

SMART MATERIALS, ADAPTIVE STRUCTURES AND INTELLIGENT SYSTEMS

September 9 – 11, 2024

Atlanta, GA

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

SMASIS Conference Synopsis

Adaptive Structures and Materials Systems are intelligent systems with sentience and responsiveness to changing environments. This field has rapidly matured through interdisciplinary efforts. The conference aims to bring together global experts to discuss the latest smart materials breakthroughs and adaptive structure applications with high impact in sectors like automotive, aerospace, energy, consumer products, and medical technology.

Schedule

Feb 12, 2024: 400 word abstract due
Feb 19, 2024: Abstract Acceptance notification
Mar 18, 2024: Draft paper due
Apr 22, 2024: Draft Paper acceptance notification
Jun 7, 2024: Copyright form due
Jun 10, 2024: Final paper due

Full papers will appear in an archival ASME Conference Proceedings. High quality conference papers will be considered for publications in relevant ASME journals with an expedited review process.

Authors please note: Only 2 presentations per author with one full registration.

Participation

Authors should submit a 400 word abstract to the conference web site:

<https://event.asme.org/smasis>

Questions can be directed to:

Shahrazad Towfighian, Conf. Chair,
stowfigh@binghamton.edu

Johannes Riemenschneider, Technical Chair,
johannes.riemenschneider@dlr.de

Brent Utter, Technical Co-Chair,
utterb@lafayette.edu

Uwe Marschner, Int'l Co-chair,
Uwe.marschner@tu-dresden.de

Wei-Hsin Liao, Int'l Co-chair,
whliao@cuhk.edu.hk

The conference is divided into symposia broadly ranging from basic research to applied technological design and development to industrial and governmental integrated system and application demonstrations. The symposia and their topical areas specifically are:

Structural Health Monitoring

Chair: *Zhenhua Tian, Virginia Tech*

Co-Chairs: *Sumit Gupta, ORNL*

Jinki Kim, Georgia Southern

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

Chair: *Patrick Musgrave, University of Florida*

Co-Chairs: *Farhan Gandhi, Rensselaer Poly*

Brent Bielefeld, Booz Allen Hamilton

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

Chair: *Giovanni Berselli, Univ. of Genoa*

Co-Chairs: *Abdessattar Abdelkefi, NMS Univ.*

Jeff Hill, Brigham Young Univ.

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.

Energy Harvesting

Chair: *Serife Tol, Univ. of Michigan*

Co-Chairs: *Wei Che Tai, Michigan State Univ.*

Lihua Tang, Univ. of Auckland

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.

Development and Characterization of Multifunctional Materials

Chair: *Mohammad Malakooti, U. of Washington*

Co-Chairs: *Amir Ameli, U. of Mass. Lowell*

Christopher Bowland, ORNL

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

Chair: *Vanessa Restrepo Perez, TAMU*

Co-Chairs: *Cody Gonzalez, USTA*

Matthew Bryant, NC State

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.

Mechanics & Behavior of Active Materials

Chair: *Paris von Lockette, Univ of Maryland*

Co-Chairs: *Zhangxian Deng, Boise State*

John Gallagher, Merrimack College

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.

Special Symposium: Embodying Physical Computing and Mechano-Intelligence

Chair: *Kon-Well Wang, University of Michigan*

Co-Chairs: *Suyi Li, Virginia Tech*

Andres F. Arrieta, Purdue University

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.

SMASIS in-action

Hardware Showcase: **Chairs:** *Maria Sakovsky, Stanford Univ, Paul Gilmore, Toyota, Cody Gonzalez, University of Texas at San Antonio,*

All authors are invited to present physical demonstrators of their respective developments as part of the hardware showcase and compete for the best hardware award. The showcase runs throughout the conference and provides opportunities for technical discussions and networking.

Industry Forum: *Paul Motzki, Saarland University*

A dedicated industry forum is planned to get companies perspectives in the field represented even more. This forum will include an exhibition as well as dedicated sessions.

Student Activities: *Patrick Walgren, AFRL, Rishikesh Srinivasaraghavan Govindarajan, Embry-Riddle Aeronautical University,*

Student events at SMASIS 2024 will provide opportunities for technical communication, networking, and community outreach.