

CALL FOR PAPERS

for Special Collection on

**Transforming rail operations with intelligent perception, control, and management for enhanced efficiency and safety**

**Theme:** The deployment of an Industrial Cyber-Physical Systems (ICPS) approach in rail transportation industry would result a paradigm shift towards heightened intelligence, efficiency, and safety. The incorporation of advanced technologies, such as intelligent perception, knowledge-based and data-driven integrating control, and artificial intelligence, has notably enhanced the capabilities of rail systems. This influence extends beyond the technological realm, impacting everyday applications and elevating the overall safety and efficiency of rail operations. Nevertheless, the deployment of intelligent devices and the application of advanced technologies in rail systems necessitate a comprehensive exploration of intelligent perception, control, and management. This is to effectively address the unique challenges posed by the complex environment and strict safety requirements of the rail systems. Intelligent perception entails the development of sophisticated sensing and perception technologies, enabling rail vehicles and infrastructure to interpret and respond to dynamic environmental conditions. The focus on control revolves around formulating strategies for autonomous and connected rail vehicles, adaptive traffic management, and advanced control mechanisms designed to optimize the performance of rail systems. Management, as a critical element, involves seamlessly integrating information technologies for real-time monitoring, decision-making, and resource allocation. This integration is vital for enhancing the overall efficiency and reliability of rail operations. This special section serves as a platform to foster cutting-edge research on the application of intelligent technologies in the rail industry, aiming to showcase innovative research contributions that strategically leverage intelligent technologies to enhance the capabilities of rail systems.

**This special collection will focus on (but not limited to) the following topics:**

- Intelligent perception technologies for rail systems
- Artificial intelligence applications in rail systems
- Control strategies for autonomous and connected rail vehicles
- Cybersecurity challenges in the rail transportation industry
- Real-time monitoring and decision-making mechanisms for rail operations
- Intelligent maintenance in rail industry
- Human-machine interaction in rail environment
- New trends in global transcontinental railway transportation
- Resilience and Reliability of Rail Industrial Cyber-Physical Systems

**Guest Editors**

- Prof. Hairong Dong, Beijing Jiaotong University, China, [hrdong@bjtu.edu.cn](mailto:hrdong@bjtu.edu.cn)
- Prof. Clive Roberts, Durham University, UK, [Clive.Roberts@durham.ac.uk](mailto:Clive.Roberts@durham.ac.uk)
- Prof. Ulrich Maschek, Technische Universität Dresden, Germany, [ulrich.maschek@tu-dresden.de](mailto:ulrich.maschek@tu-dresden.de)
- Dr.-Ing. Haifeng Song, Beihang University, China, [hfsong@buaa.edu.cn](mailto:hfsong@buaa.edu.cn)

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