ASME SMASIS 2023

The ASME 2023 Conference on Smart Materials, Adaptive Structures and Intelligent Systems

CONFERENCE
Sept 11 – 13, 2023

Location:
Doubletree by Hilton Austin
Austin, TX

Schedule at a Glance

The American Society of Mechanical Engineers®
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SETTING THE STANDARD

Schedule at a Glance

SYMPOSIA KEY	
Symposium 1	Development and Characterization of Multi-Functional Materials
Symposium 2	Mechanics and Behavior of Active Materials
Symposium 3	Modeling Simulation and Control of Adaptive Systems
Symposium 4	Integrated System Design and Implementation
Symposium 5	Structural Health and Performance Monitoring
Symposium 6	Bioinspired Smart Materials and Systems
Symposium 7	Energy Harvesting

Schedule at a Glance

SUNDAY, SEPTEMBER 10							
8:00AM–6:00PM	Leadership Summit (By Invitation Only) - Dovers Room						
	Symposium 1: Development & Characterization of Multi-Functional Materials	**Symposium 2: Mechanics and Behavior of Active Materials**	**Symposium 3: Modeling Simulation and Control of Adaptive Systems**	**Symposium 4: Integrated System Design and Implementation**	**Symposium 5: Structural Health and Performance Monitoring**	**Symposium 6: Bioinspired Smart Materials and Systems**	
					Symposium 7: Energy Harvesting		

Schedule at a Glance

MONDAY, SEPTEMBER 11								
	Magnolia Room	**Austin Room**	**Dewitt Room**	**Dovers Room**	**Dezavala Room**	**Robertson Room**	**Phoenix Ballroom South Lobby Level**	**Phoenix Ballroom North**
7:00AM–8:00AM	Breakfast - Phoenix Ballroom Central							
8:00AM–9:00AM	Keynote: Jaret Riddick, Ph.D. - Phoenix Ballroom North							
9:10AM–10:30AM	**1-1 Liquid Metals** **Chair: Mohammad Malakooti (University of Washington)** **Co-Chair: Youngshang Han (University of Washington)**	**2-1 Shape Memory Alloy Actuators** **Chair: Othmane Benafan (National Aeronautics and Space Administration)** **Co-Chair: Marcus Young (University of North Texas)**	**3-1 Emerging Techniques in Control and Programming** **Chair-James Gibert (Purdue University)** **Co-Chair: Paul Motzki (Saarland University)**	**4-1 Mechanics of Smart Structure Applications** **Chair: Francis Phillips (DEVCOM ARL)** **Co-Chair: Martin Radestock (German Aerospace Center)**	**5-1 Biosensing** **Chair: Peng Patrick Sun (University of Central Florida)** **Co-Chair: Zhenhua Tian (Virginia Tech)**	**6-1 Artificial Muscle Actuators** **Chair: Matthew Bryant (North Carolina State University)** **Co-Chair: Caterina Lamuta (The University of Iowa)**	**High School Student Event: K-12 Outreach** **Chair: Patrick Walgren (Air Force Research Laboratory)**	
9:10AM	**112282** **Adding Solid and Fluids to Liquid Metals: How to Make Multifunctional Liquid Metal Pastes, Foams, and Emulsions** **Konrad Rykaczewski (Arizona State University)**	**110390** **Shape Memory NiTiHf Machined Helical Springs: Balancing Displacement and Force Output for Actuation** **Peter Caltagirone (National Aeronautics and Space Administration)**	**110634** **Integrating Multivariate Signal Processing and Ensemble Machine Learning for Optimal Control of Prosthetic Hands** **Mortaza Pirouz (The University of Texas at Dallas)**	**110216** **Artificial Intelligence (AI) for Active Vibration Control Optimization on Smart Structures** **Maryne Febvre (University Lyon)**	**110811** **Development of a Laser Vibrometer-Based Shear Wave Sensing System for Characterizing Mechanical Properties of Viscoelastic Materials** **Bowen Cai (Mississippi State University)**	**111022** **Spatial Optimization for Fluidic Artificial Muscle (FAM) Bundle** **Emily Duan (North Carolina State University)**		
9:30AM		**110991** **High Load NiTi Shape Memory Alloy Actuators: A Study of Cyclic Behavior** **Kai Thüsing (Fraunhofer Institute)**	**111410** **Inertial Programming Through Heterogeneity** **Xinhao Quan (Purdue University)**	**110685** **Indoor Impact Event Localization via Energy Ratio Mapping Function in Dispersive Media** **Andrew Gothard (Tennessee Technological University)**	**117601** **Monitoring Volumetric Defects in 3D Bioprinting With Video-Based Vibrometry** **Jinki Kim (Georgia Southern University)**	**112290** **Passive Priming of Fluidic Artificial Muscles in Variable Recruitment** **Olivia Mabe (North Carolina State University)**		
9:50AM	**110804** **Lightweight Soft Conductive Composites Embedded With Liquid Metal Fiber Networks** **Jiexian Ma (SUNY Binghamton)**	**111548** **High Temperature Micro-Scale Actuators From Melt-Spun Shape Memory Alloy: Microstructure and Functional Performance** **Michael Kuntz (Smarter Alloys)**	**111412** **Heterogeneous Nonlinear Stiffness Programming** **Qianyu Zhao (Purdue University)**	**110999** **Morphing Turbofan Engine Inlet at Take-Off Cross-Wind Conditions** **Giada Abate (DLR)**	**117534** **Digital Medicine for Cardiovascular Health** **Roozbeh Jafari (Texas A&M University)**	**111078** **High Performance Hierarchical Supercoiled and Hypercoiled Muscles With Embedded Heating Wire** **Samuel Tsai (University of Illinois at Urbana-Champaign)**		
10:10AM	**111059** **Printing Functional Elastomers for Stretchable Thermoelectric Devices** **Youngshang Han (University of Washington)**					**113809** **Geni-TCPFL: Fabrication and Characterization of Graphene-Nickel Silver Powder-Poly (Vinyl Alcohol) Hybrid Solution Coated Twisted and Coiled Artificial Muscles From Fishing Line** **Pawandeep Matharu (The University of Texas at Dallas)**		
10:30AM–10:50AM	Coffee Break - Phoenix Ballroom Pre-Function Foyer							

