

Call for Papers

The AIAA Structures and Materials Technical Committees are sponsoring a special session on

Applications of Artificial Intelligence and Machine Learning to Problems in Structures and Materials

AIAA SciTech 2020

6-10 January 2020

Hyatt Regency Orlando

Orlando, Florida

The AIAA (American Institute of Aeronautics and Astronautics) Structures and Materials Technical Committees are pleased to announce a call for papers to be presented in special sessions on **Applications of Artificial Intelligence and Machine Learning to Problems in Structures and Materials** within the AIAA SciTech Forum.

Artificial Intelligence and machine learning (deep learning included) technologies offer the potential to revolutionize and streamline current processes to develop and qualify materials, as well as improve our design process for aerospace structures. These sessions will examine applications of various artificial intelligence and machine learning technologies to further the development of new materials and structural, along with the associated design and qualification/certification. Abstracts are sought covering recent research, technological advancements, and systems level perspectives in the above areas. The committee welcomes submissions from government, industry, academic, and small businesses.

Extended abstracts of no less than 1,000 words are due **June 11, 2019**

Final manuscript due **December 2, 2019**

Detailed abstract preparation instructions and policies can be found

<https://scitech.aiaa.org/callforpapers>

Make sure to select the “Special Sessions” option during submission

Please notify us if you are planning to submit an abstract. For more information contact one of the following organizers:

Dr. Wenbin Yu
Purdue University
wenbinyu@purdue.edu

Dr. Steven Wanthal
The Boeing Company
steven.wanthal@boeing.com

Integrated Computational Materials Engineering (ICME) “Celebrating a Decade of ICME at AIAA”

**January 6-10, 2020
Hyatt Regency - Orlando, Florida**

The AIAA (American Institute of Aeronautics and Astronautics) Materials, Structures, Multidisciplinary Design Optimization (MDO), Nondeterministic Approaches (NDA), and Systems Engineering Technical Committees (TCs) are very pleased to announce a coordinated series of special sessions and training events on Integrated Computational Materials Engineering within the [AIAA SciTech Forum 2020](#). ICME initiatives focus on the integration of materials information, captured in computational tools, with engineering product design, optimization, performance analysis and manufacturing process simulation (references: [NAP 2008](#), [NSTC 2011](#)). The coordinated efforts of ICME and the Materials Genome Initiative (MGI), in concert with the [United States Government “Digital Engineering”](#) and [Manufacturing USA](#) initiatives, aim to deliver the required infrastructure and training to accelerate innovation, discovery, development, validation, and use of advanced materials and manufacturing processes as an integral part of next generation multi-disciplinary design/make with a focus on designing for affordability. The presentations addressed in these events are affiliated with and compliment the efforts of ASM International ([AeroMat & Computational Materials Data Network](#)), [TMS](#), [ASME \(Verification & Validation Sub-Committee efforts\)](#), and SciTech short courses for ICME.

To this end, the Materials, Structures, MDO, NDA, and Systems Engineering Technical Committees are soliciting papers with recent research, technological advancements, and systems level perspectives that address issues/challenges involved in the integration of ICME into design systems, manufacturing/production, sustainment/aftermarket systems and structural analysis. The end goal of these sessions is to tabulate challenges and solutions for accelerating implementation of ICME capability across industry, academia and government.

The session organizers welcome submissions & participation from government, industry, academia, and small businesses in the following ICME integration events for [AIAA SciTech Forum 2020](#):

- Lecture
 - “ICME – Success Cases & Lessons Learned”
 - Invited Lecture: John Allison (**to be confirmed**)
- Cross-TC Coordinated Technical Sessions
 - “Additive Manufacturing Modeling”
 - Chairs: Stephanie TerMaath and Rob Taylor
 - “Verification, Validation & Uncertainty Quantification for ICME”
 - Chair: Barron Bichon
 - “Integrating Composite Manufacturing Modeling with Design”
 - Chairs: Greg Odegard, Wenbin Yu, Josh Dustin, and Marianna Maiaru
- ICME “Lunch & Learn”
 - Speaker: Steve Arnold (**to be confirmed**)
- Tutorial
 - Verification & Validation Best Practices for ICME
 - Instructors: David Riha, Mark Benedict (**to be confirmed**)
- ICME Prize 2020 Award
 - [Prize Competition Presentations & Award Selection](#)
 - Contacts: Wenbin Yu, John F. Matlik, Steve Arnold

