

WAAE 2026 Track 4 Description

Basic Information:

专栏题目
Title

中文：航空航天装备可靠性分析
英文：Reliability Analysis under Uncertainty of Aerospace Equipments

专栏介绍和征稿主题
Introduction and topics

中文：航空航天装备的服役性能往往受到多种不确定性因素的影响，综合考虑这些不确定性因素的影响，开展结构可靠性分析，对于提升机械装备的服役性能具有重要意义。随着装备复杂度的提升以及精细化设计理念的不断深入，可靠性分析在航空航天领域的应用越来越广泛。近年来，代理模型技术、AI 技术不断取得突破，装备可靠性分析所需的算力成本被大幅缩减，进一步推动了可靠性分析技术的落地应用。从结构强度与疲劳，到机构卡滞与运动精度，从新型材料服役性能到部件多物理场耦合，可靠性分析技术均扮演了重要角色。

本专栏旨在汇集航空航天装备的可靠性分析领域的前沿理论、关键技术与工程应用成果，促进学术界与工业界的交流合作，推动相关技术创新与工程实践发展。热忱欢迎国内外相关领域专家学者和工程技术人员投稿。

征稿主题包括但不限于：

- 复合材料结构、航空发动机结构可靠性
- 可重复使用航天器的结构可靠性
- 可靠性、参数灵敏度、不确定性量化的代理模型技术
- 航空航天结构的可靠性设计与优化
- AI 技术在可靠性分析中的应用
- 飞机襟缝翼、起落架、舱门等运动机构可靠性
- 数字孪生技术与结构可靠性

英文：The service performance of aerospace equipment is often influenced by various sources of uncertainty. Conducting structural reliability analysis while comprehensively accounting for these uncertainties is of great significance for improving the operational performance of mechanical systems. With the increasing complexity of modern equipment and the continuous advancement of refined design methodologies, reliability analysis has found increasingly widespread applications in the aerospace field. In recent years, significant breakthroughs in surrogate modeling and artificial intelligence (AI) technologies have substantially reduced the computational cost required for reliability analysis, further promoting the practical implementation of reliability-based technologies. From structural strength and fatigue assessment to mechanism jamming and motion accuracy, and from the service performance of advanced materials to multiphysics coupling behavior of components, reliability analysis plays a vital role in those research fields.

This special issue aims to bring together the latest theoretical developments, key technologies, and engineering applications in the field of aerospace reliability analysis. It seeks to promote communication and collaboration between academia and industry, while advancing technological innovation and engineering practice in this area. Researchers, scholars, and engineering professionals from related fields worldwide are warmly invited to submit their contributions.

- Structural Reliability of Composite Materials, Engine Blades, etc.
- Reliability of Reusable Space Vehicles
- Surrogate Models for Reliability, Sensitivity Analysis or Uncertainty Quantification
- Reliability-driven Design for Aerospace Structures
- AI Techniques for Reliability Analysis
- Mechanism reliability of slats/flaps, landing gears, doors, etc.
- Reliability analysis and digital twin.

Track Chair(s):

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Organizer’s Brief Biography

中文：

何新党，西北工业大学力学与交通运输工程学院，教授，博士生导师，国家级青年人才。主要从事机械传动系统可靠性设计与验证、无损检测与结构失效分析、先进材料性能测试与试验装备开发等领域的研究。主持国家重大专项基础研究项目(千万级)、国家自然科学基金面上项目、国家级军口纵向项目、国家重大专项子课题、XX 专项子课题等国家级项目 6 项，主持陕西省重点研发计划、博士后基金、航空基金、航天科技创新基金等省部级项目 4 项，出版专著 1 部，主编教材 2 部，参编国家级规划教材 2 部，发表学术论文 40 余篇，申请发明专利 20 余项，软件著作权 10 余项。获全国周培源力学力学竞赛优秀指导教师、西工大先进工作者、本科教学卓越新秀、研究生课程思政教学名师等多项荣誉。任全国研究生教育评估监测专家库专家、《机械设计科学与技术》《应用力学学报》期刊青年编委、《工程力学》《航空学报》《兵工学报》等多个期刊特邀审稿人。

