toh, Douglas Van Bossuyt, Vimal Viswanathan, and Kristin Wood. We sincerely appreciate the time and effort these individuals contributed to maintaining the high quality of this DTM conference.

This year, seven papers were nominated for the DTM Best Paper Award:

DETC2020-17966 *"DECONSTRUCTION OF IDEA GENERATION METHODS INTO A FRAMEWORK OF CREATIVITY MECHANISMS"* by **Senni Kirjavainen and Katja Hölttä-Otto.**

DETC2020-18140 *"METHOD SELECTION IN HUMAN-CENTERED DESIGN TEAMS: AN EXAMINATION OF DECISION-MAKING STRATEGIES"* by **Vivek Rao, Euiyoung Kim, Jieun Kwon, Alice Agogino, Kosa Goucher-Lambert.**

DETC2020-18455 *"THE STAKEHOLDER DISAGREEMENT METRIC (SDM): QUANTIFYING PREFERENCE DISAGREEMENT BETWEEN PRODUCT STAKEHOLDERS"* by **Suzanne Chou, Mojtaba Arezoomand, Marianna Couliantianos, Kowit Nambunmee, Richard Neitzel, Achyuta Adhvaryu, and Jesse Austin-Breneman.**



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DETC2020-19426 "HOW ENGINEERING DESIGN STUDENTS' PSYCHOLOGICAL SAFETY IMPACTS TEAM CONCEPT GENERATION AND SCREENING PRACTICES" by **Courtney Cole, Jacqueline Marhefka, Kathryn Jablokow, Susan Mohammed, Sarah Ritter, and Scarlett Miller.**

DETC2020-19508 "INTRODUCING LIKELIHOOD OF OCCURRENCE AND EXPECTED COST TO HUMAN ERROR AND FUNCTIONAL FAILURE REASONING FRAMEWORK" by **Lukman Irshad, Daniel Hulse, H. Onan Demirel, Irem Y. Tumer, and David C. Jensen**

DETC2020-22004 "TOWARD A THEORY OF SYSTEMS ENGINEERING" by **George A. Hazelrigg and Donald G. Saari.**

DETC2020-22104 "THE VALUE OF PROTOTYPING: AN INVESTIGATION OF THE RELATIONSHIP BETWEEN THE COSTS OF PROTOTYPING, PERCEIVED VALUE, AND DESIGN OUTCOME" by **Jacob Nelson and Jessica Menold.**

Each one of these papers is of the highest quality, but the committee selected DETC2020-18140 "METHOD SELECTION IN HUMAN-CENTERED DESIGN TEAMS: AN EXAMINATION OF DECISION-MAKING STRATEGIES" by Vivek Rao, Euiyoung Kim, Jieun Kwon, Alice Agogino, Kosa Goucher-Lambert as the DTM Best Paper. The Best Paper will be presented on Monday of the conference.

there will be short "lightning talks", with talks representing the 11 topics above or on visions for future research in design theory and methodology. While full length papers will appear in the proceedings, these technical presentations will not appear, so the only opportunity to learn about them will be during this session. This year, the ASME Design Theory and Methodology Award will be presented to Dr. Dan McAdams. In addition, we will also be presenting our inaugural ASME Design Theory and Methodology Young Investigator Award at the Committee Meeting which will be presented to Kate Fu.

We welcome you to the 32nd International Conference on Design Theory and Methodology!

Thank you,



Conference Chair
Dr. Scarlett Miller
Pennsylvania State University



Program Chair
Dr. Tahira Reid
Purdue University



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44th Mechanisms and Robotics Conference (MR)

The Mechanisms and Robotics Technical Committee of the ASME Design Engineering Division welcomes you to the 44th 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 assembled an exciting conference program and slate of activities for the attendees, with more than 100 peer-reviewed technical papers organized into 8 technical symposia, a keynote speech, and the Student Mechanisms and Robot 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, and various applications. Our Keynote Address will be given by Dr. Nabil Simaan, Professor of Mechanical Engineering Computer Science and Otolaryngology, and the director of the Advanced Robotics and Mechanism Applications Lab at Vanderbilt University.