For more information, review details in links above and/or contact one of the following TC leads:

Dr. Steve Arnold (Materials TC)
National Aeronautics & Space Administration (NASA)
steven.m.arnold@nasa.gov

Dr. Stephen P. Engelstad (Structures TC)
Lockheed Martin Aeronautics Company
stephen.engelstad@lmco.com

Dr. H. Alicia Kim (MDO TC)
University of California, San Diego (UCSD)
alicia@ucsd.edu

Dr. Barron J. Bichon (NDA TC)
Southwest Research Institute
barron.bichon@swri.org

Mat French (Systems Engineering TC)
Rolls-Royce Corporation/LibertyWorks™
Mat.French@liberty.rolls-royce.com

Call for Papers

The AIAA Structures Technical Committee is sponsoring a Special Session on:

Structural Joints and Repairs

January 6-10, 2020
Hyatt Regency - Orlando, Florida

This session will focus on technology advances in the areas of design, analysis, manufacturing, inspection, testing, and performance evaluation of Structural Joints and Repairs for aerospace vehicles. Structural joints may include bonded, bolted, or new innovative joining methods. Structural repairs may include innovative design concepts, new material combinations, and/or manufacturing processes. Topics of interest may include but are not limited to: analysis & design for predicting strength and durability, structural health monitoring for assessing integrity, material selection and processing, 3D printing, non-destructive testing for damage assessment, automated joining and repair processes for repeatability and reliability. The committee welcomes submissions from government, industry, academia, and small businesses.

Abstracts must be submitted online at: <https://scitech.aiaa.org/>

Make sure to select the “Structural Joints and Repairs” topic option under “Structures” when prompted during submission.

Please notify us if you are planning to submit an abstract. Please also include the line “Structural Joints and Repairs” above the title of your extended abstract. The abstracts for the special sessions will go through the same review process as abstracts for the general call for papers.

Extended abstracts are due **June 11, 2019**
Final manuscript due **December 2, 2019**

For more information, please contact one of the following organizers:

Dr. Stephanie TerMaath
The University of Tennessee, Knoxville
stermaat@utk.edu
865-974-7711

Dr. Scott Norwood
Lockheed Martin Aeronautics Company
scott.norwood@lmco.com
817-935-3688

Call for Papers

The AIAA Structures Technical Committee is sponsoring a special session

Composite Interlaminar Enhancement Methods and Modeling

AIAA SciTech 2020

January 6-10, 2020
Hyatt Regency Orlando
Orlando, Florida

Laminated composite structures are particularly susceptible to interlaminar delamination due to their lower strength in the thickness direction. Since co-cured and bonded composite joints experience similar limitations, they are often the “weak-link” in a structural component. Several interlaminar reinforcement techniques have been developed over the past few decades to overcome this inherent weakness. The intent of this special session is to bring together the composite structures technical community to discuss recent advances in interlaminar enhancement methods to include novel fabrication techniques, new experimental results, and advanced analysis methods. Increasing technology readiness in these areas will lower the risk of transitioning these approaches to future systems.

