Special Session 8

Belief Reliability Theory and Applications: Recent Advances, Methods, and Practices

Goal »»»

As systems continue to evolve toward higher complexity, stronger functionality and tighter performance requirements, reliability is increasingly required not only to be evaluated, but also to be designed, understood and validated from first principles. This shift highlights the need for a more fundamental perspective on reliability beyond traditional approaches centered on statistical failure analysis.

Belief reliability, pioneered by Prof. Rui Kang, provides such a perspective. It is developed within a broader effort to establish reliability as a scientific discipline. In this view, reliability is defined as the repeatability of system function across time and space, and is organized through an integrated structure of principles, experiments, and mathematical representation. Within this emerging framework of reliability science, belief reliability represents a systematic development that links these elements in a coherent manner. It interprets reliability in terms of system function, performance margin, degradation and their uncertainties, and provides a structured basis for reliability analysis, design and verification. Rather than focusing solely on uncertainty quantification, it contributes to a more general understanding of how reliability is formed, maintained and assessed in complex systems. In recent years, this line of research has gained increasing attention, with sustained progress in theoretical developments and expanding applications in practice. It offers new ways to address challenges such as complex system behavior, limited testing information, evolving performance and the need for more effective reliability design and validation strategies.

This special session aims to provide a focused forum for presenting recent advances in belief reliability and exploring its implications for modern reliability science and applications. It reflects the growing need for a principle-based understanding of reliability and for closer integration between theoretical developments and practical implementation. The session seeks to bring together researchers and practitioners from both academia and industry, encouraging interactions between foundational research and practice.

Topics »»»

Topics of interest include, but are not limited to:

- Fundamental principles and theoretical developments of belief reliability
- Function- and performance-oriented reliability modeling and analysis
- Reliability-oriented design, validation and testing methodologies
- Methods for reliability evaluation under limited information
- Computational approaches and tools for belief reliability
- Applications in complex systems, including engineering systems such as aerospace, manufacturing, energy and transportation, as well as other systems such as biological systems, social systems, and systems in artistic contexts
- Integration with data-driven and intelligent approaches
- Industrial practices and case studies ….

Chair(s) »»»

Xiaoyang Li, 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 I CONFERENCE + SHORT COURSE
July 20, 2026 I TECHNICAL EXCELLENCE & TRIBUTE
July 21, 2026 I INNOVATION & FUTURE OUTLOOK
July 12-25, 2026 I 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: 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

http://icre.org/

ICRE — RELIABILITY ENGINEERING

特别专题 8

确信可靠性理论及应用：最新进展、方法与实践

专题目标 》》》》

随着系统复杂性不断提高、功能不断增强以及性能要求日益严格，可靠性已不再只是一个用于评估的指标，而是需要从基本原理出发加以设计、理解与验证的系统属性。这一转变表明，有必要超越以统计失效分析为主的传统方法，从更加基础的视角重新认识可靠性问题。

康锐教授提出的确信可靠性理论为此提供了新的思路。该理论立足于将可靠性发展为一门科学学科。在这一视角下，可靠性被定义为系统功能在时空上的可重复性，并通过"原理—实验—数学表征"的一体化结构加以描述。在这一逐步形成的可靠性科学框架中，确信可靠性从系统功能、性能裕量、退化及不确定性等方面对可靠性进行刻画，为可靠性分析、设计与验证提供了系统化的方法。相较于仅关注不确定性量化的传统可靠性理论，确信可靠性更强调从整体上理解功能可靠如何形成、维持与演化。近年来，该研究方向持续受到关注，在理论方法上不断向纵深与横阔推进，同时在工程实践中获得了广泛的应用，为应对复杂系统行为、信息有限、性能动态演化以及可靠性正向设计与验证等问题提供了新的思路。

本专题将搭建一个聚焦确信可靠性的学术交流平台，展示该领域的最新研究进展，并探讨其在现代可靠性科学与工程中的作用与发展趋势。本专题反映了当前对基于原理理解可靠性的迫切需求，以及理论发展与工程实践深度融合的发展方向。会议将汇聚来自学术界与工程界的研究人员与实践者，促进基础研究与实际应用之间的交流与合作。

专题主题 》》》》

征稿主题包括但不限于：

- 确信可靠性的基本原理与理论
- 面向功能与性能的可靠性建模与分析方法
- 可靠性正向设计方法
- 可靠性实验方法
- 样本或信息不完备条件下的可靠性评估方法
- 确信可靠性的计算方法与工具
- 确信可靠性在复杂系统中的应用，包括航空航天、制造、能源、交通等工程系统，以及生物系统、社会系统及艺术情境中的抽象系统
- 确信可靠性与数据驱动方法和智能方法的融合
- 确信可靠性的工程实践与典型案例研究
- …

专题主席 》》》》

李晓阳，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。
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- 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。
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- 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）
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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

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