Smart Material, Adaptive Structures and Intelligent Systems Newsletter

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MESSAGE FROM THE CHAIR

Onur Bilgen, Rutgers University ▪

Welcome to the second edition of the ASME Smart Materials, Adaptive Structures, and Intelligent Systems (SMASIS) Division newsletter! I am thrilled to welcome you as the current chair of our division. This newsletter provides updates since summer 2024, as we embark on a mission to further advance the field of smart materials and intelligent systems and to grow our division. I am incredibly proud of our vibrant community. Together, we have created a division that is not only a leader in the field but also a supportive and inclusive network.

A New Era for Our Division

Evolving from first a technical committee, then branch, to the full scale of an ASME division, our community already achieved great strides, from a highly successful conference to strategic planning sessions that have set a clear mission and defined our core values. I want to extend my heartfelt thanks to everyone who has contributed to these efforts.

Planning for the Future of SMASIS Conference

Prompted by ASME, we formed a taskforce called "The Future SMASIS Study Group" soon after the 2024 Conference. The Group conducted a strategic review of the SMASIS conference to plan for its evolution beginning in 2026. The Group evaluated past attendance, financial performance, and community feedback through ASME surveys and a targeted SMASIS Senate survey. After exploring several models, they proposed a co-located conference format with QNDE to enhance interdisciplinary collaboration while preserving each conference's identity. The 2026 joint model includes shared sessions and events, distinct registrations, websites, awards, banquet and luncheons and competitions, and targeted strategies to grow attendance and engagement. This proposal was recently approved by the two divisions. This taskforce is led by James Gilbert (Purdue University) and includes Nancy Johnson, Nathan Salowitz (University of Wisconsin – Milwaukee), Diann Brei (University of Michigan), Janet Sater (IDA), and Brent Utter (Lafayette College).

Developing Technical Committee Procedures

A taskforce has been formed to develop uniform guidelines and best practices for the Technical Committees in our division. This document is intended to provide information on how to form a TC in the SMASIS division, the process to join a TC, descriptions of TC and symposia leadership roles, activities and responsibilities of the TC, and more. The document is currently under review by the Executive Committee. This taskforce was led by Russell Mailen (Auburn University) with original contributions by Andy Sarles (University of Tennessee, Knoxville) and Steve Anton (Tennessee Tech).

Continuing the Improved Processes for the Awards

During my 2023-2024 tenure as the vice-chair, I am proud to share that our division fully reviewed and improved the processing of all awards and recognitions. Further improving upon the recently adopted processes, awards this year were facilitated by the current vice-chair, Eric Freeman (University of Georgia.) Calls for nominations for all awards were distributed to the division in early 2025 and reviewers were recruited from the division senate to handle evaluations. Conflicts of interest were checked and eliminated prior to disseminating nominated manuscripts and guidelines to the committees formed. Winners (see the remainder of this newsletter) were selected using the improved processes. Plaques and certificates will be presented at the 2025 SMASIS Conference Banquet.

Our Mission, Vision, and Motto

The mission of our interdisciplinary division is that it brings together diverse experts worldwide dedicated to technical advances and applications of smart materials, adaptive structures, and intelligent systems to exchange ideas, advance the field, and impact science, technology and humanity.

Our efforts are inspired by the vision of representing a sustainable global hub that empowers a diverse community of experts to advance the science, education, and technological solutions to rapidly evolving global challenges with smart materials, adaptive structures, and intelligent systems with impactful and transformational technologies.

The way we work together and how we value community interaction is encapsulated in our motto, "If you want to go fast, go alone. If you want to go far, go together." It also reflects our commitment to pushing the boundaries of smart materials technology and fostering a dedication to continuous improvement and excellence.

Organizational Structure

Our division is structured to promote active participation and leadership at various levels. We have several Technical Committees (TCs) focused on different areas of smart materials and systems. These committees are the heart of our technical activities, driving research, development, and collaboration. Our Senate and Executive Committee provide governance and strategic direction, ensuring we stay true to our mission and values.

Get Involved – Join Us

We invite you to become an active member of our division. There are numerous ways to get involved:

• Attend the SMASIS Conference in Fall, and the SPIE Smart Structures + NDE Conference in Spring to network, learn, and share your research.

