

AIAA SciTech 2024

Structures Technical Committee

AIAA SciTech 2024
January 8-12, 2024
Orlando, FL

The Structures Technical Discipline covers any aero-structure-, aircraft- and/or spacecraft- (e.g., launch vehicles) related science and technology in design, analysis, computer modeling, optimization, manufacturing, and testing. Its topics include the latest development in both traditional structures and innovative concepts, ranging from coupons and components to vehicles and comprising metallic, composite, and/or hybrid materials. It also covers refinement, improvement and development of current approaches, and exploration in structural repair, damage, fatigue, fracture, stability, and manufacturing. Papers on advancements in durability, damage tolerance, aging, fail-safe and/or safe life are also encouraged. We welcome papers on best practices, historical lessons learned, and advances in structural applications. Papers on other topics in structures not explicitly mentioned above are also strongly encouraged.

AIAA Structures Technical Discipline at SciTech 2024 will include joint sessions in 3D Woven Composites, Analysis and Structures. Structures and Materials in Extreme Environments, Artificial Intelligence and Machine Learning for Problems in Structures and Materials, Fatigue Loads and Spectrum Generation, and Structural Optimization Application for Aircraft and Spacecraft.

The Structures Technical Discipline at SciTech 2024 will include special sessions in Crashworthiness of eVTOL/UAM Vehicles, Additive Structures, Structural Health Monitoring & Non-Destructive Evaluation, and Stitched Composite Structures. There will also be Special Sessions in Honor of Dr. Anthony Palazotto and in Memory of Dr. Harry Hilton.

We invite you to submit a paper for the AIAA Structures Technical Discipline at SciTech 2024. The major deadlines are as follows:

Extended abstracts of no less than 1,000 words are due **May 25, 2023**
Author notification of paper acceptance on or about **August 25, 2023**
Final manuscript due **December 4, 2023**

For more information, contact the AIAA Technical Discipline Chair for SciTech 2024:

Jeffrey Chambers
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Examples of session topics are listed below, however this list is not exclusive. Other topics in structures not explicitly listed below are also welcomed.

Traditional Session Topics:

Typical sessions over the last 5 years:

- Aircraft and Spacecraft Structural Design, Analysis, Test
- Buckling and Stability of Aircraft and Spacecraft Structures
- Composite Structural Analysis, Design, Testing, and Manufacturing
- Fatigue, Fracture, and Impact Damage of Structures
- Multifunctional Concepts and Approaches in Aircraft and Spacecraft Structures
- Structural Joints and Repairs
- Other Topics in Structures

Joint Sessions with other TCs:

- 3D Woven Composite Materials and Structures
- Structures and Materials in Extreme Environments
- Artificial Intelligence and Machine Learning for Problems in Structures and Materials
- Fatigue Loads and Spectrum Generation
- Structural Optimization Application for Aircraft and Spacecraft

Special Sessions for SciTech 2024:

- Crashworthiness of eVTOL/UAM Vehicles
- Additive Structures
- Structural Health Monitoring & Non-Destructive Evaluation
- Stitched Composite Structures

“In Honor/Memory of” Sessions:

- Special Session in Honor of Dr. Anthony Palazotto
- Special Session in Memory of Dr. Harry Hilton

Other Topics in Structures:

This list of session topics is not exclusive. Papers on other topics in structures are strongly encouraged. Additional information on joint special sessions is attached.

Call for Papers

The AIAA Structures Technical Committee and the Materials Technical Committee are sponsoring a Joint Special Session on

3D Woven Composites Materials and Structures

AIAA SciTech 2024

January 8-12, 2024

Orlando, FL

The AIAA (American Institute of Aeronautics and Astronautics) Structures and the Materials Technical Committees solicits papers with recent research, technological advancements, and systems-level perspectives on **3D Woven Composites Materials and Structures** within the AIAA SciTech conference. It is the intention to examine advances relevant to aerospace materials and structures including:

- Design, analysis, and characterization of 3D woven materials and structures
- Novel manufacturing techniques for 3D woven preforms and composite structures
- New analysis methods for 3D woven material and structural design and evaluation
- Imaging and microstructural evaluation of 3D woven materials and structures
- Novel observations of material and structural response characteristics resulting from mechanical and/or thermal loading
- Process modeling of 3D woven materials and structural components, including weaving, compaction, infusion, and/or cure of 3D woven preforms
- Integration of process and performance predictions of 3D woven composites
- Qualification/certification approaches and challenges for 3D woven materials and structures

The committee welcomes submissions from government, industry, academic, and small businesses. All abstracts will be evaluated by qualified individuals from these sectors.

