

# WAAE 2026 9 Track Description

## Basic Information:

专栏题目  
Title

中文：智能设计、增材制造以及 AI 技术在航空航天领域的应用  
英文：Intelligent Design, Additive Manufacturing, and AI Applications in Aerospace Engineering

专栏介绍和征稿主题  
Introduction and topics

**中文：**轻量化与多功能一体化结构设计始终是航空航天部件的核心追求，对战斗效能和经济性均至关重要。过去数十年，以增材制造为代表的先进制造技术极大拓展了航空航天结构的设计空间，使各种高性能乃至多功能结构的设计与制备成为可能。超材料、层级点阵结构、拓扑优化构型、仿生多材料组织等新概念不断被引入，推动实现高承载、热防护、电磁隐身等综合性能的集成。近年来，人工智能与智能设计方法的快速兴起，为这一领域注入了全新动力：基于 AI 的生成式设计与多目标优化、机器学习驱动的材料-结构协同设计、数字孪生赋能的性能预测与验证，正在重塑增材制造航空航天结构的设计范式，使得更短周期、更高效率、更优性能的智能设计成为现实。我们欢迎投稿融合智能设计、增材制造、数字孪生、过程仿真优化、原位监测与智能质量控制等前沿方向的研究，潜在主题包括但不限于：

- 1. 面向增材制造的智能设计与优化
- 2. AI 与数字孪生驱动的结构性能验证
- 3. 飞机与航天器结构的增材制造
- 4. 航空航天增材制造的仿真与工艺优化
- 5. 先进航空航天结构的力学性能、可靠性与失效演化
- 6. 航空航天制造的原位监测与智能质量控制
- 7. 先进航空航天材料、超材料与轻质结构
- 8. 智能航空航天制造与工程的未来趋势

**英文：**Design of lightweight and multifunctional integrated structures has always been a crucial objective in aerospace components, which is of high importance for both combat effectiveness and economic efficiency. Over the past decades, the design space for aerospace structures has been significantly broadened by the development of advanced manufacturing technologies, especially additive manufacturing. Leveraging the capabilities of additive manufacturing, various advanced structures with high-performance or even multifunctional properties can be designed and fabricated. Novel design concepts such as metamaterials, hierarchical lattice structures, topology-optimized configurations, and bioinspired multi-material organizations have been introduced to achieve integrated properties including high strength, thermal protection, and electromagnetic invisibility. In recent years, the rapid emergence of artificial intelligence and intelligent design methods has brought transformative momentum to this field. AI-based generative design and multi-objective optimization, machine-learning-driven material - structure co-design, and digital-twin-enabled performance prediction and verification are reshaping the design paradigm of additively manufactured aerospace structures, making intelligent design with shorter cycles, higher efficiency, and superior performance a tangible reality. We welcome submissions exploring intelligent design, additive manufacturing, digital twins, process simulation and optimization, in-situ monitoring, and intelligent quality control, etc. Potential themes include, but are not limited to:

- 1. Intelligent Design and Optimization for Additive Manufacturing
- 2. AI and Digital Twin-Based Structural Performance Verification
- 3. Additive Manufacturing of Aircraft and Spacecraft Structures
- 4. Simulation and Process Optimization of Aerospace Additive Manufacturing
- 5. Mechanical Properties, Reliability, and Failure Evolution of Advanced Aerospace Structures
- 6. In-Situ Monitoring and Intelligent Quality Control for Aerospace Manufacturing
- 7. Advanced Aerospace Materials, Metamaterials, and Lightweight Structures
- 8. Future Trends in Intelligent Aerospace Manufacturing and Engineering

## Track Chair(s):



|                             |                                                                   |
|-----------------------------|-------------------------------------------------------------------|
| 姓名<br><b>Name</b>           | 杨未柱<br>Weizhu Yang                                                |
| 称谓<br><b>Prefix</b>         | 副研究员<br>Associate Professor                                       |
| 部门<br><b>Department</b>     | 力学与交通运输工程学院<br>School of Mechanics and Transportation Engineering |
| 单位<br><b>Organization</b>   | 西北工业大学<br>Northwestern Polytechnical University                   |
| 城市/地区<br><b>City/Region</b> | 西安/陕西<br>Xi'an/Shaanxi                                            |
| 邮箱<br><b>Email</b>          | wzhyang@nwpu.edu.cn                                               |

