Title:
Control, Communication and Emerging Technologies in Smart Rail Systems

Modality:
- Half-day (e.g., 3 hours plus breaks)

Scope (no longer than 4 pages), including the following sections:

Rail transport networks are now reaching an important development stage worldwide. High-speed rail transport systems have achieved significant development in Europe and Asia and are beginning to become popular in many countries. Metropolitan transport will have an increasing importance in the coming years to reduce pollution and congestion in cities. Both metropolitan and high speed railways require the use of advanced signaling and control systems to guarantee and optimize their operation. For these reasons it is necessary to use modern communication and signaling systems for the intelligent control of these railways. In addition, the railway infrastructures use many supplementary systems such as remote control, video surveillance, obstacle detection and operating aids that require the intensive use of information and communication technologies. In all cases the electrical and electronics equipment must have a high quality of service, reliability and availability to fulfill railway requirements.

The aim of this special issue is to present a collection of high-quality research papers on recent developments, current research challenges and future directions in the use of control, communications, and emerging technologies to realize smart rail systems that are safer, and more efficient. We are soliciting original contributions that have not been published and are not currently under consideration by any other journals. The topics of interest include, but are not limited to:

- Energy efficiency and sustainability of smart rail transportation
- Smart rail system modeling and optimization
- Architectures, algorithms and protocols for data dissemination, processing, and aggregation for smart rail systems
• Networked information processing, decision making, and intelligent control for smart rails
• Smart railway communications and networking
• Wireless technologies for smart rail systems
• Applications and services for smart rail systems
• Security, privacy, and dependability in smart rail systems
• Results from experimental systems, testbeds, and pilot studies for smart rails
• Intelligent transportation, rail traffic modeling, decentralized congestion control in Smart rail systems

- Organizers (names, affiliations, emails, and short bio):

Li Zhu, Beijing Jiaotong University, Beijing, China, lizhu@bjtu.edu.cn
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Prof. Zhu received the PhD degree in traffic information engineering and control from Beijing Jiaotong University in 2012. From 2009 to 2010, he was a visiting student in University of British Columbia (UBC) and Carlton University in Canada, where he worked on the research and development in the areas of advanced wireless communication technologies in railway control system. He joined state key laboratory of rail traffic control and safety at Beijing Jiaotong University, Beijing, in 2012, where he is currently a Professor. His research interests include train ground communication system, communication based train control system, cross-layer/cross-systems design in wireless networks, and security in train control system. He has published 70+ papers in reputable journals/conferences. Most of the papers are published in well-known journals, such as IEEE Transactions on Vehicular Technology, IEEE Transactions on Intelligent Transportation System, and IEEE Journal on Selected Areas in Communications (JSAC). His doctoral dissertation "cross layer design in CBTC train ground communication system" was awarded the Beijing exceptional doctoral dissertation.

As the head and coordinators of projects, Prof. Zhu works on a series of (more than 10) projects from the Ministry of Education and Natural Science Foundation etc. He has served on the Technical Program Committee (TPC) of numerous conferences and as the TPC Co-Chair of IEEE ITSC’14, IEEE ITS’15, IEEE ITS’16, TPC member of Globecom’14, ICC’14. He is also the reviewer of several well-known journals, including IEEE Transactions on Vehicular Technology, IEEE Transactions on Intelligent Transportation System, EURASIP Journal on Wireless Communications Networking, Wiley Journal on Security and Communication Networks, and International Journal of Wireless Communications and Networking.

In industry area, as a main participant, Prof. Zhu design the data communication system of the CBTC system of Beijing Metro Yizhuang Line, which is the first train control system with self-owned intellectual property right. He published 4 granted patent during the system design process.
• Intended audience and expected attendance of the special session:

Rail Engineers, Rail Transit Student, Professors

• Materials and equipment needed for the special session:

None

• Contact details of the proposers (email, postal address, etc):

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