Extended abstracts of no less than 1,000 words are due **May 25, 2023**

Author notification of paper acceptance on or about **August 25, 2023**

Final manuscript due **December 4, 2023**

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

<https://www.aiaa.org/SciTech/presentations-papers/call-for-papers>

Make sure to select the “3D Woven Composites Materials and Structures” topic option under “Materials” or “Structures” when prompted during submission.

For more information, contact one of the following organizers:

Prof. Dianyun Zhang

Prof. Hülya Cebeci

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İstanbul Technical University

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Call for Papers

The AIAA Structures Technical Committee and the Materials Technical Committee are sponsoring a Joint Special Session on

Structures and Materials in Extreme Environments

AIAA SciTech 2024

January 8-12, 2024

Orlando, FL

The AIAA (American Institute of Aeronautics and Astronautics) Structures Technical Committee and the Materials Technical Committee are soliciting papers with recent research, technological advancements, and systems-level perspectives on **Structures and Materials within Extreme Environments** within the AIAA SciTech conference. It is the intention to examine advances including:

- Special considerations for materials, design, analysis, and testing of structures in extreme environments (e.g. hypersonic; entry descent, and landing; aircraft and rocket engine; space/planetary exploration; and cryogenic applications)
- Design, analysis, and test methods for materials in extreme environments (e.g. additive structures, lattice structures, high temperature composites)
- Design and Analysis methods for combined and/or coupled loads, including modeling, design optimization, and multi-disciplinary analysis (fluid, thermal, and structural interactions; optics; deployable structures)

The committee welcomes submissions from government, industry, academic, and small businesses. All abstracts will be evaluated by qualified individuals from these sectors.

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<https://www.aiaa.org/SciTech/presentations-papers/call-for-papers>

Make sure to select the “Structures and Materials in Extreme Environments” topic option under “Materials” or “Structures” when prompted during submission.

For more information, contact one of the following organizers:

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Call for Papers

The AIAA Structures Technical Committee and the Materials Technical Committee are sponsoring a Joint Special Session on

Artificial Intelligence and Machine Learning for Problems in Structures and Materials

AIAA SciTech 2024

January 8-12, 2024

Orlando, FL

The AIAA (American Institute of Aeronautics and Astronautics) Structures and Materials Technical Committees solicit papers with recent research, technological advancements, and systems-level perspectives in Artificial Intelligence and Machine Learning for Problems in Structures and Materials within the AIAA SciTech conference. Artificial Intelligence and machine learning (deep learning included) technologies offer the potential to revolutionize and streamline current processes to develop and qualify materials and improve our design process for aerospace structures. These sessions will examine applications of various artificial intelligence and machine learning technologies to develop new material further and structural applications and their application to design and qualification/certification. Applications to all aero-structures, aircraft and spacecraft (such as launch vehicles), are welcome.

The committee welcomes submissions from government, industry, academic, and small businesses. All abstracts will be evaluated by qualified individuals from these sectors.

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Make sure to select the “Artificial Intelligence and Machine Learning for Problems in Structures and Materials” topic option under “Materials” or “Structures” when prompted during submission.

For more information, contact one of the following organizers:

Yumeng Li
Steven Wanthal

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Call for Papers

The AIAA Structures Technical Committee and Structural Dynamics Technical Committee are sponsoring a Joint Session on

Fatigue Loads and Spectrum Generation

AIAA SciTech 2024

January 8-12, 2024

Orlando, FL

The AIAA (American Institute of Aeronautics and Astronautics) Structures Technical Committee and Structural Dynamics Technical Committee solicits papers with recent research, technological advancements, and systems-level perspectives on Fatigue Loads and Spectrum Generation for the AIAA SciTech conference. Applications to all aero-structures, aircraft and spacecraft (such as launch vehicles), are welcome. Potential topics could include but are not limited to: 1) air load determination (statistical, discrete nz, measured strains and loads for gust and maneuver – abrupt and balanced), 2) ground handling load determination (landing impact, taxi., thrust reverse events), 3) spectrum generation (load generation, handling load-to-stress conversion, spectrum event load time history representation), and 4) test spectra (analytic loads, clipping and truncating of spectra).

The committee welcomes submissions from government, industry, academic, and small businesses. All abstracts are peer-reviewed.