• Join one of our Technical Committees to collaborate with peers in your area of expertise.

• Nominate deserving individuals for our awards to recognize excellence in our field.

• Volunteer to help judge papers that have been nominated for our division- and TC-level awards.

• Participate in student events and mentoring programs to support the next generation of engineers and researchers.

Share your feedback and ideas to help us continually improve and innovate. We are always open to new initiatives and look forward to your contributions. Whether you have suggestions for new projects or want to volunteer your time and skills, your involvement is invaluable.

Learn More

To stay informed and engaged, please visit our website for updates and detailed information about our activities and initiatives. Join our meetings and events to connect with fellow members and stay at the forefront of advancements in smart materials and intelligent systems.

Integration of Emerging Topics

Some of our earliest fields of innovation have now reached levels of maturity, in which smart material technology has attained market readiness and integration. The generated scientific knowledge has become part of modern university curricula. But we are still striving to constantly envision, lead and integrate new and emerging topics.

Words of Thanks

As my four-year tenure comes to an end in September, I want to take this opportunity to give a heartfelt thanks to my fellow EC officers, Bjoern Kiefer (TU Freiberg) who preceded me in all offices, Eric Freeman (University of Georgia), James Gilbert (Purdue University), Cornel Ciocanel (Northern Arizona University). Thanks to Janet Sater (IDA), Nancy Johnson, and Sergio Lucato (Teledyne Scientific) for years of service to our community. Most importantly, I want to thank Diann Brei (University of Michigan), for her tremendous efforts and support, for embodying the collective memory of our community and for her inspirational leadership.

As a division, we also want to express our sincere appreciation to Barbara Zlatnik, who in her role as Senior Manager of Technical & Engineering Communities (TEC) Operations is our direct ASME contact, for the continued support. I also want to send a special thanks to Mary Jakubowski for her tremendous support of our Conference.

And finally, thanks you all for your scientific contributions, volunteering and dedication to our community. Here's to a bright and innovative future for the SMASIS Division!

Sincerely,

Onur Bilgen

Chair, ASME SMASIS Division

Awards

ASME Gary Anderson Award

For notable contributions to the field of Adaptive Structures and Material Systems. The prize is awarded to a young researcher in his or her ascendancy whose work has already had an impact in his/her field within Adaptive Structures and Material Systems.

Austin R.J. Downey, University of South Carolina

Austin R.J. Downey, is an Associate Professor of Mechanical Engineering, Aerospace Engineering, Civil Engineering at the University of South Carolina. His work is pioneering ultra -low-latency machine-learning and embedded control solutions for structures operating in extreme dynamic environments. His NSF CAREER, AFOSR Young Investigator, and Fulbright awards share a single focus: developing ultra-low-latency state-estimation and control strategies for structures in extreme dynamic environments, optimized for execution on heterogeneous computing architectures. Applications span hypersonic flight control and real-time blast mitigation. His broader smart-structure portfolio features smart concrete systems, meter-scale sensing skins, self-sensing composite laminates, and UAV-deployable sensor packages for structural health monitoring.

Since earning dual doctoral degrees in Engineering Mechanics and Wind Energy Science Engineering & Policy from Iowa State University in 2018 as an NSF-IGERT Fellow, he has published more than 80 peer-reviewed papers. Austin mentors a diverse team of 10 Ph.D. candidates, 5 M.S. students, and over 25 undergraduates, and has graduated 3 Ph.D. and 10 M.S. students. Moreover, he has mentored more than 80 past undergraduate researchers whose collective accomplishments include three NSF GRFP and two DoD SMART fellowships. A committed advocate of open science, he maintains more than 100 public GitHub repositories, sharing code, data, and hardware designs. ■

ASME Dedicated Service Award

In 1983, the ASME Board of Governors approved the establishment of the ASME Dedicated Service Award (DSA). It honors unusual dedicated voluntary service to the Society marked by outstanding performance, demonstrated effective leadership, prolonged and committed service, devotion, enthusiasm and faithfulness.