MONDAY, SEPTEMBER 11								
	Magnolia Room	Austin Room	Dewitt Room	Dovers Room	Dezavala Room	Robertson Room	Phoenix Ballroom South Lobby Level	Phoenix Ballroom North
10:50AM–12:10PM	1-2 Functional Soft Matter Chair: Mohammad Malakooti (University of Washington) Co-Chair: Russell Mailen (Auburn University)	2-2 Shape Memory Alloy Actuator Material and Characterization Standards Chair: Darren Hartl (Texas A&M University) Co-Chair: Santo Padula (NASA Glenn Research Center)	3-2 Methods for Dynamics and Structural Analysis Chair: James Gibert (Purdue University) Co-Chair: Paul Motzki (Saarland University)	4-2 Multistable Stuctures Chair: Maria Sakovsky (Stanford University) Co-Chair: Francis Philips (DEVCOM ARL)	7-1 Flow-Induced Vibration Energy Harvesting Chair: Serife Tol (University of Michigan) Co-Chair: Guobiao Hu (The Hong Kong University of Science and Technology)	6-2 Marine and Underwater Robotics Chair: Jovana Jovanova (T.U. Delft) Co-Chair: Michael Philen (Virginia Tech)	High School Student Event: K-12 Outreach Chair: Patrick Walgren (Air Force Research Laboratory)	
10:50AM	118554 Bio-Like Soft Materials With Life-Like Intelligence Ximin He (University of California, Los Angeles)	111147 Standard Test Methods for Shape Memory Alloys for Actuation Douglas Nicholson (Boeing)	110973 Modal Analysis of 2d Periodic Structures Using Dynamic Condensation With Primal Assembly Jae-Hung Han (Korea Advanced Institute of Science and Technology)	111093 Enhancing the Design Space of Bistable Laminates by Tailoring the Attachment Boundary Conditions Aghna Mukherjee (ETH Zurich)	111066 Nonlinear Dynamics of Two-Degree-of-Freedom Vortex-Induced Vibration Energy Harvester Guobiao Hu (The Hong Kong University of Science and Technology)	111077 Jelly-Z 2.0: 3D Printed Soft Jellyfish Robot Actuated With Self-Coiled Cnt-C-Ni-PVA Coated TCPFL Pawandeep Matharu (The University of Texas at Dallas)		
11:10AM		111420 Standard Material Specifications for Shape Memory Alloys for Actuation Dean Pick (Kinitics Automation Limited)	111060 A Novel Resonant Suspended Beam Mechanism for Weight Measurement Shuai Ju (University of North Texas)	110581 Aero-Structural Response of a Slitted Bistable Laminate Karthik Boddapati (Purdue University)	111090 The Performance Investigation of Triboelectric Nanogenerator Based on Flow Induced Vibration by Applying Bluff Bodies With Different Cross Sections Hao Wu (Shanghai University)	110945 Nebula: A Flexible, Solid-State Swimming Robot Enabled by HASEL Actuators Isabel Hess (University of Florida)		
11:30AM	111164 Thermally Reversible Origami Using Bilayer Liquid Crystal Elastomer Films Greg Mccallum (Auburn University)	110739 A Unified Approach for Characterizing Mechanical and Actuation Fatigue in SMAs Hrishikesh Padalia (Texas A&M University)	110914 Tuning Modal Response by Moment Coupled Subordinate Comb-Shaped Oscillator Array Sourabh Sangle (Texas A&M University)	119396 Multistable Soft Robotics for Force Modulation and Programmed Dynamics Juan C. Osorio (Purdue University)	118600 Harvesting Energy From Aeroelastic Instabilities Jayant Sirohi (The University of Texas at Austin)	111137 Prediction of Hydrodynamic Loads on a Flexible Bio-Inspired Underwater Propulsor Using Physical Reservoir Computing Patrick Musgrave (University of Florida)		
11:50AM	113183 Electrically Conductive Egain-Elastomer Composites for Printing Stretchable Circuits Youngshang Han (University of Washington)	110624 Shape Memory Materials Analysis and Research Tool (SM2ART) Database: Comparing Legacy Data to New Experimental and Computational Data Othmane Benafan (National Aeronautics and Space Administration)				111702 Design of a Soft Underwater Gripper With SMA Actuation Jovana Jovanova (T.U. Delft)		
12:10PM–1:40PM	TC: Active Material Technologies and/or Multifunctional Materials	TC: Structural Health Monitoring	TC: Adaptive Systems Dynamics and Controls	TC: Active Material Technologies and Integrated Systems	TC: Energy Harvesting	TC: Bio Inspired Structures and Systems		
12:10PM–1:40PM	Lunch - Phoenix Ballroom Central							

