

# Special issue of the 2nd International Competition of Structural Health Monitoring (IC-SHM 2021)

## Preface

Civil infrastructure, such as buildings and bridges, constitutes a crucial part of people's everyday lives, pushing strong demand for maintaining its safety and serviceability. These structures are subject to a myriad of risks depending on their age and the environment in which they are built, including deterioration and natural/human-made disasters. To determine an appropriate course of actions against those risks, up-to-date structural conditions need to be assessed by reliable and efficient inspection and monitoring methodologies.

The 1st International Project Competition for Structural Health Monitoring (IPC-SHM2020) was organized in 2020 to tackle the challenge by fostering and encouraging innovations in the structural health monitoring (SHM) community. In IPC-SHM2020, 75 teams worked on three projects related to bridges in the field. The projects served as benchmarks to develop and evaluate different structural health monitoring methodologies, leading to the proposals of innovative solutions. Building on the success of IPC-SHM 2020, the 2nd International Competition of Structural Health Monitoring (IC-SHM 2021) was organized in 2021 to further extend the frontiers of computer vision-based civil infrastructure inspection and monitoring. The competition was organized by the Asia-Pacific Network of Centers for Research in Smart Structures Technology (ANCRiSST), University of Illinois Urbana-Champaign, Harbin Institute of Technology, Zhejiang University/University of Illinois at Urbana-Champaign Institute (ZJU-UIUC Institute), and the University of Houston.

The IC-SHM 2021 consisted of three projects: (i) computer vision-based post-earthquake inspections of railway viaducts, (ii) computer vision-based post-earthquake inspections of buildings, and (iii) computer vision-based vibration measurement and damage assessment. 478 students and young researchers in 167 teams from 20 countries and regions registered for the competition, leading to 53 final submissions from 12 countries/regions. The full papers and their algorithm accuracies were evaluated in two rounds to determine three top-performing teams for each of the three projects. This special issue contains papers from those nine award-winning teams with the hope that the presented insights help the whole research community build up experiences in innovative SHM approaches aided by computer vision techniques.

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