### Organizer's Brief Biography

#### 中文:

杨未柱，西北工业大学副研究员、博士生导师，力学国家级实验教学示范中心副主任。长期从事动力装置热端部件长寿命高可靠性技术、增材制造力学超材料设计及应用研究，主持国家自然科学基金面上、国家科技重大专项专题等项目 20 项，发表论文 50 余篇，授权专利 17 项，参与获批国家标准 2 项，在航空发动机及燃气轮机等动力装置中取得了一定的应用。入选国家博新计划、全国超材料优秀青年学者、陕西省青托等，担任中国材料研究学会超材料分会青年理事、Engineering Reports 期刊副主编、International Journal of Structural Integrity 青年编委等。

#### 英文:

YANG Weizhu, Associate Professor and Doctoral Supervisor at Northwestern Polytechnical University, and Deputy Director of the National Demonstration Center for Experimental Mechanics Education. He has long been engaged in research on long-life and high-reliability technologies for hot-end components of power devices, as well as the design and application of additively manufactured mechanical metamaterials. He has led 20 projects, including those funded by the National Natural Science Foundation of China, the National Science and Technology Major Project (part). He has published over 50 papers, been granted 17 patents, and participated in the approval of two national standards. His work has achieved certain applications in power devices such as aero engines and gas turbines. He has been honored with the National Postdoctoral Innovative Talent Support Program, the National Outstanding Young Scholar in Metamaterials, and the Shaanxi Youth Talent Lifting Program. He serves as a Youth Director of the Metamaterials Branch of the Chinese Materials Research Society, Associate Editor of Engineering Reports, and Early Editorial Board Member of the International Journal of Structural Integrity, etc.



|                             |                                                     |
|-----------------------------|-----------------------------------------------------|
| 姓名<br><b>Name</b>           | 费成巍<br>Cheng-Wei FEI                                |
| 称谓<br><b>Prefix</b>         | 研究员<br>Research Professor                           |
| 部门<br><b>Department</b>     | 航空航天系<br>Department of Aeronautics and Astronautics |
| 单位<br><b>Organization</b>   | 复旦大学<br>Fudan University                            |
| 城市/地区<br><b>City/Region</b> | 上海<br>Shanghai                                      |
| 邮箱<br><b>Email</b>          | cwfei@fudan.edu.cn                                  |

### Organizer's Brief Biography

**中文：**费成巍，复旦大学航空航天系研究员/博导、“闽江学者”领军人才-讲座教授，航空宇航学科全国优秀博士学位论文获得者(5篇/年)、香江学者、复旦-河南省高性能智能伺服系统工程技术中心负责人（与612共建）、全国航空航天材料专家委员会副主任委员、上海航空学会航空动力专业委员会副主任/科创产教融合工作委员会副主任，航天科工集团质量与可靠性中心咨询专家，全球前2%顶尖科学家（终身、年度（2020-2025））。主要从事飞行器/航发结构强度与智能可靠性方面研究，相关技术成果在日内瓦、美国硅谷、金砖国家等国际发明展夺得多个金奖（均排名第1），数字仿真科技奖（10人/年）、中国航空学会技术发明奖二等奖（排名第1）、上海市航空学会科学技术奖二等奖2项（排名第1）等奖项。主持/承担国家自然科学基金（3项）、工信部“两机”专项课题、工信部“民机”专项课题、国家重点研发计划课题、GF技术基础重点项目课题、航空发动机/民机重点型号支撑课题、上海市科委课题等20余项。发表论文近200篇，其中SCI检索约150余篇，ESI高被引15篇及热点文章、封面文章，亮点文章各1篇。主编工信部“十四五”规划教材1部、中文学术专著3部，参编英文专著4部。授权发明专利/软著15项，其中国外专利2项。担任《Power and Propulsion Research》、《航空动力学报》、《航空工程进展》、《航空发动机》等11本期刊编委，以及AAME2024/2025、MEAE2024/2025、ICFECS2025等国际会议大会主席/分会主席。

