

Special issue of the 1st International Project Competition of Structural Health Monitoring (IPC-SHM 2020)

Preface

This special issue of the Journal of Smart Structures and Systems includes the manuscripts of the winning groups at the 1st International Project Competition of Structural Health Monitoring (IPC-SHM 2020). It was held from June 2nd, 2020, to January 7th, 2021, at Harbin Institute of Technology, China.

To promote the development of structural health monitoring (SHM) around the world, the IPC-SHM 2020 was initiated and organized by the Asia-Pacific Network of Centers for Research in Smart Structures Technology (ANCRiSST), Harbin Institute of Technology, University of Illinois at Urbana-Champaign, and four leading companies in the application of SHM technology. This competition aimed at engaging young scholars in various research topics within the SHM field, encouraging them to be creative and propose effective solutions to address practical challenges in full-scale SHM applications. Three SHM datasets from real-world structures were released online both in China (<http://www.schm.org.cn>) and the USA (<http://sstl.cee.illinois.edu/ipc-shm2020>). A total of 330 participants formed 112 teams from 70 universities and institutions in 12 countries and registered for the competition. In the end, a total of 75 papers were submitted from 56 teams associated with 57 affiliations. Of those submitted, 31, 30, and 14 papers were for Projects 1, 2, and 3, respectively. A two-round review process was followed. After completing the review by the organization committee and the awards committee, the top 10, 10, and 5 teams were selected as the prize winners for the three competition projects, respectively. Ever since the first meet of IPC-SHM 2020, IC-SHM 2021 has been launched at the University of Illinois at Urbana-Champaign and has become a big scientific festivity for young scholars and students in the SHM community.

The organizers of IPC-SHM 2020 decided to promote the selected high-quality papers in full texts as a special issue of the Journal of Smart Structures and Systems. Publication of full papers based on this international competition has multiple advantages. For the authors, the quality of their work will be considerably improved through the blind peer-review process. For the research community, it provides an excellent source of reference by collecting these winning papers in a special issue. For the journal and the competition, it is an excellent way to pay a positive role in advancing the frontier of artificial intelligence (AI) in SHM. To provide equal opportunity to all authors of the winning and invited groups of IPC-SHM 2020, an announcement on the special issue was included in the emails sent to all the participants and announced on the websites as well.

This special issue received manuscripts from 21 teams, 20 out of which passed the peer review process and met the norms and the rigor for publication. The topics covered in this special issue include: (i) image-based identification of fatigue cracks in bridge girders, (ii) data anomaly detection for SHM, and (iii) condition assessment of stay cables using cable tension data. Special

appreciation goes to the reviewers for their effort and commitment to conduct rigorous and constructive reviews. It is hoped that this special issue will make a good reference material and be of great use for AI in SHM.

October 5, 2021

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