Schedule at a Glance

MONDAY, SEPTEMBER 11								
	Magnolia Room	Austin Room	Dewitt Room	Dovers Room	Dezavala Room	Robertson Room	Phoenix Ballroom South Lobby Level	Phoenix Ballroom North
1:40PM–3:00PM	1-3 Integrated Sensing Chair: Russell Mailen (Auburn University) Co-Chair: Tyler Tallman (Purdue University)	2-3 Design and Application of Shape Memory Alloy Rotary Actuators Chair: Dean Pick (Kinitics Automation Limited) Co-Chair: Marcus Young (University of North Texas)	3-3 Compliant Structures and Mechanisms Chair: Jovana Jovanova (T.U. Delft) Co-Chair: Greta Vazzoler (UniGE)	4-3 End Effector Development Chair: Brent Utter (Lafayette College) Co-Chair: Farhan Gandhi (Rensselaer Polytechnic Institute)	5-2 Monitoring Civil Infrastructure Chair: Sumit Gupta (Oak Ridge National Laboratory) Co-Chair: Xuan Zhu (The University of Utah)	6.3 Bioinspired Vibrations and Waves Chair: Pablo Tarazaga (Texas A&M University) Co-Chair: Steven Anton (Tennessee Tech.)		
1:40PM	111109 Embedded Sensing and Localization of Pressure in Silicone Skin Using Sensors Printed From Carbon Nanofiber/ Thermoplastic Polyurethane Filament Joseph Meier (Purdue University)	111153 Simulation of Buckling Shape Memory Alloy Tubes Under Torsional Loading Darren Hartl (Texas A&M University)	110461 Conceptual Design of a Compliant, Low-Cost Prosthetic Hand Giovanni Berselli (University of Genova)	110931 Aeroelastic Analysis of Controls Informed Adaptive Small Unmanned Aerial System Francis Phillips (U.S. Army DEVCOM Army Research Laboratory)	111009 Classifying Soil Saturation Levels Using a Network of UAV-Deployed Smart Penetrometers Puja Chowdhury (University of South Carolina)	110915 Directed Particle Motion Driven by Superimposed Two-Dimensional Traveling Waves William Rogers (Texas A&M University)		
2:00PM	111162 Characterization of Electrospun, Conducting Polymer Electrodes Enabling Mobility for All Midhan Siwakoti (Auburn University)	111551 Development, Fabrication and Testing of a Self-Biasing Shape Memory Alloy Torque Tube Michael Kuntz (Smarter Alloys)	110774 A Comparison of Mechanics Simplifications in Pose Estimation for Thermally-Actuated Soft Robot Limbs Juan Pacheco Garcia (Boston University)		111824 UAV-Based Remote Sensing for Municipal Solid Waste Landfill Cover Integrity Inspection and Monitoring Peng Patrick Sun (University of Central Florida)	113286 Novel Pumping Mechanism for Heat Sinks With Fluid Medium Using Steady State Traveling Waves Krishnakumar Rajendran (Michigan Technological University)		
2:20PM	111169 Effect of Area Density on Sensitivity and Strain Survival of Reduced Graphene Oxide Under Large Strains Armin Yazdi (University of Wisconsin-Milwaukee)	111028 Shape Memory Alloy Reconfigurable Technology-Vortex Generators: Targeted Alloy Design Othmane Benafan (NASA Glenn Research Center)	110481 Parametric Studies of Flexible Sandwich Panels as a Compliant Fairing for Folding Wingtip Joints Nuhaadh Mahid (University of Bristol)	110416 Design of Shape Memory Alloy Actuated Grippers Benjamin John (Fraunhofer IWU)		110641 An Investigation on the Effectiveness of Cross-Sectional Tapering for Broadband Non-Reflective Traveling Waves Generation in Beams With Passive Discontinuities Amirhossein Omidi Soroor (Texas A&M University)		
2:40PM	108891 Colloidal Microchannel Formation via Directed Self-Assembly on Substrate of Tunable Stiffness Ryan Dumont (Kennesaw State University)	111216 Shape Memory Alloy Actuated Vortex Generators: Development and Flight Test F. Tad Calkins (Boeing)	111065 Adaptive Bandgap Formation in a Periodic Tensegrity Structure Rawad Yazbeck (Texas A&M University)	110732 3d Printed Flexible Gripper With Capacitance Sensing Brittany Newell (Purdue University)				
3:30PM–3:30PM	Coffee Break - Phoenix Ballroom Pre-Function Foyer							

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	Magnolia Room	Austin Room	Dewitt Room	Dovers Room	Dezavala Room	Robertson Room	Phoenix Ballroom South Lobby Level	Phoenix Ballroom North
3:30PM–4:50 PM	Student Event: Career Panel Chair: Patrick Walgren (Air Force Research Laboratory)	Student Best Paper Chair: Vanessa Restrepo (Texas A&M University)		4-4 Structural Design and Optimization Chair: Martin Radestock (German Aerospace Center - DLR) Co-Chair: Roeland De Breuker (TU Delft)			Hardware Showcase Chair: Paul Motzki (Saarland University), Co-Chair: Maria Sakovsky (Stanford University)	DEI Seminar Oliver Myers (Clemson University)
3:30PM				111014 Structurally Functional RC Filters Using Coupled Three-Dimensional Topology Optimization Darren Hartl (Texas A&M University)				
3:50PM				111067 Development and Validation of a Multiscale Topology Optimization Framework Using Material Property Feasibility Constraints Brent Bielefeldt (National Research Council)				
4:10PM				110742 Mechanics of Infilled Morphing Skins: Design Rules and Application to Twist-Morphing Wings Patrick Walgren (Air Force Research Laboratory)				
4:30PM				110955 Low-Energy Stiffness Modulation in Lattice Structures Maria Sakovsky (Stanford University)				
3:30PM–5:30PM	Hardware Showcase Chair: Paul Motzki (Saarland University), Co-Chair: Maria Sakovsky (Stanford University)							
6:30 PM–9:30PM	SMASIS Senate Meeting - Phoenix Ballroom South, Lobby Level							

