## 6-10 MULTIBODY DYNAMIC SYSTEMS AND APPLICATIONS

**6-10-1 Multibody Dynamic Systems and Applications I**
**Third Floor, David L. Lawrence Convention Center, Room 306**
**10:00am–11:45am**

**Session Chair:** Shanzhong (Shawn) Duan, *Saint Martin's University, Lacey, WA, United States*

**10:00am – A New Approach for Locating the Instantaneous Centers of Zero Velocity for 1-DOF Planar Linkages**
Technical Paper Publication. IMECE2018-86341
Nadim Diab, *Rafik Hariri University, Mount Lebanon, Lebanon*

**10:21am – Identification of Vehicle Inertia Parameters: From Test Bench Design to Movement Trajectory Optimization**
Technical Paper Publication. IMECE2018-87545
Di Yao, Kay Büttner, Günther Prokop, *Dresden University of Technology, Dresden, Germany*

**10:42am – Vibration Suppression in Two-Dimensional Oscillation Dynamical Systems**
Technical Paper Publication. IMECE2018-87858
Adnan S. Saeed, Mohammad Al-Shudeifat, *Khalifa University, Abu Dhabi, Abu Dhabi, United Arab Emir.*

**11:03am – Multibody Dynamics Approaches for Study on Good and Bad Whole-Body Vibrations**
Technical Paper Publication. IMECE2018-88485
Shanzhong (Shawn) Duan, *Saint Martin's University, Lacey, WA, United States*

**11:24am – Real-Time Simulation of Flexible Multibody Models in Real-Time**
Technical Presentation. IMECE2018-89504
William Prescott, *Siemens Product Lifecycle Management, Coralville, IA, United States*

## 6-3 NONLINEAR DYNAMICS, CONTROL, AND STOCHASTIC MECHANICS

**6-3-1 Nonlinear Dynamics, Control, and Stochastic Mechanics I**
**Third Floor, David L. Lawrence Convention Center, Room 309**
**1:45pm–3:30pm**

**Session Chair:** Dumitru Caruntu, *University of Texas Rio Grande Valley, Edinburg, TX, United States*

**Session Co-ChairS:** Marco Amabili, *McGill University, Montreal, QC, Canada,* Bogdan Epureanu, *University of Michigan, Ann Arbor, MI, United States*

**1:45pm – Design and Development of an Unmanned Underwater Vehicle (UUV) in the Form of a Cuttlefish**
Technical Paper Publication. IMECE2018-86530
Susheelkumar Cherangara Subramanian, Thao Le, Jason Olson, Sandesh G. Bhat, Sangram Redkar, *Arizona State University, Mesa, AZ, United States*

**2:06pm – Modal Damping and Frequency Variations in Nonlinearly Coupled Oscillators With Negative Linear Stiffness Components**
Technical Paper Publication. IMECE2018-87474
Fatima Alhammadi, Mohammad Al-Shudeifat, *Khalifa University of Science and Technology, Abu Dhabi, Abu Dhabi, United Arab Emir.*

**2:27pm – Nonlinear Damping in Nonlinear Vibrations**
Technical Presentation. IMECE2018-87718
Marco Amabili, *McGill University, Montreal, QC, Canada*

**2:48pm – Voltage Response of Circular Plate MEMS Resonators Under Superharmonic Resonance**
Technical Paper Publication. IMECE2018-87766
Martin Botello, Julio Beatriz, Dumitru Caruntu, *University of Texas Rio Grande Valley, Edinburg, TX, United States*

**3:09pm – Dynamic Model and Control Design for a Nonlinear Hydraulic Actuator**
Technical Paper Publication. IMECE2018-88320
Carlos Borrás Pinilla, José L. Sarmiento, Juan F. Ortíz, *Universidad Industrial de Santander, Bucaramanga, Colombia*

## 6-4 DESIGN AND CONTROL OF ROBOTS, MECHANISMS AND STRUCTURES

**6-4-5 Mechanism Design I**
**Third Floor, David L. Lawrence Convention Center, Room 307**
**1:45pm–3:30pm**

**Session Chair:** Yin-ping Chang, *Oakland University, Rochester, MI, United States*

**Session Co-Chair:** Sebastian Roa Prada, *Universidad Autonoma de Bucaramanga, Bucaramanga, Santander, Colombia*

**1:45pm – Improving Motion Stability of the Plane 3-RPR Parallel Manipulator at Singular Configuration**
Technical Paper Publication. IMECE2018-86218
Yu-Tong Li, Yuxin Wang, *China University of Petroleum, Huadong, Qingdao, Shandong, China*

**2:06pm – Computational Design of a Bird-Inspired Perching Landing Gear Mechanism**
Technical Paper Publication. IMECE2018-86615
Paul Nadan, Christopher Lee, *Frankln W. Olin College of Engineering, Needham, MA, United States*

**2:27pm – Motion Capture of the Selective Hand Picking Movements as the Basis for the Design of Mechanically Assisted Picking Tools in Coffee Plantations in Colombia**
Technical Paper Publication. IMECE2018-88428
Jeyson Andres Hernandez Barbosa, Sebastian Roa Prada, Dario J. Hernandez Bolivar, Brajan Nicolas Ruiz Romero, Oscar E. Rueda, *Universidad Autonoma de Bucaramanga, Bucaramanga, Santander, Colombia*

