

2026 10th International Conference on RELIABILITY ENGINEERING

Hangzhou, China July 19-21, 2026

Special Session 14

Resilience and Risk Mitigation of Industrial Cyber-Physical Systems Against Cascading Failures

Goal >>>>

Industrial Cyber-Physical Systems (ICPS) are increasingly deployed in smart manufacturing, energy, railway transportation, process industries, marine engineering, and other critical infrastructures. Due to tight coupling, cross-domain interaction, and multi-layer coordination, disturbances, faults, cyber attacks, and human errors can propagate across sensing, communication, control, computation, and physical layers, causing cascading failures with serious safety, operational, and economic consequences. This special session focuses on resilience modeling, risk assessment, and mitigation of ICPS under cascading failure scenarios. It emphasizes FMEA, FMECA, and ETA, together with data-driven modeling, intelligent monitoring, digital twins, complex network analysis, and system safety engineering, to support research on failure prevention, hazard identification, propagation analysis, resilience enhancement, and recovery optimization.

Topics >>>>

Main topics are (but not limited to):

- Failure mode identification and multi-level FMEA for industrial cyber-physical systems
- Cross-layer failure modeling of sensors, actuators, controllers, and communication links
- Extended FMEA/FMECA for cyber attacks, hardware/software faults, and human errors
- FMECA-based assessment of failure severity, occurrence, detectability, and criticality
- Weak-point identification, hazard ranking, and risk prioritization for cascading failures
- ETA-based analysis of disturbance triggering, failure propagation, and consequence escalation
- Dynamic event tree analysis considering protection mechanisms, redundancy, emergency intervention, and uncertainty
- Integrated modeling and closed-loop risk management frameworks combining FMEA, FMECA, and ETA
- Real-time risk assessment and early warning using digital twins, online monitoring, and data-driven methods
- Fault-tolerant control, fault isolation, recovery optimization, and representative industrial applications for resilience enhancement
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Chairs >>>>



Datian Zhou, Beijing Jiaotong University, China

Publication >>>>

The accepted papers passed through the peer-reviewed process after proper registration and presentation will be included in ICRE 2026 Conference Proceedings, which will be archived in IEEE Xplore, and indexed by EI Compendex, Scopus, and other indexing services.

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.zmmeeting.org/submission/icre2026>
More details about submission, please visit at: <https://www.icre.org/sub.html>

Conference Program >>>>

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

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

Sponsors  Co-sponsors



Technical Support



Contact

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Email: icre_conf@outlook.com
web: <http://www.icre.org>

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特别专题 14

工业信息物理系统抵御级联失效的韧性与风险防控

专题目标

随着工业信息物理系统 (Industrial Cyber-Physical Systems, ICPS) 在智能制造、能源电力、轨道交通、流程工业、海洋工程与关键基础设施中的广泛部署, 系统运行呈现出高度耦合、强交互和多层级协同等特征。网络层、控制层、感知层与物理过程之间的深度耦合, 使局部扰动、设备失效、软件异常、通信中断或人为误操作更容易沿系统结构与功能链条扩散并演化为级联失效, 进而导致安全事故、服务中断、性能退化和重大经济损失。

本专题聚焦工业信息物理系统在级联失效场景下的韧性建模、风险识别与防控方法, 重点围绕失效模式与影响分析; 失效模式、影响及危害性分析和事件树分析等经典可靠性与风险分析方法, 探讨其与数据驱动建模、智能监测、数字孪生、复杂网络分析及系统安全工程的融合机制。专题旨在为工业信息物理系统从“失效预防—风险评估—传播分析—韧性增强—恢复优化”的全链条研究提供交流平台, 推动形成兼具理论深度、工程适用性和可解释性的级联失效分析与风险缓释方法体系。

专题主题

- 细分专题主题 (包括但不限于):
- 工业信息物理系统失效模式识别与多层级失效模式与影响分析
- 传感器、执行器、控制器及通信链路的跨层失效建模
- 面向网络攻击、软硬件故障与人因失误的扩展失效模式、影响及危害性分析方法
- 基于失效模式、影响及危害性分析的失效严重度、发生概率、可探测性与关键性评估
- 面向级联失效的关键薄弱环节识别、危害排序与风险优先级分析
- 基于事件树分析的扰动触发、失效传播与后果升级过程分析
- 考虑保护机制、冗余设计、应急干预与不确定性的动态事件树分析
- 失效模式、影响及危害性分析与事件树分析的集成建模方法与闭环风险管理框架
- 融合数字孪生、在线监测与数据驱动技术的实时风险评估与预警
- 面向系统韧性提升的容错控制、故障隔离、恢复优化与典型工业应用

专题主席



周达天, 北京交通大学, 中国

会议出版

会议录用文章将被收录至ICRE 2026会议论文集, 由IEEE出版, 并被EI Compendex 和 Scopus 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、研究方法以及研究成果。
 - 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