Submitted papers were eligible for several awards, including the Mechanisms and Robotics Best Paper award, Freudenstein Young Investigator award, the A.T Yang Memorial award, and Compliant Mechanisms award. The authors of the best papers of the Mechanisms and Robotics Conference are invited to submit enhanced archival versions of their papers to an IDETC Special Issue of the ASME Journal of Mechanisms and Robotics. We would like to thank Soh Gim Song, Chair of the Awards Committee, for coordinating the selection of the awards. Please attend our Tuesday award session preceding the MR Keynote lecture for the presentation of these awards and the announcement of the winners of the Student Mechanism and Robot Design Competition.

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 Mechanism Synthesis & Analysis: Dongming Gan, Latifah Nurahmi
- MR-2 Theoretical & Computational Kinematics: Jose Rico, Hongliang Shi
- MR-3 Compliant Mechanisms: Guimin Chen, Shikui Chen
- MR-4 Origami-Based Engineering Design: Mary Frecker, Zhong You
- MR-5 Motion Planning, Dynamics & Control: Joo H. Kim, Damien Chablat
- MR-6 Medical & Rehabilitation Robots: Nina Robson, Abbas Fattah
- MR-7 Mobile Robotics: Mahdi Haghshenas-Jaryani, Dave Myszka
- MR-8 Novel Mechanisms, Robots & Applications: Reza Fotouhi, Ketao Zhang
- MR-10 Student Mechanisms and Robot Design Competition: Mark Plecnic, Yu She
- MR-11 Mechanisms and Robotics Keynote



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We extend special thanks to all authors, reviewers, presenters, symposium organizers, session-chairs, and other volunteers who have contributed to the overall success of the conference. We trust that you will enjoy the conference and look forward to your continued support of future Mechanisms and Robotics Conferences.



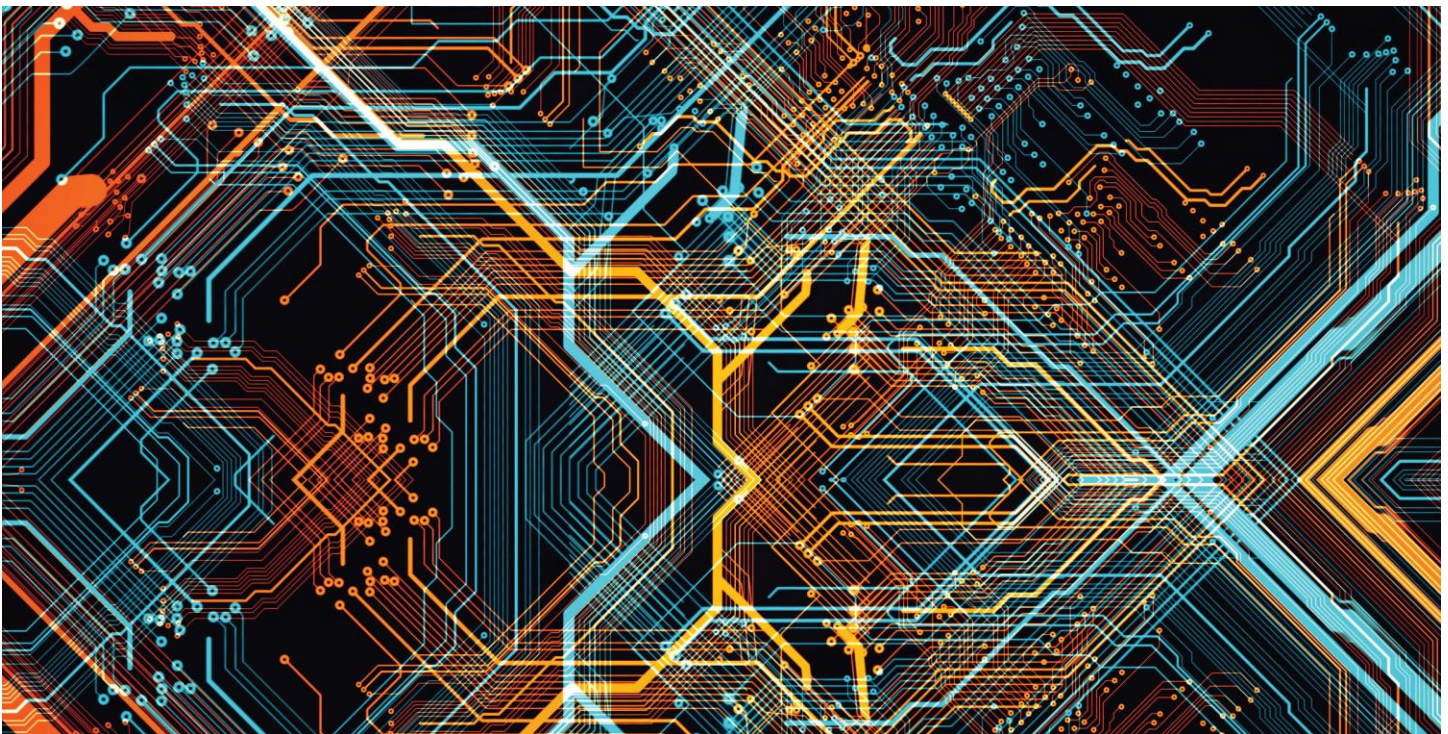
Conference Chair
Phil Voglewede
Marquette University