Extended abstracts of no less than 1,000 words are due **May 25, 2023**

Author notification of paper acceptance on or about **August 25, 2023**

Final manuscript due **December 4, 2023**

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

<https://www.aiaa.org/SciTech/presentations-papers/call-for-papers>

Make sure to select the “Fatigue Loads and Spectrum Generation” topic option under “Structures” or “Structural Dynamics” when prompted during submission.

For more information, contact one of the following organizers:

Rich Manwell

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Call for Papers

The AIAA Structures Technical Committee and Multidisciplinary Design Optimization Technical Committee are sponsoring a special session on

Structural Optimization Application for Aircraft and Spacecraft

AIAA SciTech 2024

January 8-12, 2024

Orlando, FL

The AIAA (American Institute of Aeronautics and Astronautics) Structures Technical Committee and Multidisciplinary Design Optimization Technical Committee solicits papers with recent research, technological advancements, and systems-level perspectives on **Structural Optimization** playing a critical role in aircraft and spacecraft design throughout a life cycle. It revolutionizes design, analysis and manufacturing of structural components and assemblies resulting in lighter and stronger multifunctional structures that not only meet challenging requirement in aeronautics and astronautics, but also reduce cost and shorten the development timeline. Tremendous opportunities exist in industry to leverage optimization methods, tools and processes for structural improvement for new and existing aircraft configurations, innovative component designs, aging fleet part replacements, extreme environment adaptation, etc. The AIAA Structures Technical Committee and Multidisciplinary Design Optimization Technical Committee seek papers of development and application on structural optimization at the component level as well as vehicle level.

Potential topics could include, but not limited to the following:

- Topology Optimization and Application
- Topography Optimization and Application
- Lattice Structure Design and Application
- Size Optimization and Application
- Shape Optimization and Application
- Design of Experiments and Application
- Machining Learning/Artificial Intelligence and Application
- Manufacturing of Optimized Structures
- Test or Certification of Optimized Structures
- Parametric Study at Vehicle Level

The committee welcomes submissions from government, industry, academic, and small businesses. All abstracts will be evaluated by qualified individuals from these sectors.

Extended abstracts of no less than 1,000 words are due **May 25, 2023**

Author notification of paper acceptance on or about **August 25, 2023**

Final manuscript due **December 4, 2023**

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

<https://www.aiaa.org/SciTech/presentations-papers/call-for-papers>

Make sure to select the “Structural Optimization Application for Aircraft and Spacecraft” topic option under “Structures” or “MDO” when prompted during submission.

For more information, contact one of the following organizers:

Zhenning Hu
Vladimir Balabanov

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Call for Papers

The AIAA Structures Technical Committee is hosting a Special Session on

Crashworthiness of eVTOL/UAM Vehicles

AIAA SciTech 2024

January 8-12, 2024

Orlando, FL

The AIAA (American Institute of Aeronautics and Astronautics) Structures Technical Committee solicits papers with recent research, technological advancements, and systems-level perspectives on Crashworthiness of eVTOL/UAM Vehicles for the AIAA SciTech conference. Aircraft crashworthiness is one fundamental element of assuring the overall safety of eVTOL/UAM operations and must be designed into the vehicle from an early stage. Crashworthiness is the ability of a structure to protect its occupants during an impact. A crashworthy aircraft/rotorcraft can limit the loads transmitted to the occupants to survivable and/or non-injurious, humanly tolerable levels (for a “survivable” impact). Papers are solicited for topics that emphasize crashworthiness due to structural design, rather than counting on the safety benefits of add-on features such as airbags and parachutes.

Potential topics could include but are not limited to the requirements, design, analysis, and testing of: 1) crushable, energy absorbing airframes and/or airframe load attenuation systems, 2) protective passenger cabin structures which provide a survivable volume for the occupants, 3) occupant restraint systems and seat track attachments to the airframe, 4) next-generation energy-absorbing seats, and 5) occupant protection against secondary impact due to headstrike/flail in the cabin, restraint of items of mass such as batteries/powerplants/cargo, and ensuring egress capability features after crash/deformation.

The committee welcomes submissions from government, industry, academic, and small businesses. All abstracts will be evaluated by qualified individuals from these sectors.

Extended abstracts of no less than 1,000 words are due **May 25, 2023**

Author notification of paper acceptance on or about **August 25, 2023**

Final manuscript due **December 4, 2023**

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

<https://www.aiaa.org/SciTech/presentations-papers/call-for-papers>

Make sure to select the “Crashworthiness of eVTOL/UAM Vehicles” topic option under “Structures” when prompted during submission.