Chris Lynch, University of California Riverside

Chris Lynch is a transformative leader with over two decades of impactful service and leadership to ASME and the SMASIS community. Most notably Chris in 2005 he co-founded the ASME Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS) Conference and served many years on the conference Executive Advisory Board. He has steadily built and supported the SMASIS community serving on TC/Branch leadership, Aerospace division leadership and current member of the SMASIS division steering committee. ■

Mary Frecker, Pennsylvania State University

In recognition of Mary Frecker's continuous and dedicated service to ASME through the Design Engineering Division and the newly formed SMASIS Division. Mary is the role-model for making significant contributions to our scientific community through leadership, mentorship, and research innovation. ■

ASME Adaptive Structures and Material Systems Award

The Adaptive Structures and Material Systems Award recognizes significant contributions to the sciences and technologies associated with adaptive structures and/or materials systems. The award is intended to honor a lifetime of achievement and sustained impact in the field and is given only to a senior researcher.

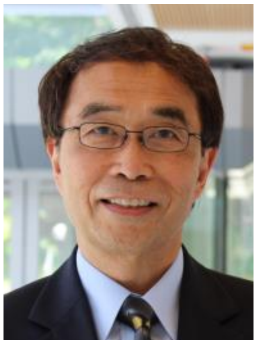
The Adaptive Structures and Material Systems Prize was established in 1993 by the Aerospace Division and operated as a divisional award until 2014, when it was elevated to a Society Award as the Adaptive Structures and Material Systems Award.

George A. Lesieutre

Lesieutre is Professor Emeritus of Aerospace Engineering at Penn State. He earned a B.S. in AeroAstro from MIT and a Ph.D. in Aerospace Engineering from UCLA. His research focuses on structural dynamics of aerospace systems, including passive damping and active structures. He is the author of a graduate-level textbook on structural dynamics. Prior to joining Penn State, he held positions at several companies and a national lab. At Penn State, he previously served as Associate Dean for Research, Department Head, and Director of the Center for Acoustics and Vibration. Lesieutre is a Fellow of the American Institute of Aeronautics and Astronautics and previously served on the AIAA Board of Directors, as General Chair for the 2015 AIAA SciTech Forum, and on several NASEM study panels. He presented the SDM Lecture at SciTech 2014. Lesieutre has received several awards, including five annual best paper awards and the SPIE Lifetime Achievement Award in Smart Structures and Materials. He has advised more than 60 graduate students and published more than 300 technical articles. He once paddled a canoe from Montreal to the Gulf of Mexico as part of a historical reenactment and ran a 50-mile ultramarathon. He is an instrument-rated private pilot. ■

ASME Honorary Member

Honorary Membership is one of the most prestigious ASME award. It is awarded for a lifetime of service to engineering or related fields--e.g. science, research, public service. This achievement is described as "distinguished service that contributes significantly to the attainment of the goals of the engineering profession." Ranking closely with Honorary Membership is the ASME Medal which is awarded for "eminently distinguished engineering achievement." Honorary Membership was first awarded in 1880, the founding year of the Society.



Kon-Well Wang, University of Michigan

Kon-Well Wang, the A. Galip Ulsoy Distinguished University Professor and Stephen P. Timoshenko Professor of Mechanical Engineering at the University of Michigan, has been elected Honorary Member of the American Society of Mechanical Engineers (ASME)—one of the society's highest recognitions. Professor Wang is celebrated for his groundbreaking research in structural dynamics, including the development of multifunctional adaptive structures and innovative metastruc-

Awards (continued)

tures inspired by nature. His work has profoundly influenced engineering education, research, and industry applications from automotive systems to aerospace.

With over 400 publications, leadership roles at the University of Michigan and the National Science Foundation, and numerous prestigious awards, Professor Wang has advanced engineering both as an eminent scholar and a dedicated mentor to more than 90 graduate students and postdocs. His visionary approaches and strategic leadership have elevated the engineering community, shaped national research directions, and enhanced the profession's impact. Professor Wang will be formally recognized at the ASME International Mechanical Engineering Congress & Exposition in November 2025. ■

Active Material Technology and Integrated Systems TC Outstanding Contribution Award

Wind tunnel and flight testing of a lamb wave-based ice accretion sensor, Council of European Aerospace Societies Aeronautical Journal