Program Co-Chair
Pinhas Ben-Tzvi
Virginia Tech



Program Co-Chair
Leila Notash
Queens University





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14th International Conference on Micro- and Nanosystems (MNS)

On behalf of the Organizing Committee of Micro- and Nanosystems (MNS) Conference, it is our great honor to invite you to join in the ASME 14th International Conference on Micro- and Nanosystems (MNS), one of the eleven conferences of IDETC/CIE 2020, on 17-19 August 2020.

This conference, sponsored by the Technical Committee of Micro- and Nanosystems (MNS), an integral part of the ASME Design Engineering Division, will provide researchers in industry, academia, and government a forum to exchange scientific and technical information related to recent developments and emerging issues in the design, mechanics, dynamics, control, and manufacturing of micro- and nanoscale systems. The 14th MNS Conference will start on 16th August with Keynote lecture, Best paper awards, and Committee meeting. Scheduled symposia in 2020 include:

MNS-1 Keynote Lecture: *Prof. Steve Shen* (University of Washington)

Topic: PZT nano-composite thin-film sensors

MNS-2 Dynamics of MEMS and NEMS

MNS-3 Bio MEMS/NEMS

MNS-4 Micro/Nano Robotics and Manufacturing

MNS-5 Functional Materials and Surface Engineering

MNS-6 MEMS Sensors and Actuators

MNS-7 MEMS/NEMS Neural and Digital Computing

MNS-8 Flexible MEMS/NEMS

This conference would not have been made possible without the dedicated efforts of the symposia organizers. Thus, big appreciations go to Najib Kacem, Shahrzad Towfighian, Brian Jensen, Chu-Yu Huang, Dumitru Caruntu, Gloria Wiens, Irene Fassi, Longqiu Li, Yong Shi, Yu Liu, Muhammad Khan, Oliver Barham, Fadi Alsaleem, Siavash Pourkamali for organizing the symposia.



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The Technical Committee of MNS and the Organizing Committee of the 14th MNS Conference hope to make the conference an exciting and memorable scientific event.



Conference Chair

Gou-Jen Wang

National Chung Hsing University, Taiwan



Program Chair

Hanna Cho

The Ohio State University



Program Co-Chair

Mohammad Shavezipur

Southern Illinois University





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16th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC)

On behalf of the ASME Technical Committee on Multibody Systems and Nonlinear Dynamics, we extend a wholehearted welcome to the attendees of the 16th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC). Consisting of 12 symposia, the conference features more than 90 presentations covering traditional and emerging topics in the broad areas of multibody systems and nonlinear dynamics. This event presents a unique opportunity for researchers, practitioners, educators, and students to report on their accomplishments, exchange ideas, and become familiar with emerging trends in the field. The conference is organizing competitions for two awards – Best Paper, and Best Student Paper. Finally, a special issue of the ASME Journal of Computational and Nonlinear Dynamics will be dedicated to our event.

This year, we are honored to recognize Professor Friedrich Pfeiffer as the recipient of the D'Alembert Award for seminal contributions in frictional contact phenomena in multibody dynamics. Dr. Pfeiffer's D'Alembert keynote address is on Tuesday afternoon. Established in 2005, D'Alembert Award recognizes lifelong contributions to the field of multibody system dynamics. Previous recipients include Thomas R. Kane, Werner Schiehlen, Edward Haug, Javier García de Jalón, Ahmed Shabana, Olivier Bauchau, and Jens Wittenburg.