**英文：**Dr. Chengwei Fei is a research Professor and Ph.D supervisor at Department of Aeronautics and Astronautics, Fudan University, as well as a "Minjiang Scholar" Leading Talent -Chair Professor. He has been awarded the National Outstanding Doctoral Dissertation in Aerospace Engineering (five awards per year), is a Hong Kong Scholar, and serves as the director of the Fudan-Henan High-Performance Intelligent Servo System Engineering Technology Center (co-established with 612 Research Institute). Additionally, he holds positions as Vice Chairman of the National Aerospace Materials Expert Committee, Deputy Director of the Aeronautical Power Committee and the Science and Technology Innovation-Industry-Education Integration Working Committee at the Shanghai Aeronautical Society, and Consulting Expert at the Quality and Reliability Center of China Aerospace Science and Industry Corporation. He ranks among the world's top 2% scientists (both lifetime and annual awards for 2020 - 2025). His research focuses on structural strength and intelligent reliability of aircraft and aero-engine components. His technical achievements have received numerous accolades, including gold/special gold medals at international invention exhibitions in Geneva, Silicon Valley, and BRICS countries (all ranking first), the Digital Simulation Technology Award (one award per year for ten recipients), the Second Prize of the Chinese Aeronautical Society's Technical Invention Award (first place), and two Second Prizes from the Shanghai Aeronautical Society's Science and Technology Awards (both first places). He has led or participated in over 20 research projects, including those funded by the National Natural Science Foundation, the Ministry of Industry and Information Technology's "Two Aircraft" Special Program, the "Civil Aircraft" Special Program, the National Key R&D Program, the GF Technology Foundation Key Project, key support projects for aero-engines/civil aircraft models, and projects commissioned by the Shanghai Municipal Science and Technology Commission. He has published nearly 200 papers, including approximately 150 indexed in SCI, 15 ESI highly cited articles, one hot article, one cover article, and one featured article. He has authored one textbook for the Ministry of Industry and Information Technology's 14th Five-Year Plan, three Chinese academic monographs, and contributed to four English-language monographs. He holds 15 authorized invention patents and software copyrights, including two international patents. He serves as an editorial board member for 11 journals such as Power and Propulsion Research, Journal of Aeronautical Dynamics, Advances in Aeronautical Engineering, and Aeronautical Engine, and has presided over international conferences including AAME 2024/2025, MEAE 2024/2025, and ICFECS 2025.



|                      |                                                          |
|----------------------|----------------------------------------------------------|
| 姓名<br>Name           | 赵哲南<br>Zhenan Zhao                                       |
| 称谓<br>Prefix         | 副研究员<br>Associate Researcher                             |
| 部门<br>Department     | 杭州国际创新研究院<br>Hangzhou International Innovation Institute |
| 单位<br>Organization   | 北京航空航天大学<br>Beihang University                           |
| 城市/地区<br>City/Region | 杭州/浙江<br>Hangzhou/Zhejiang                               |
| 邮箱<br>Email          | fyzzn@163.com                                            |

## Organizer's Brief Biography

**中文：**赵哲南，硕士生导师，工学博士，现任北京航空航天大学杭州国际创新研究院大飞机科创中心副研究员。主要研究方向为先进航空航天高温部件极端力学问题（高温部件的先进结构设计、极端环境长寿命服役性能和定寿等）与增材制造力学问题（增材制造高温合金强韧化、金属增材制造过程和工艺力学、增材制造金属多尺度力学行为等），形成基于增材制造的航空航天高温结构与性能评价特色研究方向。目前主持国家自然科学基金青年项目、国家资助博士后研究人员计划等国家级项目三项，先后参与国家自然科学基金面上项目、重点实验室开放课题等多项横、纵向课题。在 *International Journal of Plasticity*, *International Journal of Fatigue*, *International Journal of Mechanical Sciences*, *Journal of Alloys and Compounds*、航空学报中英文版等力学、材料、航空领域权威期刊发表论文 20 余篇（第一、通讯作者 8 篇），Scopus 总被引 400 余次。

**英文：**ZHAO Zhenan, Master's Supervisor, Doctor of Engineering. Currently Associate Researcher at the Large Aircraft Science and Technology Innovation Center, Hangzhou International Innovation Institute, Beihang University. His primary research focuses on extreme mechanics problems in advanced aerospace high-temperature components (including advanced structural design, long-term service performance and life determination in extreme environments) and mechanics issues in additive manufacturing (such as strengthening and toughening of additively manufactured high-temperature alloys, process and process mechanics of metal additive manufacturing, and multi-scale mechanical behavior of additively manufactured metals). He has established a distinctive research direction centered on the structural design and performance evaluation of aerospace high-temperature components based on additive manufacturing.

He currently leads three national-level projects, including the National Natural Science Foundation of China (NSFC) project, and the National Postdoctoral Program for Innovative Talents project. He has also participated in several projects, including General Projects of the NSFC, Major Special Projects, and other projects.

He has published over 20 papers as a primary author in leading journals in the fields of mechanics, materials, and aeronautics such as the *International Journal of Plasticity*, *International Journal of Fatigue*, *International Journal of Mechanical Sciences*, *Journal of Alloys and Compounds*, and the *Chinese Journal of Aeronautics* (including its English version). He has 8 publications as first or corresponding author, and his work has received over 400 citations on Scopus.