Martin Pohl, German Aerospace Center (DLR), Institute of Lightweight Systems, Department of Adaptive Systems. ■

Ephraim Garcia Best Paper Award

3D printed feathers with embedded aerodynamic sensing, Bioinspiration and Biomimetics

Ruowen Tu, Postdoctoral researcher, Istituto Italiano di Tecnologia, University of Michigan (related to the paper). **Rémy A. Delplanche**, Ph.D. candidate, The University of Montana. **Bret Tobalske**, Professor, The University of Montana. **Daniel J. Inman**, Professor, University of Michigan, Aerospace Engineering. **Henry A. Sodano**, Professor, University of Michigan. ■

Structural Dynamics and Control Division Best Paper Award

Parallel Mechanical Computing: Metamaterials that can Multitask, Proceedings of the National Academy of Sciences

Mohamed Mousa, PhD Candidate, Department of Mechanical and Aerospace Engineering, University at Buffalo (SUNY). **Mostafa Nouh**, Professor, ASME Fellow, Department of Mechanical and Aerospace Engineering, University at Buffalo (SUNY). ■

Mechanics and Material Systems Division Best Paper Award

3D Soft Architectures for Stretchable Thermoelectric Wearables with Electrical Self-Healing and Damage Tolerance, Advanced Materials

Youngshang Han, Ph.D. Student, Department of Mechanical Engineering, University of Washington, Seattle, WA. **Halil Tetik**, Postdoctoral Scholar, Department of Mechanical Engineering, University of Washington, Seattle. **Mohammad H. Malakooti**, Assistant Professor, Department of Mechanical Engineering, University of Washington, Seattle. ■

Student Spotlight

Isabel Lehenbauer, University of Florida

Isabel Lehenbauer is a PhD candidate in the Fluids and Adaptive Structures Lab at the University of Florida. Her research aims to realize soft robotic swimmers that harness the multi-functionality of their flexible structure. Isabel's work has resulted in multiple generations of bio-inspired soft robotic swimmers and has culminated in a trout-inspired undulatory swimmer, Nebula, that has soft artificial muscles (HASEL actuators) and kinematic sensing embedded directly into the continuum body. Her research has also demonstrated the multi-functionality of HASEL muscles and shown that they can be used in reverse to harvest electricity. For this work she received the DOE's Marine Energy Graduate Student Fellowship and has worked on site at the National Renewable Energy Lab helping to realize Flexible Wave Energy Converters that harvest electricity from the ocean's waves. Isabel plans to complete her PhD in December 2025 with the overarching research aim to demonstrate a multi-functional soft robotic swimmer where the muscles can be used to both power the swimmer's kinematics and harvest energy from the flow. Her advances in soft robotic swimmers will help overcome the limitations of conventional unmanned underwater vehicles and enable improved environmental monitoring from the coasts to the ocean depths. ■

Karthik Boddapati, Purdue University

Karthik Boddapati is a PhD in Mechanical Engineering from Purdue University. Since 2020, he has conducted research at the Programmable Structures Lab. His work focuses on the design and modeling of multistable composite laminates, which are promising for morphing applications

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Feature

Smart Material and Adaptive Structure Development for Aerospace Applications

Frederick T. Calkins and Douglas Nicholson, The Boeing Company ▪ The Boeing Company, including the legacy McDonnell Douglas Company, has been at the forefront of smart materials and adaptive structures innovations for aeronautical and space applications throughout history. Adaptive structures have long been essential components of Boeing products and high visibility demonstrations. For example, the leading and trailing edge aircraft wing or the V-22 rotating rotorblade hub were commercialized because of the tremendous value they bring to the vehicle. In other cases, adaptive or morphing technology was demonstrated but not commercialized; the 1988 Boeing/NASA Mission Adaptive Wing flight test of a F-111 demonstrated superior performance by replacing wing control surfaces with variable camber but was not developed further. Smart structures often include smart material with controllable and responsive properties that can provide unique capabilities and opportunities for aerospace applications. The capabilities enabled by Shape Memory Alloy (SMA) materials have led Boeing to focus on their development for a range of applications. Aerospace systems benefit from SMA properties such as high available output energy, lightweight and compact elements, load bearing integration, exceptional robustness, multifunctionality, and variety of forms and output motion.