The annual keynote lectures are a highlight of our event. This year, we are honored to host lectures by Prof. Haiyan Hu (China), Prof. Steven Shaw (US), and Dr. Roland Pastorino (France). Prof. Hu served as the President of Nanjing University of Aeronautics and Astronautics from 2001 to 2007, and President of Beijing Institute of Technology from 2007 to 2017. He has also played an important leadership role in promoting the Chinese academia as President of Chinese Society of Theoretical and Applied Mechanics, and President of Chinese Society for Vibration Engineering over the past decade. He has been the Presidium Member of the Chinese Academy of Sciences, Member of General Assembly of International Union of Theoretical and Applied Mechanics, as well as editorial members for 6 international journals, such as Journal of Sound and Vibration, and International Journal of Nonlinear Mechanics. Our second keynote speaker, Dr. Shaw received his PhD from Cornell University in 1983 and was elected as an ASME Fellow in 1995. He is a leading expert in the topics of fundamental nonlinear vibrations and MEMS devices. Through seminal academic research papers, his close work with industry partners, and his extensive editorial service, Dr. Shaw has made a significant and lasting impact in our field. Among multiple awards, his contributions to vibrations research were recognized in 2013 with the N. O. Myklestad Award from the ASME Design Division. Our industry keynote talk is given by Dr. Pastorino and deals with model-based testing as an enabling technology in model-based product development. Dr. Pastorino currently heads the Model-Based System Testing (MBST) Team at Siemens Digital Industries Software in Leuven, Belgium. He received his PhD in the field of real-time multibody dynamics and state estimation from University of A Coruña (Spain) in 2012. As product and research manager at Siemens, he is in charge of the creation of innovative products combining testing and simulation solutions to support the development of mechatronics systems. He received the "Siemens Digital Industries Software 2017 Technology Award" and is responsible for successfully introducing the first MBST products into the automotive, aerospace, and mechanical industries market.



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Last but not least, we would like to acknowledge the all-important effort and contribution made by the symposium organizers as well as manuscript reviewers – thank you very much indeed, your help has been essential. We would also like to thank all contributors for choosing this conference as the venue for sharing the outcomes of their intellectual pursuits.

Looking forward to another successful MSNDC Conference.



Conference Co-Chair
Dan Negrut
University of Wisconsin-Madison



Conference Co-Chair
Pierangelo Masarati
Politecnico Di Milano



Program Chair
Sachin Goyal
University of California



Program Co-Chair
Francisco J. González
University of A Coruña (Spain)



Program Co-Chair
Richard Wiebe
University of Washington



24th Reliability, Stress Analysis and Failure Prevention Conference (RSAFP)

The RSAFP Committee of the Design Engineering Division participate in 2020 International Mechanical Engineering Congress and Exposition with a focus on “RSAFP in Design Methods and Analyses,” and “Design with and Failure Analyses of Polymer, Composite, Additive Manufactured and Meta Materials”. Very interesting works are presented within these themes; for example, the work on “Development of a Modal Selection Method for Full Strain Field Estimation” describes a “Data Expansion Method” for more reliable full field health monitoring estimation of large complex structures such as turbomachinery. For this purpose, the modal characteristics of the system are derived with the strain data at several discrete location and the contribution of each mode is quantified. T

he most significant modes are used in the expansion process subsequently by sorting the modes based on their contribution. The paper on “Uncertainty Quantification with Maximum Entropy Method for Fatigue Life Estimation” discusses the influence of critical part tolerances and load conditions on fatigue life in FEA and a non-linear analytical model with a probability density function involving 80 function evaluations, which is one order of magnitude lower than necessary for a comparable accuracy achieved by Monte Carlo simulation. “Sampling-Based Reliability Analysis Using Deep Feedforward Neural Network” proposes methods that can improve the accuracy of reliability analysis when the number of samples is not enough and the sampling-based methods are considered. Various polynomial functions and random variables are used to create training data sets consisting of various realizations and corresponding true percentile values.