Schedule at a Glance

TUESDAY, SEPTEMBER 12								
	Magnolia Room	**Austin Room**	**Dewitt Room**	**Dovers Room**	**Dezavala Room**	**Robertson Room**	**Phoenix Ballroom South**	**Phoenix Ballroom North**
7:00AM–8:00AM	Breakfast - Phoenix Ballroom Central							
8:00AM–9:00AM	Keynote: Adti Chattopadhyay, Ph.D - Phoenix Ballroom North							
9:10AM–10:30AM	**1-4 Fiber Composites** **Chair: Amir Ameli (University of Massachusetts Lowell)** **Co-Chair: Sumit Gupta (Oak Ridge National Laboratory)**	**2-4 Design and Application of Shape Memory Alloy Structures and Devices** **Chair: Tad Calkins (Boeing)** **Co-Chair: Mike Kuntz (Smarter Alloys)**	**3-4 Foldable Structures** **Chair: Jeff Hill (Brigham Young University)** **Co-Chair: Giovanni Berselli (Unige)**	**4-5 Aerospace Applications** **Chair: Kenny Pagel (Fraunhofer IWU)** **Co-Chair: Johanness Riemenschneider (German Aerospace Center)**	**7-2 Energy Harvesting, Sensing and Monitoring** **Chair: Wei-Che Tai (Michigan State University)** **Co-Chair: Serife Tol (University of Michigan)**	**6-4 Bioinspired Smart Composites** **Chair: Matthew Bryant (North Carolina State University)** **Co-Chair: Vanessa Restrepo (Texas A&M University)**		
9:10AM	**111044** **An Analytical Model for the Transverse Piezoresistive Response of Fiber-Reinforced Nano-Modified Polymers via an Electrical Concentric Cylinder Assemblage Approach** **Sultan Ghazzawi (Purdue University)**	**111522** **Finite Element Analyses and Experimental Studies of Knitted Shape Memory Alloy Actuation Behavior Under High Loads** **Darren Hartl (Texas A&M University)**	**117643** **Selective 1 DOF Deformation and Rigidity of Tendon Constrained Inflatables** **Ellen Kim (University of Michigan)**	**119404** **Aeroelastic Investigation of Spanwise Morphing Wings From Multistable Honeycombs** **D. Matthew Boston (Purdue University)**	**111091** **On Phase Coupling of a Vortex-Induced Swing Sensor** **Qianyi Peng (Shangahai University)**	**117652** **Sustained Self-Healing of Fiber-Reinforced Polymer Composites via In Situ Thermal Remending** **Jason Patrick (North Carolina State University)**		
9:30AM	**110933** **The Effects of Electroplating on the Mechanical Properties of Additively Manufactured Structures** **Kevin Simonson (Purdue University)**	**111165** **Performance of Self-Folding Shape Memory Polymer Origami** **Russell Mailen (Auburn University)**	**109911** **Modeling of a Nonlinear-Elastic Compliant Mechanism With Tension-Compression Asymmetry** **Brianne Hargrove (University of Michigan)**	**111168** **A Theoretical and Experimental Analysis of the Aerodynamic Response of a Piezocomposite Ornithopter Wing** **Mohammad Katibeh (Rutgers University)**	**110971** **Vortex Intensification of a Triboelectric Nanogenerator Array for Water Energy Harvesting** **Biao Wang (Shanghai University)**			
9:50AM	**111430** **Investigation of Yarn Pullout as a Mechanism of Ballistic Performance Enhancement in Silica Nanoparticle-Impregnated Kevlar Fabric** **Nicholas Nowak (Oklahoma State University)**	**111248** **Effectiveness of Shape Memory Alloy Golf Clubs in Enhancing Golfer Performance** **Darren Hartl (Texas A&M University)**	**117579** **Actuated Folding of Origami Structures Through Thin-Layered Tile-Based Air Surface Inflation Bladders** **Li Tiantian (University of Michigan)**	**117647** **Wind Tunnel and Flight Demonstrations in AIRGREEN2** **Umberto Mercurio (Italian Aerospace Research Centre)**	**111152** **Improving Durability of Triboelectric Energy Harvester for Load Monitoring in Total Knee Replacement** **Mahmood Chahari (Binghamton University)**	**110495** **Design and Development of Self-Adaptive Composite Materials With Temperature Induced Shape-Shifting Properties** **Manuel Jose Carvajal Loaiza (Texas A&M University)**		
10:10AM	**117613** **Development of Structural Batteries Based on Carbon Fiber Composites** **Paul Gilmore (Toyota Research Institute of North America)**				**109903** **Numerical Study of a Piezoelectric Vibration Energy Harvester Without and With an Ortho-Planar Spring Using a Modified H-Shape Structure** **Ibnu Taufan (University of Limerick)**	**111179** **Characterization of Shape Memory Alloys for Smart Composites Under Different Environmental Conditions Using an In-Situ Thermal Chamber** **Avik Ahuja (Texas A&M University)**		
10:30AM–10:50AM	Coffee Break - Phoenix Ballroom Pre-Function Foyer							