Some examples of interlaminar enhancement techniques are:

- stitching
- z-pinning
- flocking
- tufting
- compliant interlayers
- 3-D woven joints
- needling
- nano-reinforcements

Extended abstracts of no less than 1,000 words – June 11, 2019

Final manuscript – December 2, 2019

Detailed abstract preparation instructions and policies can be found at

<https://scitech.aiaa.org/callforpapers>

Make sure to select the “Structures” technical discipline during submission

Please notify us if you are planning to submit an abstract. For more information contact one of the following organizers:

Dr. Stephen Clay
Air Force Research Lab
stephen.clay.2@us.af.mil

Dawn Jegley
NASA Langley Research Center
dawn.c.jegley@nasa.gov

Call for Papers

The AIAA Structures Technical Committee is sponsoring a special session in Honor of Dr. Mostafa Rassaian

AIAA SciTech 2020

January 6-10, 2020
Hyatt Regency Orlando
Orlando, Florida

These sessions are in recognition of the outstanding, thirty years of contributions by Dr. Mostafa Rassaian to many fields in aerospace engineering. They also recognize his extensive technical career as a technical fellow at Boeing Research and Technology, and his long time membership and service to the AIAA. Among Dr. Rassaian's noteworthy contributions are crashworthiness certification by analysis supported by smart testing, high energy impact event simulation in composites such as bird strike, composite laminate optimization and failure prediction of non-traditional and steered fiber laminates, and coupled structural acoustic and vibration modeling for aircraft noise control.

Extended abstracts of no less than 1,000 words – June 11, 2019
Final manuscript – December 2, 2019

Detailed abstract preparation instructions and policies can be found at

<https://scitech.aiaa.org/callforpapers>

Make sure to select the “Structures” technical discipline during submission

Please notify us if you are planning to submit an abstract. For more information contact the session organizer:

Dr. Ali Najafi
ANSYS Inc.
ali.najafi@ansys.com

Call for Papers

The AIAA Structures Technical Committee is sponsoring a special session topic on
Multifunctional Structures

AIAA SciTech 2020

January 6-10, 2020
Orlando, Florida

The AIAA (American Institute of Aeronautics and Astronautics) Structures Technical Committee Bio-inspired and Multifunctional Structures Subcommittee is very pleased to announce a call for papers to be presented in sessions on **Multifunctional Structures** within the AIAA SciTech Forum. Any structures-related aspect of multifunctional structures that is relevant to aerospace is acceptable for papers, including:

- Self-sensing and/or healing intelligent and multifunctional structures (polymers, metals, ceramics, fibers, etc.) for hot and cold environments
- Optimized and integrated multifunctional structures for space applications that incorporate primary structure with Micro-Meteoroid and Orbital Debris (MMOD) resistance, thermal and radiation protection, antennae, etc.
- Optimized and integrated multifunctional aircraft structures that incorporate primary structure with other requirements such as lightning strike protection, acoustic transmission reduction, fuel storage and venting, thermal or electrical conductivity (or insulation), etc.
- Modeling and experimentation of predictive relationships between the structure and material composition
- Integration for more complex phenomena and interdisciplinary couplings between the structures discipline and other traditionally separate disciplines such as aerodynamics, heat transfer, materials, control, optics, chemistry, and biology
- Multidisciplinary computational methods for analysis, optimization, and design
- Integrated system analysis and design to couple subsystems, components, subcomponents, and environment
- Validation of numerical simulations
- Development of novel structural concepts with active and/or passive adaptive control of structural deformations
- Innovative applications
- Apparatus and techniques

To this end, the Structures Technical Committee is soliciting papers with recent research, technological advancements, and systems level perspectives in the above areas. The committee welcomes submissions from government, industry, academic, and small businesses.

Extended abstracts of no less than 1,000 words are due **June 11, 2019**

Final manuscript due **December 2, 2019**

Detailed deadline information, abstract preparation instructions, and policies can be found at:

<https://scitech.aiaa.org/callforpapers>

Please notify us if you are planning to submit an abstract. For more information contact one of the following organizers:

Mr. Andrew Lovejoy
NASA Langley

Dr. Sandra Walker
NASA Langley

Dr. James B. Min
NASA Glenn

Call for Papers

The AIAA Structures Technical Committee is sponsoring a special session on

Historical Lessons Learned and Advances in Structural Applications

at

AIAA SciTech 2020

January 6-10, 2020

Hyatt Regency Orlando

Orlando, Florida

As engineers/scientists in our aeronautics and astronautics community head toward retirement and or consider changing positions and jobs it is essential to capture technical knowledge that has been obtained over the years. This special session is a call to all engineers to recap their most significant findings and share them with a broader audience in the AIAA community. The intent of this session is to help ensure that these major findings are not forgotten. It is important to learn from our historical experiences and share them so that younger generations will not have to repeat the classical work that has already been completed. For this session Engineers/Scientists will focus on significant historical findings and advances in the area of Structures.

