# Special Session IX

## Special Session Basic Information:

| 专栏题目<br>Session Title | 中文：高端装备关键部件诊断与预测：理论、方法与应用<br>英文：Diagnostics and Prognostics for Critical Components of High-End Equipment: Theories, Methodologies, and Applications |
|---|---|

### 专栏介绍和征稿主题
### Introduction and topics

中文： 随着航空发动机、高速列车、新能源汽车、数控机床等高端装备向智能化、高可靠性方向发展，其关键部件的故障诊断与剩余寿命预测技术已成为领域内的研究热点。关键部件的微小故障可能导致整个系统的性能衰退甚至灾难性事故，因此，实现在复杂工况下的早期诊断与精准预测，对于保障装备安全运行、降低运维成本具有重要的理论意义与工程价值。

本分会旨在为学术界与工业界的研究人员提供一个交流平台，聚焦高端装备关键部件诊断与预测的前沿理论、关键技术挑战及创新应用。我们诚邀原创性研究论文，探讨信号处理、人工智能、数字孪生及物理信息融合等领域的新型诊断与预测方法，以提升高端装备的运行可靠性及安全性。

征稿主题包括但不限于：

- 高端装备可靠性分析
- 新型传感与信号处理技术
- 关键部件寿命预测与健康管理
- 复杂工况下的监测、诊断及预测方法
- 数字孪生与智能运维

英文： As high-end equipment such as aero-engines, high-speed trains, new energy vehicles, and computer numerical control machine tools advance toward intelligence and high reliability, fault diagnosis and remaining useful life prediction technologies for their critical components have become research hotspots in the field. Minor faults in critical components may lead to performance degradation or even catastrophic accidents of the entire system. Therefore, achieving early diagnosis and accurate prediction under complex operating conditions holds significant theoretical importance and engineering value for ensuring safe equipment operation and reducing operation and maintenance costs.

This Special Session aims to provide a communication platform for researchers from both academia and industry, focusing on cutting-edge theories, key technical challenges, and innovative applications in the diagnostics and prognostics of critical components of high-end equipment. We cordially invite original research papers that explore novel diagnostic and prognostic methods based on signal processing, artificial intelligence, digital twins, and physics-informed fusion.

Topics of interest include, but are not limited to:

- Reliability analysis of high-end equipment
- Novel sensing and signal processing techniques
- Life prediction and health management of critical components
- Monitoring, diagnosis, and prediction methods under complex operating conditions
- Digital twins and intelligent operation and maintenance

## Special Session Chair(s):

| | |
|---|---|
| **姓名**<br>**Name** | 孔金震<br>Jinzhen Kong |
| **称谓**<br>**Prefix** | 副教授<br>Associate Professor |
| **部门**<br>**Department** | 机械工程学院<br>School of Mechanical Engineering |
| **单位**<br>**Organization** | 河北工业大学<br>Hehei University of Technology |
| **城市/地区**<br>**City/Region** | 天津<br>Tianjin |

### Organizer's Brief Biography

中文：河北工业大学副教授，河北工业大学“元光学者”、兴冀青年拔尖人才、天津市企业科技特派员。博士毕业于上海交通大学，从事设备故障预测及健康管理、动力电池健康状态评估及寿命预测理论与方法、智能运维与大数据分析等研究，主持国家自然科学基金青年基金、天津市科研项目、校企合作项目等，作为学术骨干参与国家重点研发计划、国家自然科学基金创新群体项目、国家自然科学基金等多项国家级项目。发表 SCI 论文 20 余篇，出版英文专著 1 章，获批国家发明专利授权 6 项。担任 IEEE Transactions on Reliability 等 10 余个国际学术期刊审稿人。

英文：Jinzhen Kong, associate professor at Hebei University of Technology (HEBUT), Yuan Guang Scholar of HEBUT, Xing Ji Young Top Talent, Tianjin Enterprise Science and Technology Specialist. She earned her Ph.D. degree from Shanghai Jiaotong University, and her research interests include prognosis and health management, power battery health state assessment and life prediction. She presided over the National Natural Science Foundation of China Youth Fund, Tianjin Municipal Scientific Research Project, etc., and participated in the National Key Research and Development Program, National Natural Science Foundation of China Innovation Group Project as an academic backbone. She has published more than 20 SCI papers, 1 book chapter, and 6 national invention patents. She has served as a reviewer for more than 10 international academic journals, including IEEE Transactions on Reliability.

| | |
|---|---|
| **姓名**<br>**Name** | 侯炳昌<br>Bingchang Hou |
| **称谓**<br>**Prefix** | 副教授<br>Associate Professor |
| **部门**<br>**Department** | 高端装备机械传动全国重点实验室<br>State Key Laboratory of Mechanical Transmission for Advanced Equipment |
| **单位**<br>**Organization** | 重庆大学<br>Chongqing University |
| **城市/地区**<br>**City/Region** | Chongqing |

### Organizer's Brief Biography

中文：准聘副教授，就职于重庆大学高端装备机械传动全国重点实验室机器人研究所。博士毕业于上海交通大学，研究方向为装备健康监测与诊断、智能无人系统等，取得了准算数均值比框架、脉冲模态分解、优化权重谱等创新成果，在 MSSP、IEEE/ASME Transactions 等权威期刊发表一作 SCI 论文 10 余篇，其中 3 篇入选 ESI 高被引；入选 2025 年度 World's Top 2% Scientists；获 ICSMD 2022 国际会议论文 Best paper 奖（一作）。受邀担任 MSSP、IEEE Transactions 等 20 余本期刊审稿人，多次获杰出审稿人奖。

英文：Associate Professor, affiliated with the Robotics Institute of the State Key Laboratory of Mechanical Transmission for Advanced Equipment at Chongqing University. He earned a Ph.D. degree from Shanghai Jiao Tong University, his research interests include equipment health monitoring and diagnosis, intelligent unmanned systems, etc. His representative research work includes the quasi-arithmetic mean ratio framework, impulsive mode decomposition, and optimized weight spectrum. He published over 10 first-author SCI papers in authoritative journals, with 3 selected as ESI highly cited papers, and ranked in the top 2% of scientists globally in 2025. He won the Best Paper at the ICSMD 2022 (first author). He Serves as a reviewer for over 20 SCI-indexed journals and received several Outstanding Reviewer Awards.