For more information, contact one of the following organizers:

Rich Manwell
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Call for Papers

The AIAA Structures Technical Committee is sponsoring a special session on

Additive Structures

AIAA SciTech 2024

January 8-12, 2024

Orlando, FL

The AIAA (American Institute of Aeronautics and Astronautics) Structures Technical Committee solicits papers with recent research, technological advancements, and systems-level perspectives on **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.

Potential topics could include:

- 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

The committee welcomes submissions from government, industry, academic, and small businesses. All abstracts will be evaluated by qualified individuals from these sectors.

Extended abstracts of no less than 1,000 words are due **May 25, 2023**

Author notification of paper acceptance on or about **August 25, 2023**

Final manuscript due **December 4, 2023**

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

<https://www.aiaa.org/SciTech/presentations-papers/call-for-papers>

Make sure to select the “Additive Structures” topic option under “Structures” when prompted during submission

For more information, contact one of the following organizers:

Rob Taylor

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Call for Papers

The AIAA Structures Technical Committee is hosting a Special Session on

Structural Health Monitoring & Non-Destructive Evaluation

AIAA SciTech 2024
January 8-12, 2024
Orlando, FL

The AIAA (American Institute of Aeronautics and Astronautics) Structures Technical Committee solicits papers with recent research, technological advancements, and systems-level perspectives on **Structural Health Monitoring (SHM)** as a means to evaluate the integrity of structure by acquiring and analyzing data from sensors and then processing the data to determine the presence of structural damage. As the technology and reliability of SHM sensors mature, the industry will be able to implement SHM systems as an alternative to conventional non-destructive inspections (NDI) such as visual, eddy current, ultrasonic and X-ray inspection methods. An advantage of SHM systems is the ability to assess structure without direct physical access. The introduction of composite materials into the aerospace industry has required many in the **Non-Destructive Evaluation (NDE)** community to re-evaluate their well-established techniques on composite and hybrid material systems. This has led to the development of In-Situ NDI systems. As novel monitoring systems are developed, they must be designed to meet the current standards established by the civil and military aviation authorities.

Potential topics could include the following:

- Probability of Detection for SHM
- Novel SHM systems for Metallic and Composite Structures
- Computational approaches for SHM
- SHM Reliability and Durability
- Novel sensing for damage detection
- Ultrasonics
- Non-Destructive Inspection Techniques
- Fiber optics, Thermography, Eddy Current and X-Ray techniques
- Prognostic and Health Management
- Condition Based Maintenance
- Certification of SHM systems

The committee welcomes submissions from government, industry, academic, and small businesses. All abstracts will be evaluated by qualified individuals from these sectors.

Extended abstracts of no less than 1,000 words are due **May 25, 2023**
Author notification of paper acceptance on or about **August 25, 2023**
Final manuscript due **December 4, 2023**

Detailed deadline information, abstract preparation instructions, and policies can be found at:
<https://www.aiaa.org/SciTech/presentations-papers/call-for-papers>

Make sure to select “Structural Health Monitoring & Non-Destructive Evaluation” topic option under “Structures” when prompted during submission.

For more information, contact one of the following organizers:

Marcias Martinez
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Call for Papers

The AIAA Structures Technical Committee is hosting a Special Session on

Stitched Composite Structures

AIAA SciTech 2024

January 8-12, 2024

Orlando, FL

The AIAA (American Institute of Aeronautics and Astronautics) Structures Committee solicits papers with recent research, technological advancements, and systems-level perspectives that have been performed for **Stitched Composite Structures** within the AIAA SciTech conference to examine advances relevant to aerospace structures including:

- Manufacturing processes to produce stitched composite structures
- Design approaches to incorporate stitching into composite structures
- Analysis procedures and methods for stitched composite structures for both basic performance and detailed progressive damage assessment
- Testing related to the characterization and/or performance of stitched composite structure at the coupon, subcomponent, or full-scale levels

The committee welcomes submissions from government, industry, academic, and small businesses. All abstracts are peer-reviewed.

Extended abstracts of no less than 1,000 words are due **May 25, 2023**

Author notification of paper acceptance on or about **August 25, 2023**

Final manuscript due **December 4, 2023**

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

<https://www.aiaa.org/SciTech/presentations-papers/call-for-papers>

Make sure to select “Stitched Composite Structures” topic option under “Structures” when prompted during submission.

For more information, contact one of the following organizers:

Andrew Lovejoy

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