

2026 10th International Conference on RELIABILITY ENGINEERING

Hangzhou, China July 19-21, 2026

<http://icre.org/>

Special Session 6

Explainable AI for Prognostics and Health Management of Aerospace and Avionic Systems

Goal >>>>

The practical deployment of Machine Learning (ML) and Artificial Intelligence (AI) for Prognostics and Health Management (PHM) of aerospace and avionic systems is often hindered by “black-box” limitations, including data scarcity in extreme operating scenarios, physical inconsistency with aerospace engineering principles, the lack of robust explainability, and poor generalizability to unseen flight and mission conditions. As a critical branch of interpretable intelligent frameworks, Physics-Informed Machine Learning (PIML) and Explainable AI (XAI) integrate prior physics-based knowledge, failure mechanisms, domain expertise, and airworthiness requirements directly into the PHM learning process, breaking the bottlenecks of traditional data-driven models for safety-critical aerospace equipment.

This special session explores how XAI and PIML enable aerospace and avionic PHM to move toward physically grounded, interpretable, certifiable and trustworthy AI solutions, bridging the gap between theoretical algorithm innovation and industrial engineering deployment. We invite global researchers, industry practitioners and certification experts to share recent advancements in interpretable ML/PIML methodologies, as well as their field-specific applications to the reliability, health assessment and predictive maintenance of complex aerospace and avionic systems.

Topics >>>>

Topics of interest include, but are not limited to:

- Physics-Informed/Hybrid Models for PHM
- Explainable AI Methods & Frameworks in Aviation and Aerospace PHM
- Physics-Informed PHM Methods for Extreme Scenarios and Small Data
- Data Augmentation & Simulation-Based Learning
- Multi-Modal Sensor Fusion & Knowledge Integration
- Digital Twin & Simulation-Enriched PHM
- Explainable PHM Modeling Integrating Failure Mechanisms and Domain Knowledge
- Explainable AI-Driven Predictive Maintenance and Maintenance Decision-Making
- Application and Validation of XAI and PIML in Typical Aerospace Equipment
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Chairs >>>>



Juan Chen, Beihang University, China



Jiming Ma, Beihang University, China

Publication >>>>

We provide a good opportunity by presenting your updated research knowledge and also by publishing it in the conference proceedings. submitted paper will be peer reviewed by conference committees, and accepted papers will be included into conference proceedings which will be indexed by SCOPUS and Ei compendex.

Submission >>>>

1. Full paper (presentation and publication)
 - The paper must be written in English.
 - All submissions will undergo a peer-review process by the conference committee.
 - The paper should be at least FIVE pages including all figures, tables, and references.
 - The paper should be submitted as a PDF document in .pdf format.
 - submitted paper must be unpublished.
 - Accepted papers will be invited for oral presentation or poster presentation and will be included in the conference proceedings.
2. Abstract (presentation only)
 - Abstracts will be considered for presentation (oral/poster) only without publication.
 - The abstract must be written in English.
 - Abstracts should be no more than 300 words and clearly outline the title, purpose, methods, and outcomes of the research or practice being described.
 - All submissions will undergo a peer-review process by the conference committee.

* Welcome to submit the paper or abstract by Electronic submission system: <https://www.zmeeting.org/submission/icre2026>
More details about submission, please visit at: <https://www.icre.org/sub.html>

Conference Program >>>>

July 19, 2026 | CONFERENCE + SHORT COURSE
July 20, 2026 | TECHNICAL EXCELLENCE & TRIBUTE
July 21, 2026 | INNOVATION & FUTURE OUTLOOK
July 17-22, 2026 | Young Scholar Symposium + 2026 Beihang International Summer School

Conference Venue >>>>

Conference Venue:
Hangzhou International Innovation Institute of Beihang University
Address:
No. 166, Shuanghongqiao Street, Pingyao Town, Yuhang District, Hangzhou City

Hangzhou, China

Hangzhou, a renowned Jiangnan city blending millennia of heritage and poetic scenery, boasts three world cultural heritage sites. west Lake ripples with romance; Liangzhu Ruins hold ancient wisdom; the Grand canal carries folk vibes. Timeless song Dynasty elegance meets trendy fun, and delicious local cuisine delights the taste buds. A perfect mix of classic and modern, it awaits visitors from all over the world.