TUESDAY, SEPTEMBER 12								
	Magnolia Room	**Austin Room**	**Dewitt Room**	**Dovers Room**	**Dezavala Room**	**Robertson Room**	**Phoenix Ballroom South**	**Phoenix Ballroom North**
10:50AM–12:10PM	**1-5 Functional Printing** **Chair: Amir Ameli (University of Massachusetts Lowell)** **Co-Chair: Tyler Tallmann (Purdue University)**	**2-5 Mechanics and Behavior of Shape Memory Alloys** **Chair: Santo Padula (NASA Glenn Research Center)** **Co-Chair: Doug Nicholson (Boeing)**	**3-5 Vibration Control and Noise Reduction** **Chair: Abdessattar Abdelkefi (University New Mexico)** **Co-Chair: James Gibert (Purdue University)**	**4-6 Morphing Aerospace Applications** **Chair: Farhan Gandhi (Rensselaer Polytechnic Institute)** **Co-Chair: Brent Utter (Lafayette College)**	**5-3 SHM and NDT** **Chair: Tyler Tallman (Purdue University)** **Co-Chair: Rishikesh Srinivasaraghavan Govindarajan (Embry-Riddle Aeronautical University)**	**6-5 Continuum Robotics** **Chair: Mary Frecker (The Pennsylvania State University)** **Co-Chair: Sameh Tawfick (University of Illinois at Urbana-Champaign)**		
10:50AM	**111208** **In Situ Foam 3-D Printing of Carbon Nanotube/Thermoplastic Polyurethane Nanocomposites** **Milad Azami (University of Massachusetts Lowell)**	**110907** **Architected Material Analogs for Shape Memory Alloys** **Yunlan Zhang (The University of Texas at Austin)**	**111106** **Development of Numerical Models Based on Experimental Tests for the Design of Active Vibration Controllers.** **Tarcisio M.P. Silva (Technology Innovation Institute)**	**110993** **DLR UAS Test Platform for Morphing Wings** **Martin Radestock (German Aerospace Center)**	**117419** **Smart Structural Materials With Embedded Fiber Optic Sensors for Health Monitoring in Harsh Environments** **Xinchang Zhang (Idaho National Laboratory)**	**110881** **Soft Tentacles for Underwater Robotics Powered by Twisted and Coiled Artificial Muscles (TCAMs)** **Sean Maxson (The University of Iowa)**		
11:10AM	**110626** **Finite Strain Sensing via Additively Manufactured CNF/TPU Strain Gauges** **Julio Hernandez (Purdue University)**		**109669** **On the Noise Reduction via a Weakly-Coupled Digitally Programmed Nonlinear Electroacoustic Absorber** **Maxime Morell (ENTPE)**	**111011** **High-Throughput Analysis and Morphing Design Space Decomposition for Mission-Adaptive Air Vehicles** **Darren Hartl (Texas A&M University)**	**111055** **A Non-Destructive Method for Underwater Material Second-Order Elastic Constants Measurement** **Shuai Ju (The University of Texas at Austin)**	**111027** **A Cosserat Rod Model for a Hyperelastic Continuum Robot Actuated by Twisted and Coiled Artificial Muscles** **Maxwell Hammond (The University of Iowa)**		
11:30AM	**111036** **Scanning on a Thin Slice: An Examination of a Magnetostrictive Sputtered 3D Printed Carbon Fiber Composite** **Christopher Nelon (Clemson University)**	**111206** **Effects of Oxidation and Plasticity on Transformation Temperatures in a High Temperature Shape Memory Alloy (HTSMA)** **Adrien Cassagne**	**112818** **Programmable Bandgaps in Meta-Structures With Dynamic Vibration Resonators** **Shantanu Chavan (Michigan Technological University)**	**114990** **Smartx: Intelligent Wings Enabling More Sustainable Aviation** **Roeland De Breuker (Delft University of Technology)**	**111211** **Electromechanical Impedance Based Part Identification via Linear Projection** **Sourabh Sangle (Texas A&M University)**	**111253** **Comparative Review of Two Different Design Approaches for SMA Based Continuum Robots** **Paul Motzki (Saarland University)**		
11:50AM	**111035** **Effect of Filament Color on the Development of Bistability in Switchable Bistable Squares** **Katie A. Martin (U.S. Army Corps of Engineers, Engineer Research and Development Center)**					**111030** **Reduced-Dimensional Modeling of Magneto-Active Elastomer Unimorph Actuators** **Tan Pan (The Pennylvania State University)**		
12:10PM–1:40PM	**Lunch - Phoenix Ballroom Central**							
	Student Trivia - Phoenix Ballroom Central							

Schedule at a Glance

TUESDAY, SEPTEMBER 12								
	Magnolia Room	Austin Room	Dewitt Room	Dovers Room	Dezavala Room	Robertson Room	Phoenix Ballroom South	Phoenix Ballroom North
1:40PM–3:00PM	1-6 Shape Memory Alloy Chair: Ji Su (NASA) Faith Gantz (University of North Texas)	2-6 Applications of Advanced Materials in Aerospace Applications Chair: Oliver Myers (Clemson University) Co-Chair: Cody Gonzalez	3-6 Design and Optimization of Intelligent Structures Chair: Darren Hartl (Texas A&M University) Co-Chair: Jeff Hill (Brigham Young University)	4-7 Novel Actuators Chair: Wonhee Kim (GM R&D) Co-Chair: Paul Motzki (Saarland University)	7-3 Nonlinear Energy Harvesting Chair: Wei-Che Tai (Michigan State University) Co-Chair: Guobiao Hu (Hong Kong University of Science and Technology)	6-6 Bioinspired Structures Chair: Michael Philen (Virginia Tech.) Co-Chair: Shahrzad (Sherry) Towfighian (Binghamton University)		
1:40PM	109874 Additive Manufacturing of Fe-Mn-Al-Ni Shape Memory Alloy: Microstructure and Phase Transformation Characteristics Anwar Algamal (University of Toledo)	110974 In-Flight Structural Test of a Hoverbike Using Fiber Optic Sensors Jae-Hung Han (Korea Advanced Institute of Science and Technology)	111355 Design of Mechanically Intelligent Structures Jovana Jovanova (T.U. Delft)	111012 Soft Actuators From Flexible Auxetic Metamaterials and Shape Memory Alloys Springs Janghoon Woo (University of Minnesota Twin Cities)	111072 Effect of Hysteresis in the Modeling of a Piezoelectric Inverted Beam Vibration Energy Harvester Masoud Zarepoor (Lake Superior State University)	111069 Fabrication and Characterization of Flexible Matrix Composite Wafers Masaki Hada (Virginia Tech University)		
2:00PM	111003 Fabrication, Experimentation, and Characterization of a Shape Memory Alloy Driven Composite Morphing Radiator Priscilla Nizio (Texas A&M University)	110391 Flight Performance Evaluation of a Mini Drone by Revisiting Structural Design via Additive Manufacturing Technology Hande Girard (Ostim Technical University)		111166 An Innovative Multi-Layer System for Thermally Activated Switching Actions Giulia Lanzara (University of Rome)	112083 An Investigation on the Impact and Linear Double Springs Based Mechanism in the Vibration Energy Harvesting Chung Ket Thein (University of Nottingham Ningbo China)	111209 Investigating the Effects of Eccentricity on the Dynamics of Spider Webs Thijs Masmeijer (University of Washington)		
2:20PM	110692 Validation of Smanalytics: Comparison of Automatic and Human Analyzed Shape Memory Alloy Test Data Glen Bigelow (NASA Glenn Research Center)	110423 Environmental Tests of a Parabolic Self-Deployable Tapespring Boom for Cubesat Applications Deven Mhadgut (Virginia Tech. University)	111187 Design and Optimization of the Conformal Surface for an Adaptive Structure Darren Hartl (Texas A&M University)	111273 Demonstrator for Linear Dielectric Elastomer Actuator Systems Coupled to Compliant Joint Linkage Transmission Mechanisms Julian Neu (Center for Mechatronics and Automation Technology)	110951 Energy Transfer in a Quarter-Car Model With Inertially Nonlinear Inerter-Based Pendulum Vibration Absorber. Joel Cosner (Michigan State Univ.)	111231 Spider-Web-Inspired Metamaterial Design and Experimental Validation Walter Lacarbonara (Sapienza University of Rome)		
2:40PM	111572 Thermomechanical Processing of NiTiCu Shape Memory Alloy From Button to Wire Faith Gantz (University of North Texas)		111107 Determination of Material Parameters and FEM Simulation for the Development of a Design System for Shape Memory Springs Kenny Pagel (Fraunhofer IWU)	112125 A Hybrid Piezoelectric-Hydraulic Actuator Model and Prototype With Large Stroke and Force Parameters Yan Borden (University of Michigan)		111235 Hybrid Soft-Rigid Joint With Inherent Sensing and Actuation Capabilities Based on Rolled Dielectric Elastomers Andreas Meyer (ZeMA - Center for Mechatronics and Automation Technology)		
3:00PM–3:30PM	Coffee Break - Phoenix Ballroom Pre-Function Foyer							

