

# QRS 2020 Workshop on Reliability and Resilience of Complex Systems

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## 1. Workshop organizers

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Biography: Shubin Si is a professor of Northwestern Polytechnical University, having taught and researched there from 1997 to 2017. He got Ph.D for Management Science and Engineering from Northwestern Polytechnical University in 2006. He is Chair of Department of Industrial Engineering of Northwestern Polytechnical University. Prof.Si is a senior member of IEEE society and the vice Chairman of Reliability Committee of the Operations Research Society of China. He has been visiting professor at Vaasa University (Finland), Alberta University (Canada) and Ecole Centrale Paris (France). His interesting research includes importance measures and system reliability optimization. He led many China national projects and has got four awards from China government. He has published over 50 papers in importance measures and its applications. Integrated importance measure has been applied by SAS-JMP in 2014.

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Biography: Ning Wang is an associate professor of Chang'an University, having taught and researched there from 2012 to 2020. He got Ph. D for Management Science and Engineering from Northwestern Polytechnical University in 2012. His interesting research includes importance measures, maintenance theory and system reliability optimization. He has published over 20 papers in his interesting research.

## 2. Program Committee

Zhiqiang Cai (Northwestern Polytechnical University, China)

Lirong Cui (Beijing Institute of Technology, China)

David W. Coit (Rutgers University, USA)

Jian Guo (Western New England University)

Gregory Levitin (The Israel Electronic Corporation, Israel)

Xiaohu Li (Stevens Institute of Technology, USA)

Yanfu Li (Tsinghua University, China)

Zhaojun Li (Western New England University, USA)

Yi-Kuei Lin (National Taiwan University of Science & Technology, Taiwan)  
Yu Liu (University of Electronic Science and Technology of China, China)  
Peter Liu (Carleton University)  
Renyan Jiang (Changsha University of Science & Technology, China)  
Tongdan Jin (Texas State University, USA)  
Yuchang Mo (Zhejiang Normal University, China)  
Mohammad Mobin (San Jose State University)  
Rui Peng (University of Science & Technology Beijing, China)  
Shubin Si (Northwestern Polytechnical University, China)  
Sheng-Tsaing Tseng (National Tsing-Hua University, Taiwan)  
Xiaoyue Wu (National University of Defense Technology, China)  
Ning Wang (Changan University, China)  
Liyang Xie (Northeastern University, China)  
Yisha Xiang (Lamar University)  
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Hisashi Yamamoto (Tokyo Metropolitan University, Japan)  
Jun Yang (Beihang University)  
Won Young Yun (Pusan National University, Korea)  
Chi Zhang (Tsinghua University, China)

### **3. CFP of this workshop**

Reliability of a system conveys information about the absence of failures, and is usually defined as the probability that the system will perform its intended function for a specified time period when operating under given environmental conditions. Reliability theory, which is the foundation of reliability engineering, deals with the interdisciplinary use of probability, statistics and stochastic modeling, combined with engineering insights into the design and the scientific understanding of the failure mechanisms, to study the various aspects of reliability. With the development of the complex systems, such as advanced aircraft, space station and nuclear power and so on, reliability theories and applications attract more and more attention in this century.

It should be noted that the growth of structural and functional complexity leads to the development of various condition monitoring and health assessment techniques so as to guarantee system reliability and availability. Degradation process is a non-negligible phenomenon in system condition monitoring and reliability practices. In recent years, PHM related topics attracted increasing attention and many efforts have been taken to develop effective methods for system health evaluation and RUL prediction.

The growth of structural and functional complexity gives rise to the development of invulnerability and resilience research of complex networked systems so as to guarantee system reliability,

availability, and resilience. A real network is robust and resilient yet fragile, which is one of basic features of a networked system. In many real networks such as power grid, city traffic, finance network, and even ecological network, a tiny local attack to some key nodes may lead to a domino-like cascading failure spreading to the entire system. In recent years, network invulnerability and resilience researches have recently attracted increasing attention. Much efforts have been taken to study how to measure the invulnerability, resilience, and adaptation of a network, how network structure affects its invulnerability and strategies to prevent and predict failure events of deleterious actions to get a more robust network.

This workshop serves as a forum for the latest achievements of the advanced theory and application of reliability, resilience, PHM and complex networked systems. We are looking forward to researchers and professionals to join our workshop and contribute their most recent research findings and best practices in the following research areas and topics.

The topics of interest include, but are not limited to:

- Reliability modeling and analysis
- Resilience modeling and analysis of complex engineering systems
- System reliability optimization
- Prognostics and health management (PHM)
- Remaining useful life (URL) prediction
- Network invulnerability and topology optimization
- Maintenance modeling and analysis
- Warranty modeling and analysis
- Case studies in reliability, resilience, and PHM

#### **4. Important Dates**

- June 15, 2020            Submission deadline
- July 10, 2020            Author notification