研究成果支撑了我国多个重大装备的传动结构性能优化与强化工艺研究。为我国多个型号的齿轮、轴承、花键、传动轴等结构优化、参数匹配优化与损伤抑制强化工艺提供了重要技术支撑，建立了结构设计、精密加工、表面改性、抗疲劳强化一体化优化工艺体系，有效改善传动构件耐磨、抗振、抗疲劳、抗冲击性能，从设计与制造端系统性提升传动系统整体可靠性与工况适配能力。

英文：

Xindang He, School of Mechanics and Transportation Engineering, Northwestern Polytechnical University, professor, doctoral supervisor, national-level young talent. Mainly engaged in research in the fields of nondestructive testing and structural failure analysis, reliability design and verification of mechanical transmission systems, performance testing of advanced materials, and development of test equipment. He has led six national-level projects. He has also led four provincial and ministerial-level projects. He has published one monograph, served as chief editor for two textbooks, contributed to two national-level planning textbooks, published over 40 academic papers, applied for more than 20 invention patents, and holds over 10 software copyrights. He has received numerous honors, including Outstanding Instructor in the Nationwide Zhou Peiyuan Mechanics Competition, Advanced Worker of Northwestern Polytechnical University, Outstanding New Talent in Undergraduate Teaching, and Distinguished Instructor in Ideological and Political Education for Graduate Courses. He serves as an expert in the National Graduate Education Evaluation and Monitoring Expert Database, a young board member of the journals Mechanical Design Science and Technology and Journal of Applied Mechanics, and is an invited reviewer for several journals.

His research has supported the performance optimization and strengthening process studies of the transmission structures of multiple major equipment in China. They have provided important technical support for the structural optimization, parameter matching optimization, and damage suppression strengthening processes of gears, bearings, splines, drive shafts, and other components for various models in China. An integrated optimization process system combining structural design, precision machining, surface modification, and fatigue resistance enhancement has been established, effectively improving the wear resistance, vibration resistance, fatigue resistance, and impact resistance of transmission components, and systematically enhancing the overall reliability and operational adaptability of transmission systems from the design and manufacturing aspects.

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Organizer's Brief Biography

中文：
杨旭锋，西南交通大学机械工程学院副教授，长期从事复杂机械结构不确定性量化、可靠性分析与优化设计方法的研究。近年来，以第一作者或通讯作者在《Computer Methods in Applied Mechanics and Engineering》《Reliability Engineering & System Safety》等本领域知名期刊发表学术论文 39 篇，其中 SCI 论文 32 篇。主持 HP 工业能力提升专项工程科研项目、国家自然科学基金（2 项）、四川省自然科学基金（2 项）、企业横向课题多项。获陕西省优秀博士学位论文，担任中国机械工程学会机械设计青年委员、《强度与环境》《Scientific Reports》等期刊青年编委。

英文：
Xufeng Yang is an Associate Professor at the School of Mechanical Engineering, Southwest Jiaotong University. His research focuses on uncertainty quantification, reliability analysis, and optimization design methods for complex mechanical structures. In recent years, he has published 39 academic papers as the first author or corresponding author in well-known journals in the field, including Computer Methods in Applied Mechanics and Engineering and Reliability Engineering & System Safety, among which 32 papers are indexed by SCI. He has led several research projects, including the HP Industrial Capability Enhancement Special Program, two projects funded by the National Natural Science Foundation of China, two projects funded by the Sichuan Provincial Natural Science Foundation, as well as multiple industry-collaborative research projects. He received the Outstanding Doctoral Dissertation Award of Shaanxi Province and currently serves as a Youth Committee Member of the Mechanical Design Division of the Chinese Mechanical Engineering Society and as a Young Editorial Board Member of the journal Strength & Environment and Scientific Reports.