In the 1970's initial interest in Nitinol led to unique applications, including a high-power heat engine to convert waste thermal energy into electrical power. At the time, most of these efforts were focused on small power output, proof-of-concept type devices. With Department of Energy support, the McDonnell Douglas Company demonstrated the largest Nitinol heat engine known at the time with up to 32W of electrical power generation and developed plans for MW power systems. The history of SMA devices at The Boeing Company accelerated in the 1980s with an aggressive research program that resulted in many concepts for wire-based spacecraft release mechanism, space structure damping elements, a sun following mechanism, couplings, bearings and rotary actuators. While SMA provided unique component capability, system solutions were needed. Implementation for a given application could be as simple as the SMA element itself or as complex as a system including controls, sensors, power electronics, mechanical mechanisms, and integration elements.

In the 1990s and into the 2000's, Department of Defense accelerated interest in smart materials, driving Boeing to propose and mature SMA actuation systems based on new SMA component forms and system technologies. DARPA funded the funded aircraft smart inlet technology under SAMPSON which provided impetus to develop and refine SMA tube based rotary actuators capable of high torque and twist output in a compact package through several programs. Continuous Moldline Technology (CMT) was developed and flight tested with NASA demonstrating aero surfaces capable of complex and continuous outer moldline (OML) shape change under aerodynamic loads. Boeing Phantom Works engineers developed equiatomic NiTi tube processing and training techniques, including the realization of strong two-way shape memory behavior, leading to the Reconfigurable Rotor Blade demonstration in 2008. Bending actuators using Ni-rich NiTi were developed and utilized for the Variable Geometry Chevron (VGC) demonstrating optimized takeoff and cruise noise reduction for a BCA 777-300ER flight test in 2005. Similar technology solutions were integrated into the jet engine thrust reverser enabling a Variable Area Nozzle (VAN) that showed improved engine efficiency during wind tunnel testing. SMA rotary and bending actuators were incorporated into a scaled airplane wing

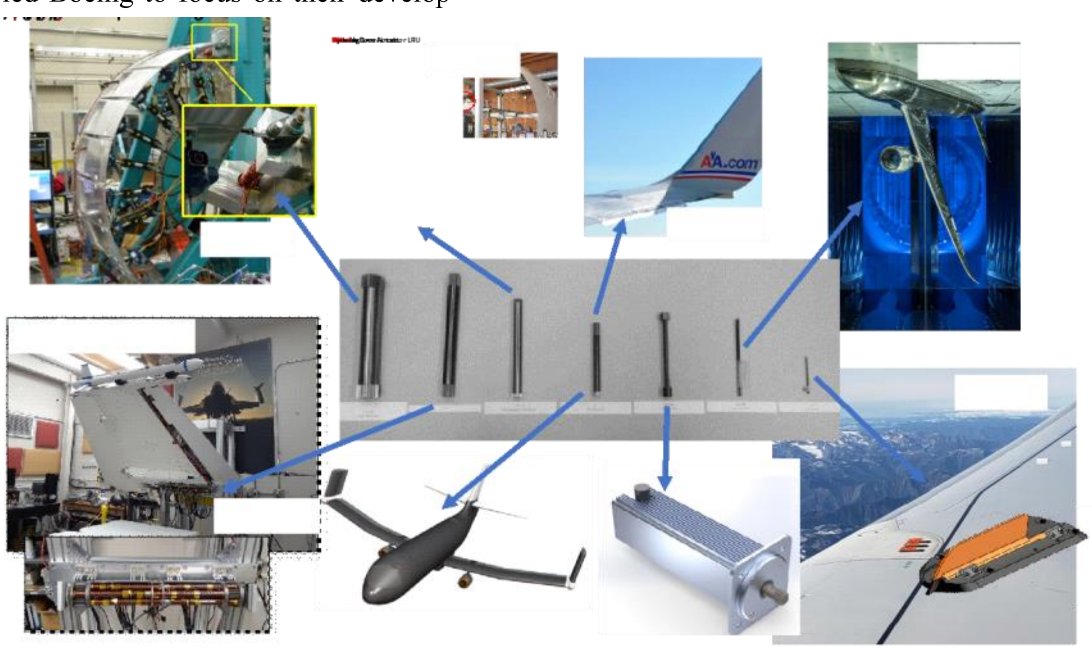

Figure 1: Shape Memory Alloy Rotary Actuator aerospace applications and demonstrations.