TUESDAY, SEPTEMBER 12								
	Magnolia Room	**Austin Room**	**Dewitt Room**	**Dovers Room**	**Dezavala Room**	**Robertson Room**	**Phoenix Ballroom South**	**Phoenix Ballroom North**
3:30PM–4:50PM	**1-7 Multifunctional Composites** **Chair: Sumit Gupta (ORNL)** **Nathan Salowitz (University of Wisconsin)**	**2-7 Smart Material Actuators and Their Applications** **Chair: Chris Lynch** **Co-Chair: Paris von Lockette (Penn State University)**	**3-7 Advanced Manufacturing and Charaterization** **Chair: Greta Vazzoler (UniGe)** **Co-Chair: Jovana Jovanova (T.U. Delft)**	**4-8 SMA Applications** **Chair: Jayant Sirohi (The University of Texas at Austin)** **Co-Chair: Wonhee Kim (GM R&D)**	**5-4 Wave-Based Sensing** **Chair: Zhenhua Tian (Virginia Tech)** **Co-Chair: Bowen Cai (Mississippi State University)**	**6-7 Materials and Structures for Bioinspired Robotics** **Chair: Caterina Lamuta (The University of Iowa)** **Co-Chair: Sameh Tawfick (University of Illinois at Urbana-Champaign)**		
3:30PM	**111115** **Self-Healing of Fiber-Reinforced Delaminated Composites** **Giulia Lanzara (University of Rome, Roma Tre)**	**111182** **Exploring 6-Ply Twisted and Coiled Polymer Actuators With Active Cooling and Position Control** **Abhishek Singh (The University of Texas at Dallas)**	**110621** **Interlocking Metasurfaces: A Joining Technology for Adaptive Structures** **Ophelia Bolmin (Sandia National Laboratories)**	**110681** **In Situ Actuation of Shape Memory Alloy Using Focused Ultrasound** **Jeffrey Hill (Brigham Young University)**	**111038** **Surface Acoustic Wave Sensors for Nondestructive Structural Monitoring of Nuclear Spent Fuel Canisters at Elevated Temperature** **Haifeng Zhang (University of North Texas)**	**110880** **Bioinspired Active Vortex Generators to Delay Stall on an Airfoil at Low Reynolds Number** **Rabiu Mamman (The University of Iowa)**		
3:50PM	**111197** **A Recyclable Self-Healing Composite With Advanced Sensing Property** **Sargun Singh Rohewal (Oak Ridge National Lab and The University of Tennessee)**	**109978** **Characterization of Shape Memory Polymer Yarns With Few Filaments for Force Generation** **Michaela Andrews (University of Minnesota)**	**111684** **Fabrication of Parallel Compliant Mechanisms via Additive Manufacturing** **Alberto Parmiggiani (Fondazione Istituto Italiano di Tecnologia)**	**110858** **Active Implant System Based on SMA Actuators for Improved Bone Facture Healing** **Susanne-Marie Kirsch (Saarland University)**		**109800** **Water Entry Dynamics of Avian Inspired Divers** **Bart Boom (University of Washington)**		
4:10PM	**111016** **Evaluation of Interface Strength and Failure Between Nickel-Titanium Shape-Memory-Alloy Wire and Bismuth-Tin Matrix for the Design of Self-Healing Composites** **Muhammad Istiaque Haider (University of Wisconsin-Milwaukee)**	**110975** **An Experimental Investigation Into Design and Printing Parameters of 4d-Printed Actuators on Time-Depend Behavior** **Siyuan Zeng (Tsinghua University)**	**112997** **Meta-Structure Transmission Loss Characterization via an Impedance Tube and the Transfer Matrix Approach** **Matt Beals (Michigan Technological University)**	**110980** **Development of Adaptive Connectors Based on Shape Memory Alloys** **Kenny Pagel (Fraunhofer Institute)**		**118556** **Materials to Makers** **Ankur Mehta (University of California Los Angeles)**		
4:30PM	**111103** **Numerical Prediction of the Effective Mechanical Behavior of Interpenetrating Phase Composites Comprising Architected Nitinol Cores** **Shahzaib Ilyas (Khalifa University of Science and Technology)**	**110972** **Experimental Study on Gradually Varying Thickness Patch for Elastic Wave Manipulation Using Piezo Disk Actuators** **Jae-Hung Han (KAIST)**	**112816** **Vibration Absorption in 3d Printers Using Subordinate Oscillator Arrays for Mobile Manufacturing** **Shantanu Chavan (Michigan Technological University)**	**111149** **Econo-Finger: 3d Printed Soft Orthotic Finger With Embedded Strain Gauge Actuated by Coiled Shape Memory Alloy Muscles** **Drew Miles (The University of Texas at Dallas)**				
5:20PM–6:00PM	**Bus loading and Travel to County Line on the Lake**							
6:30PM–8:45PM	**Pioneer Awards Banquet - County Line on the Lake**							
10:00 PM–12:00AM	Student Game Night - Lobby Collonnade							

