

2026 10th International Conference on RELIABILITY ENGINEERING

Hangzhou, China July 19-21, 2026

Special Session 3

Physics-Informed Machine Learning for Prognostics and Health Management of Industrial Equipment

Goal >>>>

The practical deployment of Machine Learning (ML) and Artificial Intelligence (AI) for Prognostics and Health Management (PHM) of industrial equipment is often hindered by "black-box" limitations, including data scarcity, physical inconsistency, the lack of explainability and the lack of generalizability to unseen operating conditions. To address these challenges, Physics-Informed Machine Learning (PIML) integrates prior physics-based knowledge, such as governing equations and domain expertise, directly into the learning process. This session explores how PIML enables PHM to move toward physically grounded, interpretable and trustworthy AI solutions. We invite researchers and industry experts to share recent advancements in PIML methodologies and their specific applications to the reliability and maintenance of complex systems.

Topics >>>>

Topics of interest include, but are not limited to:

Methods:

- Physics-informed Neural Networks
- Physics-Informed Data Augmentation
- Physics-Informed Architecture Design
- Physics-Informed Loss Function and Constraints
- Physics-Informed Explainability and Causality
- Physics-informed Transfer Learning & Domain Adaptation
- Probabilistic and Uncertainty-Aware PIML

Applications:

- Surrogate modeling
- Virtual Sensing
- Parameter Estimation
- Anomaly Detection
- Fault Diagnostics
- Remaining Useful Life Prediction
- Predictive Maintenance
- ...

Chairs >>>>



Chenyang Lai
Polytechnic University of Milan, Italy

Email: chenyang.lai@polimi.it



Piero Baraldi,
Politecnico di Milano, Italy



Enrico Zio,
Polytechnic University of Milan, Italy

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.wzmeeting.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 | PHD SCHOOL PROGRAM

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: April 10, 2026
Notification Deadline: May 5, 2026
Camera-ready Date: May 20, 2026

Contact

conference secretary: Ms. Lesley
Email: icre_conf@outlook.com
web: <http://www.icre.org>

2026 10th International Conference on RELIABILITY ENGINEERING

Hangzhou, China July 19-21, 2026

特别专题 3

面向工业装备故障预测与健康管理的（PHM）的物理信息融合机器学习

专题目标 >>>>

机器学习（ML）与人工智能（AI）在工业装备故障预测与健康管理的实际应用，往往受到“黑箱”局限的制约，包括数据稀缺、物理不一致性、缺乏可解释性，以及在未知工况下的泛化能力不足。为应对这些挑战，物理信息融合机器学习（PIML）将控制方程、领域知识等先验物理知识直接融入学习过程。本专题探讨 PIML 如何推动故障预测与健康管理的物理机理驱动、可解释、可信赖的人工智能解决方案。我们诚邀科研人员与行业专家分享物理信息融合机器学习方法的最新进展，及其在复杂系统可靠性与维护领域的具体应用。

专题主题 >>>>

主要主题包括（但不限于）：

方法论方向：

- 物理信息神经网络
- 物理信息数据增强
- 物理信息网络结构设计
- 物理信息损失函数与约束条件
- 物理信息可解释性与因果性
- 物理信息迁移学习与领域自适应
- 概率与不确定性感知的物理信息机器学习
- ...

应用方向：

- 代理建模
- 虚拟传感
- 参数估计
- 异常检测
- 故障诊断
- 剩余使用寿命预测
- 预测性维护
- ...

专题主席 >>>>



来晨阳，米兰理工大学，意大利
邮箱：chenyang.lai@polimi.it



Enrico Zio，
米兰理工大学，意大利



Piero Baraldi，
米兰理工大学，意大利

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 & 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19-21日- 博士研究生项目

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索。

重要日期 >>>>

- 投稿截止日期：2026年4月10日
- 审稿通知日期：2026年5月05日
- 注册截止日期：2026年5月20日