Figure 2: Morphing aerospace applications and demonstrations.

leading edge demonstrator to show light-weight, fully integrated variable camber actuation. In addition to these research and development efforts, Boeing took advantage of commercial SMA based products that provided unique benefits to existing products. Examples include Cryofit hydraulic couplers, which are certified for all Boeing commercial aircraft and spacecraft use, and the first non-explosive spacecraft release mechanisms.

During the 2010s and 2020s, Boeing executed many high technology readiness level (TRL) demonstrations of SMA and adaptive structures technologies for aerospace applications with partners including NASA, FAA, US Army, European Transonic Windtunnel, Rolls-Royce, and numerous small business, suppliers, collaborators, and university teams. This included the 2012 Adaptive Trailing Edge (ATE) flight test of SMA rotary actuator to control a secondary control surface on a BCA 737-800 which reduced drag and noise at multiple flight regimes. The Spanwise Adaptive Wing (SAW) integrated a high temperature SMA (NiTiHf) actuation system that enabled inflight and ground-based wing folding of an unmanned subscale fixed-wing aircraft in 2017. Later the SAW system was improved with induction heated NITiHf tubes coupled into a high torque multi-SMA tube architecture enabling a ground folding demonstration of the F/A-18 outer wing. A similar high torque multi-tubes system was used to demonstrate a compact low-weight Powered Door Opening System (PDOS) for a 757 jet engine cowling. Numerous low and high-speed wind tunnel models outfitted with SMA based Remote Control Actuated (RCA) surfaces, such as spoilers and flaps, were tested down to cryogenic temperatures over a full range of dynamic pressures demonstrating huge testing efficiency improvements. Two flight tests on a BCA 777 airplane demonstrated that small SMA tubes integrated into the vane hingeline enabled a deployable vortex generator (VG) in response to operating conditions, including external ambient temperatures, which can provide performance improvements and drag reduction. Other SMA development projects included Adaptive Heat Exchanger for jet engines, Ram Air Door Actuator for commercial airplanes, an adaptive acoustic liner, and an SMA thermal joint for space missions.

Boeing has executed many high technology readiness level (TRL) demonstrations and some production use of SMA and adaptive structures technologies for aerospace applications as described above. Figure 1 highlights some of the demonstrations which utilized SMA rotary actuators. Figure 2 shows morphing applications over the last four decades. ■

Student Spotlight (continued)

(Continued from page 4)

in aerospace and automotive systems, as well as energy harvesting, due to their ability to switch shapes and stiffness across stable states. However, the practical use of these composites is often limited by boundary conditions that restrict their multistable behavior. This prompted his research on developing reduced-order analytical models to systematically study how geometry, boundary conditions, and external loads influence the mechanics of multistable systems. His contributions enable more efficient design and analysis of such compliant structures, significantly expanding their application potential by mitigating boundary effects and geometrical constraints.

His work has led to publications in leading journals, including Composite Structures and Smart Materials & Structures, as well as a U.S. patent application and several conference proceedings at SMASIS. Karthik has received the prestigious 2025 Magoon Award for Excellence in Research and the 2024 AIAA American Society for Composites Student Paper Award. Karthik also gained mentorship experience while serving as the lead teaching assistant for multiple undergraduate mechanical engineering courses. ■