Schedule at a Glance

WEDNESDAY, SEPTEMBER 13								
	Magnolia Room	**Austin Room**	**Dewitt Room**	**Dovers Room**	**Dezavala Room**	**Robertson Room**	**Phoenix Ballroom South**	**Phoenix Ballroom North**
7:00AM–8:00AM	Breakfast - Phoenix Ballroom Central							
8:00AM–9:00AM	Keynote: Nanshu Lu, Ph.D - Phoenix Ballroom North							
9:10AM–10:30AM	**1-8 Surface Engineering** **Tanya Hutter (The University of Texas at Austin)** **Ginevra Hausherr (University of Rome)**	**2-8 Mechanics and Behavior of Magneto-Active Compsoites and Structures** **Chair: Chris Lynch (University of California Riverside)** **Co-Chair: Paris von Lockette (Penn State University)**	**3-8 Structural Dynamics and Monitoring** **Chair: Stefan Seelecke (Saarland Univ.)** **Co-Chair: James Gibert (Purdue University)**	**4-9 SMA Enabled Smart Structures** **Chair: Paul Motzki (Saarland University)** **Co-Chair: Darren Hartl (Texas A&M University)**	**7-4 Electromagnetic Energy Harvesting** **Chair: Chung Ket Thein (University of Nottingham Ningbo China)** **Co-Chair: Lihua Tang (University of Auckland)**	**6-8 Bioinspired Networks and Neurons** **Chair: Joseph Najem (Penn State University)** **Co-Chair: Andy Sarles (The University Tennessee Knoxville)**		
9:10AM	**111176** **Antibacterial Properties of Snakeskin Inspired Surfaces Layered With Nanosheet** **Mohd Danial Ibrahim (Universiti Malaysia Sarawak)**	**117721** **Magnetoactive Elastomers: Extraordinary Properties and Physics of Iron in Rubber** **Mikhail Shamonin (Ostbayerische Technische Hochschule Regensburg)**	**113760** **Localization of Human Activity in Smart Structures Using the Force Estimation and Event Localization Algorithm and Extended-Feel Algorithm** **Samikhshak Gupta (Michigan Technological University)**	**111227** **Adaptive Aerodynamic Structure Based on Antagonistic Shape Memory Alloy Wire Actuators** **Paul Motzki (Saarland University)**	**110988** **Design Optimisation of a Planar Electromagnetic Energy Harvester Suitable for Low Frequency Vibrations** **Nouman Ghafoor (University of Limerick)**	**110619** **Synaptic Plasticity in Electroosmosis-Driven Geopolymer Memristors** **Mahmudul Alam Shakib (The University of Iowa)**		
9:30AM	**109323** **Evaluation of Antibacterial Activities for Poly-Dl-Lactic Acid Nanosheet on the Biomimetic Model of Shark Skin** **Shunsuke Nakano (Tokai University)**		**113911** **Dynamic Mode Decomposition Approach for Estimating the Shape of a Cable** **Yash Chavan (Michigan Technological University)**	**111116** **Simulation of Shape Memory Alloy-Actuated Adaptive Thermal Control Systems in Space Environments** **Darren Hartl (Texas A&M University)**	**113439** **A Multi-Directional Low-Frequency Electromagnetic Energy Harvester** **Lihua Tang (University of Auckland)**	**110904** **Brain-Inspired Biomolecular Networks for Adaptive Sensing and Reservoir Computing** **Joshua Maraj (The University of Tennessee)**		
9:50AM	**110845** **Microstructured Magneto-Responsive Surfaces for Active Droplet Manipulation** **Gaia Kravanja (University of Ljubljana Faculty of Mechanical Engineering)**	**111143** **Spatial and Temporal Homogenization of Phase-Field Equations With an Application to Iron-Based Shape Memory Alloy Modeling** **Vincent von Oertzen (TU Bergakademie Freiberg)**	**110730** **Pressure Measurement Using Surface Acoustic Wave Sensor on a Curved Shape of a Vessel** **Masoud Naghdi (University of North Texas)**	**111395** **Investigation of the Thermal Heat Exchange Between NiTi-Wire Bundles and Airflow for Different Wire Arrangements.** **Susanne-Marie Kirsch (Saarland University)**	**111515** **On the Resonance/bandwidth-Coupling Relationship of Electromagnetic Vibration Energy Harvester With a Non-Varying Magnetic Flux Density** **Chung Ket Thein (University of Nottingham Ningbo China)**	**111131** **Memory in Droplets: Retaining Voltage Signals in Biologically-Inspired Droplet Networks** **Eric Freeman (University of Georgia)**		
10:10AM		**116571** **Toward a Phase Field Fracture Mechanics Model for Ni_2MnGa Magnetic Shape Memory Alloys** **Constantin Ciocanel (Northern Arizona University)**		**110889** **Systematic Thermo-Mechanical Validation of Numerous Tensile-Loaded NiTi Wire Bundles Used For Elastocaloric Heating and Cooling** **Susanne-Marie Kirsch (Saarland University)**	**111590** **Effect of Multiple Combination Modes of the Reactive Components on the Response of Electromagnetic Vibration Energy Harvester** **Chung Ket Thein (University of Nottingham Ningbo China)**	**111189** **Optimization of Neuron-Inspired Biomolecular Neuristor Action Potentials** **Ahmed Salah Mohamed (The Pennsylvania State University)**		
10:30AM–10:50AM	Coffee Break - Phoenix Ballroom Pre-Function Foyer							