A strategy that reuses samples of the previous design point to enhance the efficiency of the percentile value estimation is employed. The work “Non-Linear Finite Element Analysis of an Open Spline Connection” describes the finite element modelling, assembly and analysis of an open spline connection used on one of EMBRAER’s aircraft flap actuating system. The FEA analysis results are compared to an analytical procedure present on machine element literature. The paper on “A Computational Framework Enabling Comparative Analysis of Progressive Damage Models for Composite Materials” discusses efficient and quantified assessment of how various strain- or stress-based composite materials failure criteria and damage evolution models that capture the load-induced material degradation, along with their intrinsic parameters, can affect our understanding of material behavior and facilitate suitability decisions of such criteria. The work, “3d-Printed Polymeric Metamaterial Recovery Behavior After Large Deformation” demonstrate that body-centered-cubic (BCC) metamaterials made by 3D-printer stereolithography display good recovery properties after undergoing cyclic large compressive deformation. Papers on Excimer Laser Treatment of: “Steel Fibers for Improved Adhesion to Silicone Rubber” and “Nylon Fibers for Improved Adhesion to Vulcanized Natural Rubber” discuss fiber pull-out tests for bonding strength of steel, and nylon cord fibers to silicon and carbon black filled and vulcanized natural rubber subsequent to excimer laser treatment of the fiber surfaces for adhesion enhancement.



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As the RSAFP Conference Chair and Program Organizer, I would like to extend my thanks to session chairs and organizers, as well as authors, and reviewers of the RSAFP program.



Conference and Program Chair

Erol Sancaktar
Akron University





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32nd Conference on Mechanical Vibration and Noise (VIB)

On behalf of the Technical Committee on Vibration and Sound (TCVS), we cordially welcome the attendees of the 32nd ASME Conference on Mechanical Vibration and Noise (VIB). The VIB Conference is sponsored by the TCVS and supported by the Technical Committee on Multibody Systems and Nonlinear Dynamics (MSND). The conference covers a broad spectrum of topics in the general area of vibrations, encompassing academic investigations on fundamental theories and emerging forefronts as well as industrial applications. It is the showcase technical forum for researchers around the world and provides a focused and intimate setting for dissemination and discussion of the state of the art of various subjects in vibration and noise. This year, the VIB conference received 69 abstract submission, among which 46 were accepted as papers in proceedings and 23 were accepted as technical presentations only without papers. The VIB also co-sponsored one symposia in the MSNDC conference.

These VIB papers and presentations were organized into 20 sessions in 10 symposia. The symposia and their organizers are:

VIB-3 Dynamics & Waves in Solids and Metamaterials, by Ryan Harne, Mike Leamy, Katie Matlack and Serife Tol

VIB-4 Energy Harvesting, by Wei-Che Tai, Serife Tol and Lei Zuo

VIB-6 Industrial Applications of Vibrations & Acoustics, by Adam Brink and Ryan Monroe

VIB-7 Jointed Structures, Contact, and Friction, by Matt Allen and Adam Brink

VIB-8 Nonlinear Systems and Phenomena (VIB/MSNDC), by Peter Coffin and D. Dane Quinn

VIB-9 Rotating Systems and Rotor Dynamics, by Kiran D'Souza, Akira Saito and Wei-Che Tai

VIB-11 Time-Delay Systems and Discontinuous Systems, by Venkat Ramakrishnan

VIB-12 Vibration and Stability of Mechanical Systems, by Chris Cooley and Mark Jankauski

VIB-14 Vibration of Continuous Systems, by Dumitru Caruntu and Wiedong Zhu

VIB-15 Machine Learning Applications in Vibrations and Dynamics, by Adam Brink and Cari Martinez

The VIB 2020 conference is highlighted by keynote lectures from three eminent researchers:

- Professor Daniel Segalman, Michigan State University, recipient of the N.O. Myklestad award in recognition of major innovative contributions in the field of vibration engineering.
- Professor Ryan Harne, Ohio State University, recipient of the C.D. Mote Jr early career award in recognition of research excellence in the field of vibration and acoustics.
- Dr. Tim Walsh, Sandia National Laboratories, discussing cutting edge research in meta-materials.



Conference Chair
Venkat Ramakrishnan
Chrysler Group LLC



Program Chair
Rickey Caldwell
Merrimack College



Program Co-Chair
Adam Brink
Sandia National Laboratories