Extended abstracts of no less than 1,000 words – June 11, 2019

Final manuscript – December 2, 2019

Detailed abstract preparation instructions and policies can be found at

<https://scitech.aiaa.org/callforpapers>

Make sure to select the “Structures” technical discipline during submission

Please notify us if you are planning to submit an abstract. For more information contact the session organizer:

David Richardson

Northrop Grumman Corporation

david.richardson@ngc.com

Call for Papers

The AIAA Structures Technical Committee is sponsoring a special session on

Design, Analysis, and Certification of Additive Structures

at

AIAA SciTech 2020

January 6-10, 2020

Hyatt Regency Orlando

Orlando, Florida

Additive manufacturing (AM) using 3D printing has the potential to revolutionize design of many types of structural components if the challenge of designing and fabricating components with reliability sufficient for certification can be met. Opportunities to leverage AM processes for structural improvement include low volume production, aging component replacement, piece part reduction and assembly simplification, material savings, multi-functionality, increased complexity, and weight and performance improvement through generative design optimization free from many conventional manufacturing constraints. Despite these opportunities, formidable challenges remain in manufacturing process reliability, design and analysis methodology, printed part inspection, and certification, etc. The AIAA Structures Technical Committee seeks papers of development and application addressing these challenges at the structural or component level.

Potential topics could include the following:

- AM-informed design, analysis, and optimization methods
- Generative design optimization for AM
- Lattice structure design and application
- Process-structure-property-performance relationships, sensitivities, and models
- Predictive design tools
- Multiscale approaches
- Reliability-based approaches
- Qualification/certification approaches
- Traditional building block approach
- Rapid qualification framework
- Inspection methods—in-situ and post-process, destructive and non-destructive
- Build simulation, heat treatment, and correlation

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Make sure to select the Structures technical discipline during submission

Please notify us if you are planning to submit an abstract. For more information, contact one of the following organizers:

Dr. Rob Taylor

University of Texas at Arlington
taylorm@uta.edu

Dr. Zhenning Hu

The Boeing Company
zhenning.hu@boeing.com

Call for Papers

The AIAA Structures Technical Committee is sponsoring a Special Session on:

Stability and Failure of Structures

AIAA SciTech 2020

January 6-10, 2020

Hyatt Regency Orlando

Orlando, Florida

This session will focus on new and development advances in theoretical, semi-analytical, computational, and testing to understand and predict structural integrity of metallic and composite structures used in aerospace vehicles. Topics of interest may include but not limited to: nonlinear and/or linear conservative and nonconservative loadings, composite and metallic structural failure, damage tolerance and failure prediction of aircraft structures, experimental methods leading to semi-analytical methods, structural stability, adaptive structures, and structural health monitoring. The committee welcomes submissions from government, industry, academia, and small businesses.

Detailed abstract preparation instructions and policies can be found at

<https://scitech.aiaa.org/callforpapers>

Make sure to select the “Stability and Failure of Structures” topic option under “Structures” when prompted during submission.

Please notify us if you are planning to submit an abstract. Please also include the line “Stability and Failure of Structures” above the title of your extended abstract. The abstracts for the special sessions will go through the same review process as abstracts for the general call for papers.

Extended abstracts (no less than 1,000 words) are due **June 11, 2019**

Final manuscript due **December 2, 2019**

For more information, please contact one of the following organizers:

Dr. Vijay K. Goyal

Lockheed Martin Aeronautics Company
vijay.k.goyal@lmco.com

Dr. Mark W. Hilburger

NASA Langley Research Center
mark.w.hilburger@nasa.gov