Juan C. Osorio, Purdue University

Juan Camilo is a PhD candidate in Mechanical Engineering at Purdue University, working at the Programmable Structures Lab. Juan's research has focused on exploring nonlinear responses and systems for physical embodied control, mechanical computing, and soft robotics. He has utilized snap-through stabilities and multistability in various structures to enhance the dynamic response of soft robots, thereby enabling them to embody different stable configurations that can classify multiple external stimuli. Furthermore, Juan combined inherent sensing and threshold capabilities with memristors to encode a physical Hopfield Network into a metamaterial. This research breakthrough was recognized as the best paper in mechanics and material systems at the Smart Materials, Adaptive Structures, and Intelligent Systems conference. Juan has also received best paper and poster awards from AIAA, APS, and Gordon Research Conferences. In addition to his research, Juan has mentored five undergraduate and two master's students, resulting in several conference and journal papers. He is also passionate about teaching, having served as a teaching assistant for three different courses and a study abroad program. As part of his commitment to service, Juan is an active member of the mechanical engineering graduate organization board and a mentor in a program for exchange students from Colombia. ■

Sourabh Sangle, Texas A&M

Sourabh Sangle received his doctoral degree in Mechanical Engineering at Texas A&M University, United States in August 2025. He obtained a Bachelor of Engineering (with honors) in Mechanical Engineering from Birla Institute of Technology & Science Pilani, India. His doctoral research focused on high-frequency electromechanical impedance-based structural health monitoring and unique part identification, critical to the next generation of intelligent mechanical systems. Supported by an NSF-funded collaboration, he led efforts to achieve a 98% precision in distinguishing identically manufactured parts data-driven classification methods. Other aspects of his work integrate experimental modal analysis with finite element modeling, using tools such as ANSYS, MATLAB, Abaqus, along with non-contact laser vibrometry. Beyond research, Sourabh brings real-world impact through industry and teaching experience. As a co-op at Cummins Inc., he led a Six Sigma project that earned him company's global Business Impact Award. He also served as a session chair at conferences, and as graduate teaching assistant has mentored students in dynamics and vibrations. He has been an active contributor to the SMASIS and the ASME community, with multiple conference proceedings and journals under review. ■

Kevin Fuentes, Texas A&M

Kevin Fuentes is a PhD candidate in Mechanical Engineering at Texas A&M University, expecting to graduate in December 2025. His research focuses on updating the equations of motion for model systems to account for potential health or environmental changes that the true physical system may encounter.

The theoretical foundation of this research is that a model can effectively represent physical phenomena under a defined set of assumptions and constraints. However, if the physical system experiences a change in health status—caused by factors such as aging, usage, or environmental influences—and the model does not incorporate these changes, the model may no longer accurately describe the motion of the physical system. This is where his research becomes significant: by utilizing the input and measured output that the true system is experiencing, an adaptive estimator-observer can be implemented to update the equations of motion.

His theoretical work also extends to enhance robustness against noise and includes advances in adaptive state with input matrix estimation. Research is being supervised by Dr. James Hubbard and Dr. Mark Balas. ■

Sargun Singh Rohewal, Oak Ridge National Laboratory

Sargun Singh Rohewal is an exceptional graduate researcher whose work on hierarchical interfaces and dynamic polymer networks is directly aligned with the SMASIS mission of advancing smart materials and adaptive systems. His expertise in polymer chemistry and materials design has led to multiple high-impact publications, including Advanced Science and Advanced Functional Materials, both featured as frontispieces. His study on vitrimeric systems for extrusion and injection molding—published in Small and Polymer Chemistry—have advanced sustainable manufacturing pathways for reprocessable and multifunctional composites.

At SMASIS 2023, he presented his work on fast-relaxing vitrimers for self-sensing and in situ healing of polymer composites. In a notable collaboration with Prof. Malakooti (University of Washington), Sargun co-authored a recent Advanced Functional Materials paper on conductive liquid metal–vitrimer composites for reconfigurable and recyclable electronics, developed in part by mentoring high school students.

Sargun is equally distinguished in outreach and communication; recognized as a finalist in the UT Three Minute Thesis and 1st runner-up in the ASC 4-Minute Research Impact Competition. With strong training in fundamental chemistry and a vision to scale from molecule to application, he exemplifies the innovation and interdisciplinary spirit that defines the SMASIS community. ■