Important Dates >>>>

Submission Deadline: May 15, 2026
Notification Deadline: June 10, 2026
Camera-ready Date: June 25, 2026

Technical Support



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特别专题 6

可解释 AI 在航空航天与航电系统预测与健康中的应用

专题目标 >>>>

在航空航天与航空电子系统故障预测与健康（PHM）的实际部署中，机器学习与人工智能的“黑箱”特性常面临多重制约：极端运行场景下的数据稀缺性、与航空航天工程原理的物理一致性缺失、可解释性不足，以及面对未知飞行任务条件时的泛化能力薄弱。作为可解释智能框架的重要分支，物理信息机器学习与可解释人工智能通过将基于物理的先验知识、失效机理、领域专业知识和适航要求直接嵌入PHM学习过程，突破了传统数据驱动模型在安全关键型航空航天装备应用中的瓶颈。

本专题旨在探讨XAI与PIML如何推动航空航天PHM向物理可循、可解释、可认证且可信的AI解决方案演进，从而弥合理论算法创新与工业工程应用之间的鸿沟。我们诚邀全球研究人员、行业实践者及认证专家，分享在可解释机器学习/PIML方法论领域的最新突破，及其在复杂航空航天与航空电子系统可靠性评估、健康状态监测与预测性维护等具体场景中的创新应用。

专题主题 >>>>

征稿主题包括但不限于：

- 物理信息驱动的 PHM 模型与算法
- 航空航天 PHM 可解释 AI 算法及框架
- 面向极端场景与小样本的物理信息 PHM 方法
- 稀缺数据与仿真增强方法
- 多模态传感与知识融合
- 数字孪生与仿真辅助 PHM
- 融合失效机理与领域知识的可解释 PHM 建模
- 可解释 AI 驱动的预测性维护与维修决策
- XAI 与 PIML 在典型航空航天装备中的应用验证
- ...

专题主席 >>>>



陈娟, 北京航空航天大学, 中国



马纪明, 北京航空航天大学, 中国

会议出版 >>>>

会议收录的文章将出版在会议论文集集中出版，并提交EI Compendex, Scopus等其他检索机构审核检索。

投稿方式 >>>>

- 1). 上传文章到电子投稿系统: <https://www.zmeeting.org/submission/icre2026>
- 2). 或发送文章至会议邮箱: icre_conf@outlook.com

- 提示：
1. 全文投稿（含报告与出版）
 - 稿件须以英文撰写。
 - 所有投稿均由会议委员会进行同行评审。
 - 稿件篇幅不少于 5 页，包含所有图表及参考文献。
 - 稿件须以 PDF 格式提交。
 - 投稿稿件须为未发表的原创成果。
 - 录用稿件将受邀进行口头报告或海报展示，并收录至会议论文集。
 2. 摘要投稿（仅作报告）
 - 摘要仅用于申请报告资格（口头报告 / 海报展示），不纳入出版范围。
 - 摘要须以英文撰写。
 - 摘要字数不超过 300 词，须清晰阐明所涉研究或实践的标题、研究目的、研究方法及其研究成果。
 - 所有投稿均由会议委员会进行同行评审。
 - 详细信息请见——<https://icre.org/sub.html>

会议日程 >>>>

- 2026年7月19日- 签到注册
- 2026年7月20日- 开幕式+主旨报告+作者报告
- 2026年7月21日- 开幕式+主旨报告+作者报告
- 2026年7月12-25日- 青年学者论坛 + 2026北航国际暑期学校

会议地址 >>>>

杭州市北京航空航天大学国际创新研究院（北京航空航天大学国际创新学院）
地址：杭州市余杭区瓶窑镇双红桥街166号

中国杭州

杭州，一座融千年文脉与诗画风光的江南名城，三大世界文化遗产勾勒其独特魅力。西湖碧波漾诗意，良渚遗址藏远古智慧，大运河流淌南北烟火。宋韵风雅浸润红墙古社，新潮玩法解锁别样体验，鲜醇杭帮菜抚慰味蕾。古典与现代交织，漫步街巷皆是惊喜，正静待八方游客前来探寻。

重要日期 >>>>

- 投稿截止日期：2026年5月15日
- 审稿通知日期：2026年6月10日
- 注册截止日期：2026年6月25日