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10:50AM–12:10PM	**1-9 Magnetic Materials**	**2-9 Mechanics of Composites, Films, and Graded Materials**	**3-9 - ML for Dynamic Systems**	**4-10 SMA Mechanisms**	**5-5 Smart Sensors**	**6-9 Bioinspired Systems**		
Session Chairs	**Mikhail Shamonin (Ostbayerische Technische Hochschule Regensburg) Joy Morin (Boise State University)**	**Chair: Oliver Myers (Clemson University) Co-Chair: Cody Gonzalez (The University of Texas at San Antonio)**	**Chair: Amin Joodaky (Michigan State University) Co-Chair: Sriram Malladi (Michigan Technological University)**	**Chair: Darren Hartl (Texas A&M University) Co-Chair: Kenny Pagel (Fraunhofer IWU)**	**Chair: Daewon Kim (ERAU) Co-Chair: Steven Anton (Tennessee Tech University)**	**Chair: Vanessa Restrepo (Texas A&M University) Co-Chair: Andy Sarles (The University of Tennessee Knoxville)**		
10:50AM	**110855 Magnetostrictive Properties of Magnetoactive Elastomeric Cylinders Gašper Glavan (Ostbayerische Technische Hochschule Regensburg)**	**110752 Prediction of Load in a Bistable CFRP Laminate Undergoing Fatigue Loading Using Machine Learning Shoab Ahmed Chowdhury (Clemson University)**	**109635 Design of Multifunctional Mechano-Luminescence-Optoelectronic Composite Using Machine Learning and Multiphysics Material Characterization Donghyeon Ryu (New Mexico Tech)**	**110385 An Embedded System for Data-Based Self-Sensing in Shape Memory Alloy Wire Actuators Krunal Jagdishbhai Koshiya (ZeMA - Center for Mechatronics and Automation Technology)**	**117727 Smart Materials and Devices for Sensing and Degradation of Toxic Gases Tanya Hutter (The University of Texas at Austin)**	**110640 Understanding the Role of Diblock-Copolymer Molecular Structure on Osmotically-Actuated, Compartmentalized Tissues McKayla Torbett (The University of Tennessee)**		
11:10AM	**111048 Nanosynthesis of Terfenol-D Enabled by High-Energy Ball Milling Joy Morin (Boise State University)**	**112865 Non-Hookean Scale-Dependent Mechanical Properties in Rippled Films Jian Zhou (Argonne National Laboratory)**	**112598 Data-Driven Estimation of Bandgap Frequencies in Metastructures for Elastic Wave Absorption Hrishikesh Gosavi (Michigan Technological University)**	**110997 SMA Micro-Wire Bundle With High Cyclic Actuation Frequency Susanne-Marie Kirsch (Saarland University)**		**118882 Bio-Ionic Transistors for the Study of Cellular Bioelectric Attributes Reza Montazami (Iowa State University)**		
11:30AM	**110998 Characterization of Wetting Properties of Magnetoactive Elastomer Surfaces Raphael Kriegl (Ostbayerische Technische Hochschule Regensburg)**	**116469 Nonreciprocal Vibrations of Discretized Finite Elastic Structures With Spatiotemporally Modulated Material Properties Christina Naify (Applied Research Labs: UT Austin)**	**114737 Buckling Strength Prediction of Thin Plates With Cutouts Using Machine Learning Amin Joodaky (Michigan State University)**	**111249 Technology Demonstrator Platform for Fast-Switching Decoupled Antagonistic SMA Actuators Paul Motzki (Saarland University)**	**111151 Additive Manufacturing of Photocurable PVDF-Based Piezocapacitive Sensor Rishikesh Srinivasaraghavan Govindarajan (Embry-Riddle Aeronautical University)**			
11:50AM	**111175 Morphing Carbon Fiber Reinforced Composite Coated With Magnetic Microspheres of Alginate Giulia Lanzara (University of Rome, RomaTre)**		**113529 Estimation of Stress State in Axially Loaded Beam Using Modal Data Hrishikesh Gosavi (Michigan Technological University)**	**111255 Fully Integrated Rotary Motor Based on Antagonistic Shape Memory Alloy Wire Bundles Paul Motzki (Saarland University)**				
12:10PM–1:40PM	**Lunch - Phoenix Ballroom Central**							

Schedule at a Glance

WEDNESDAY, SEPTEMBER 13								
	Magnolia Room	**Austin Room**	**Dewitt Room**	**Dovers Room**	**Dezavala Room**	**Robertson Room**	**Phoenix Ballroom South**	**Phoenix Ballroom North**
1:40PM–2:40PM		**2-10 Design, Modeling, and Behavior of Functional and Shape Memory Materials and Composites** **Chair: Mikhail Chamonine (OTH Regensburg)** **Co-Chair: Paris von Lockette (The Pennsylvania State University)**		**4-11 Multifunctional Electrical Structures** **Chair: Jayant Sirohi (The University of Texas at Austin)** **Co-Chair: Johanness Riemenschneider (German Aerospace Center)**		**6-10 Biomedical Applications** **Chair: Steven Anton (Tennessee Tech)** **Co-Chair: Emily Duan (North Carolina State University)**		
1:40PM		**111901** **Design Approach to Particulate-Based Multifunctional Polymer Composite Materials** **Robin Collet (University of California, Riverside)**		**111178** **Annealed Pyrolytic Graphite Electrodes for Piezoelectric Acoustic Nanoweb** **Giulia Lanzara (University of Rome)**		**111029** **Simulation and Parametric Analysis of Transducer Locations in a Realistic, Compartmental Force Sensing Total Knee Replacement** **Brandon Hines (Tennessee Tech University)**		
2:00PM		**111183** **Multifractal Behavior and Material Complexity in Functional Materials** **William Oates (Florida A&M University)**		**111184** **Polymeric Ionic Electrolytes vs. Liquid Ionic Electrolytes in Thin-Film Supercapacitors Integrated in Highly Complex Aerospace Structures** **Sebastian Geier (German Aerospace Center)**		**119103** **Metal-Organic Framework-Based Platform Technology for Bioinspired Smart Textiles** **Reza Montazami (Iowa State University)**		
2:20PM		**112318** **The Influence of Substitutional Elements in Hysteresis Reduction and Thermo-Mechanical Stability of Shape Memory Alloys** **Andre Montagnoli (University of North Texas)**		**111228** **An Integrated Audio-Tactile Interface Based on Dielectric Elastomer Actuators for User Interaction** **Stefan Seelecke (Saarland University)**		**111396** **Efforts to Standardize Uniaxial Tensile Testing of Well-Preserved Human Tissue** **Miguel Angel Fuentes Garcia (Tennessee Technological University)**		
2:40PM	**CONFERENCE ENDS**							

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