Ellen Kim, University of Michigan

Ellen Kim received her B.S. in 2018 from the University of California, Los Angeles, and earned her M.S. in 2019 and Ph.D. in 2025 from the University of Michigan, Ann Arbor in Mechanical Engineering. Her dissertation work with Prof. Diann Brei and Dr. Jonathan Luntz focused on the design of constrained inflatable structures to provide novel programmable adaptive functionalities. She studied the mechanical properties of these structures with respect to the geometry of their architectural constraints through models, design methodologies, and experimental validations. During her dissertation, she worked closely with Toyota Research Institute of North America and General Motors to develop and transition technologies and holds two patents. Ellen is a recipient of the ASME SMASIS Fort Wayne Metals Hardware Award in 2024 and the UM Mechanical Engineering 3 Minute Thesis Award in 2023. Throughout her Ph.D., Ellen mentored over 20 undergraduate and graduate students in their independent research studies. Beyond her research, she served as treasurer and networking officer for the Graduate Society of Women Engineers, a social member of the UM Mechanical Engineering Graduate Council, and an organizer of student events at the ASME SMASIS conference. ■

ASME Conference on SMART MATERIALS, ADAPTIVE STRUCTURES AND INTELLIGENT SYSTEMS

September 8 – 10, 2025, Sheraton Westport Chalet, St. Louis, Missouri

Sponsored by the Smart Materials, Adaptive Structures, and Intelligent Systems Division

Structural Health Monitoring
Structural asset and life cycle monitoring; condition-based and predictive maintenance; damage detection; digital twin; digital thread and authoritative source of truth; product lifecycle management; industrial IOT; AI and machine learning; physics-informed machine learning; data analytics, data science and big data; wireless and remote monitoring; edge computing; distributed sensing; human performance monitoring; HSI.

Integrated System Design and Implementation
Adaptive/intelligent/integrated systems design; smart structures design processes and tools; smart devices and technologies; Emergent computing methods including morphological computation and physical reservoir computing; compliant mechanism design; Industrial and government smart products and system applications; sensors and actuators; power and control electronics; smart electronics and devices; MEMS.

Modeling, Simulation and Control of Adaptive Systems
Micro and macro level modeling; vibration and acoustic control; passive/semi-active/active damping and stiffness variation; actuation and motion control; intelligent and adaptive control; nonlinear control; hysteresis control; modeling simulation and control of micro/nano systems; nonlinear dynamics, and nonlinear vibration.

Mechanics & Behavior of Active Materials
Advanced constitutive measurements; micro/nano-mechanics of actuator & sensor materials; phase field modeling; multi-scale and multi-physics material models; numerical implementations; reliability issues: aging, fatigue, and fracture; energy storage materials; multiferroic materials.

Development and Characterization of Multifunctional Materials
Multifunctional material formulation, evaluation, synthesis, and processing; multifunctional composites and nanocomposites; self-healing, shape memory, piezoelectric, electrostrictive and magnetostrictive materials; interface engineering; data-driven design of functional materials; machine learning for composites; soft matter; flexible electronics.

Bioinspired Smart Materials and Systems
Convergent topics in engineering and biology; modeling and simulation of biological systems; biomechanics; biomimetic and bioinspired devices and materials; biomolecular assemblies, bioinspired or soft robotics; biohybrid or living machines; smart prosthetics and implants.

Energy Harvesting
Modeling and experiments of energy harvesting transducers and applied systems using piezoelectric and magnetostrictive materials; electroactive polymers; inductive and capacitive devices; MEMS and NEMS configurations; novel circuits and storage devices; novel applications/analysis of traditional transduction (e.g. solar, thermoelectric); energy harvesting using metamaterials.

Embodying Physical Computing and Mechano-Intelligence
This special symposium focuses on the emerging topic of embodying physical computing and mechano-intelligence in adaptive structures and materials - an intriguing direction for future autonomous and intelligent engineering systems. The scope will be broad and at multiple scales, from autonomous materials with mechano-logic and mechano-computing power, to intelligent structural systems with learning, memory, and decision-making capabilities embedded in the mechanical domain.

Special Sessions
- Deployable and Adaptive Space Structures
- Active Hybrid Composites
- Multifunctional Energy Storage Systems
- Multifunctional Yarns, Textiles, and Systems
- Toyota / Univ of Michigan Tech Incubator Session

Special Events
- Industry Forum
- Pioneer Awards Banquet
- Student Hardware Competition
- Student Best Paper Competition
- Student outing and networking opportunities