### 34. The Effect of Multi-Walled Carbon Nanotube Additives Into Diesel-Camphor Biofuel Blend on Diesel Engine Performance, Combustion and Emission
Undergrad Expo. IMECE2018-90030
**Rahul Kumar Tiwari,** *Hyundai, Chennai, Tamil Nadu, India,* **Sanat Kumar,** *Texas A&M University, College Station, TX, United States*

### 35. Self Powered Orthosis For Stroke Patient
Undergrad Expo. IMECE2018-90031
**Rahul Kumar Tiwari,** *Hyundai, Chennai, Tamil Nadu, India,* **Sanat Kumar,** *Texas A&M University, College Station, TX, United States*

### 36. Performance and Surface Integrity of Wire Electrical Discharge Machining of Thin Ti6Al4V Plate Using Coated and Uncoated Wires
Undergrad Expo. IMECE2018-90034
**Luca Watanabe Reolon, Carlos Augusto Laurindo, Ricardo Diego Torres, Fred Lacerda Amorim,** *Pontificia Universidade Catolica do Parana, Curitiba, PR, Brazil*

### 37. Pave the Path for New Architectured Materials via Multi-Material 3D Printing
Undergrad Expo. IMECE2018-90035
**Yaning Li,** *University of New Hampshire, Durham, NH, United States*

### 38. An Inflatable Aircraft for Mars Exploration
Undergrad Expo. IMECE2018-90042
**Andrew Okonya, Aman Chandra, Jekan Thanga,** *University of Arizona, Tucson, AZ, United States*

### 39. Robotic Construction on the Moon and Mars Using Selective Melting and Sintering
Undergrad Expo. IMECE2018-90043
**Andrew Okonya, Erik Jensen, Aman Chandra, Jekan Thanga,** *University of Arizona, Tucson, AZ, United States*

### 40. Fatigue Life Assessment of Dissimilar Aluminum Alloys Weld Joints Under Four Point Rotating Bending Condition
Undergrad Expo. IMECE2018-90049
**Muhammad Hashir, Riffat Asim Pasha,** *University of Engineering and Technology Taxila, Taxila Rawalpindi, Punjab, Pakistan*

### 41. Microstructure-Based Material Sensitive Design Framework
Undergrad Expo. IMECE2018-90050
**Bryan Melara, Yan Li, Marcos Rodriguez, Anh Phung, Jun Cao,** *California State University, Long Beach, Long Beach, CA, United States*

### 42. Investigation of Thermocapillary-Induced Deposited Shape in Fused-Coating Additive Manufacturing Process of Aluminum Alloy
Undergrad Expo. IMECE2018-90060
**Jun Du, Zhengying Wei,** *Xi'an Jiaotong University, Xi'an, China*

### 43. Optimization of Process Parameters and Sectional Shape of Samples in Single-Layer Single-Pass Sn63Pb37 Fused Coating Additive Manufacturing
Undergrad Expo. IMECE2018-90061
**Jun Du, Zhengying Wei,** *Xi'an Jiaotong University, Xi'an, China*

### 44. Preliminary System Development and Experimental Study of a Robotic Composite Prepreg Layup Process
Undergrad Expo. IMECE2018-90071
**Vincent Legnetto, Andrew Wichelns, Yu Zhou,** *SUNY Polytechnic Institute, Utica, NY, United States*

### 45. Numerical Simulation of Visco-Plastic Fluid Flow Between Two Parallel Plates With Triangular Obstacles
Undergrad Expo. IMECE2018-90074
**Nariman Ashrafi,** *IAU, Tehran, Iran*

### 46. Computational Design of a Bird-Inspired Perching Landing Gear Mechanism
Undergrad Expo. IMECE2018-90081
**Paul Nadan, Christopher Lee,** *Frankln W. Olin College of Engineering, Needham, MA, United States*

### 47. Defect Structure Induced Strength and Toughness Anisotropy in Hexagonal Boron Nitride (hBN)
Undergrad Expo. IMECE2018-90085
**Allison Procak,** *University of Delaware, Newark, DE, United States*

### 48. Material Testing of Skeletal Muscle Under Simple Shear
Undergrad Expo. IMECE2018-90086
**Joelle Andres-Beck,** *Bucknell University, Merlin, OR, United States*

### 49. Investigating a Framework for Visualizing Reinforcement Learning Algorithms via Quadrupedal Robotic Simulation
Undergrad Expo. IMECE2018-90087
**Brendan Bogar, Paul Reverdy,** *University of Arizona, Tucson, AZ, United States*

### 50. Assessment of Ultrasonic Vibration Assisted Grinding of CSiC Composites
Undergrad Expo. IMECE2018-90077
**Yan Wang, Jingnan Zhao, Yinghuai Dong, Chang Shi,** *Tianjin University of Science and Technology, Tianjin, China*

### 51. Hole Shielding: An FEA Study in Optimizing Stress Reduction Around a Hole
Undergrad Expo. IMECE2018-90078
**Russell Oehlert,** *Leidos, Oaks, PA, United States,* **Austin C. Prete,** *University of Maryland, New Market, MD, United States,* **Daniel Longenecker,** *Honda R&D, Dublin, OH, United States,* **Stephen Kuchnicki,** *York College of Pennsylvania, York, PA, United States*

### 52. An Object-Oriented Framework for Fast Development and Testing of Mobile Robot Control Algorithms
Undergrad Expo. IMECE2018-90080
**David Chan, Paul Reverdy, Minh Nguyen, Oshadha Gunasekara, Randall Kliman,** *University of Arizona, T*