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## 8<sup>th</sup> International Conference on Through-Life Engineering Services – TESConf 2019

### Preface

Robert X. Gao and Ruqiang Yan

This special issue of **Procedia Manufacturing** contains 35 papers presented at the 8<sup>th</sup> International Conference on Through-Life Engineering Services (TESConf 2019), held on 27-29 October 2019 at Case Western Reserve University, Cleveland, Ohio, USA.

The TES Conference was initiated in 2012 at Cranfield University, UK, with a focus on condition monitoring, diagnostics, prognostics, and maintenance of reliability-critical and technology-intensive high value products. The Conference has been hosted by Cranfield University 6 times over the past 7 years, except for 2017, when it was held at the University of Bremen, Germany. The year 2019 marks the first time for the TES Conference to be held outside of Europe. Reflecting the trend of digitalization in manufacturing and emphasizing the interconnection among key elements in Smart Manufacturing, the topics of the conference have been expanded in recent years, and in particular this year, to include Industry 4.0, Digital Twins, Internet of Things (IoT), big data analytics, etc.

This year, a total of 32 contributed papers have been accepted for presentation at parallel sessions during the conference, and inclusion in this special issue. The authors represent eight countries from six continents, which underscores the increasing relevance of Through-Life Engineering Services as one of the global focuses to advance Smart Manufacturing. These papers cover a broad spectrum of research fields, including system design and modeling, machine condition monitoring, fault diagnosis and tool life prognosis, process-embedded sensing, information extraction, supply chains, and lifecycle management. In addition, this special issue also contains three invited papers from researchers whose innovative work is of interest to TES. Together with another three invited speakers, they presented the latest development in their respected field of research, which enriched the conference program.

A highlight of the TESConf 2019 is represented by the **keynote speeches** given by four distinguished speakers, which include Dr. S. Jack Hu, Senior Vice President for Academic Affairs and Provost and UGA Foundation Distinguished Professor of Engineering at the University of Georgia, Dr. Xun Xu, Professor and Chair of Manufacturing at the University of Auckland, New Zealand, Dr. Lihui Wang, Professor and Chair of Sustainable Manufacturing at KTH Royal Institute of Technology, Sweden, and Dr. I.S. Jawahir, James F. Hardyman Chair in Manufacturing Systems and Director of Institute for Sustainable Manufacturing (ISM) at the University of Kentucky. Their talks on smart, personalized manufacturing, cyber physical systems, digital twin and big data analytics, and Industry 4.0 for advancing circular economy provided new insights into these topics of active research worldwide. In addition, a conference banquet speech was given by Dr. Chris Yuan, Professor in the Department of Mechanical and Aerospace Engineering at Case Western Reserve University. His talk on through-life sustainability of Lithium-Ion battery for electric vehicles has led to live discussions among the audience about this innovative field of research.

To promote visibility and quality of the research efforts of the attendees, a **Best Paper Award** was inaugurated for TESConf 2019. Three candidate papers, (1) “Dynamic Modeling of Planetary Gear Set with Tooth Surface Wear”, (2) “Vision-based Vibration Measurement by Sensing Motion of Spider Silk”, and (3) “Real-Time Grinding Wheel Condition Monitoring Using Linear Imaging Sensor”, were selected as Finalists from all the submitted papers, based on the outcome of the paper reviews. The Best Paper Award was given to paper (3), based on the review by the award committee that consists of a group of distinguished scholars.

TESConf 2019 is technically sponsored by the International Academy for Production Engineering (CIRP) and financially sponsored by the Institute for Smart, Secure, and Connected Systems (ISSACS) at Case Western Reserve University. On behalf of the conference organizers and attendees, we would like to express our sincere appreciation for the sponsorship. We would also like to thank members of the Conference, Program, and Local Organizing Committees, staff in the Department of Mechanical and Aerospace Engineering, and the Case School of Engineering (CSE), as well as volunteers who gave their time to help with the many details of importance for the success of the conference. It is their dedication and contribution, together with the support from all the authors and reviewers who enthusiastically participated in this conference that made TESConf 2019 a memorable event.

#### Conference Chair & Co-Chair

Professor Robert X. Gao  
Case Western Reserve University, USA  
  
Dr. John Erkoyuncu  
Cranfield University, UK

#### Program Chair & Co-Chair

Professor Ruqiang Yan  
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