

## Editorial

### A report on the 6th European Conference on Structural Control

D. J. Wagg<sup>1,\*†</sup>, E. J. Cross<sup>1</sup>, R. J. Barthorpe<sup>1</sup> and L. Faravelli<sup>2</sup>

<sup>1</sup>*Department of Mechanical Engineering, University of Sheffield, S1 3JD, UK*

<sup>2</sup>*DICAR, University of Pavia, via Ferrata 3, 27100 Pavia, Italy*

#### 1. INTRODUCTION

The 6th European Conference on Structural Control (EACS16) took place in Sheffield from 11th to the 13th July 2016. The conference was hosted by the University of Sheffield. The venue was the new Diamond building, which is a recently constructed £81 M building for teaching engineering students that opened in September 2015 [1].

The EACS conferences are sponsored by the European Association for the Control of Structures. Previous conferences have been held in Barcelona (1996), Paris (2000), Vienna (2004), St. Petersburg (2008), and Genoa (2012) [2]. The aim of the conference is to provide a forum for presentation and discussion of current research on structural control, structural health monitoring and related topics including; active control; passive and hybrid control; structural dynamics; earthquake engineering; sensors and actuators technology; smart materials; structural health monitoring, and damage identification. Approximately 85 delegates attended the conference, which brought together researchers from across Europe, and the wider world.

The conference opened with a keynote lecture by Professor Mike Todd from University of California San Diego, USA. The theme of this key note was the synergy between structural health monitoring (SHM) and control. It posed the question: *Can SHM be cast as a control problem?* In particular, can a control or optimisation approach be applied to a four stage Bayesian experimental design process, that uses: (i) evaluation of the design space including constraints, (ii) extraction of relevant candidate features and models their variability as a function of free design variables, (iii) derivation of a detector, and (iv) evaluation of detector performance. This led to an interesting debate following the keynote, in which the topic was debated further.

The conference then divided into two parallel sessions, the first on control and SHM topics, and the second on smart materials, earthquake engineering, and tuned mass dampers. Amongst the papers presented in these sessions were topics relating to fault tolerant control design, control for shake table applications, and control of human induced vibrations. There were also papers relating to damage identification, shunt dampers and mitigation of seismic excitation of structures. There was particular interest in tuned mass dampers and novel variants of this type of vibration suppression device. In the session on this topic, there were papers presented on application of a hybrid mass damper to the Canton tower, lightly damped footbridges, and tuned liquid dampers.

Tuesday started with a keynote lecture by André Preumont who is Professor of Mechanical Engineering and Robotics at Université libre de Bruxelles. The theme of this keynote was the vibration control of large civil engineering structures. This keynote gave an excellent overview of many of the most successful vibration reduction mechanisms and control devices which have been used on large civil engineering structures to date. The talk also discussed some new applications where vibration control has the potential to be applied successfully in the future.

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\*Correspondence to: David J. Wagg, Department of Mechanical Engineering, University of Sheffield, S1 3JD, UK.

†E-mail: david.wagg@sheffield.ac.uk

Technical sessions on day two of the conference included civil structural health monitoring, hybrid testing and system identification. Amongst the papers presented during these session were topics such as tracking systems for monitoring, uncertainty quantification, hybrid simulation for fire testing and the use of black box models for parameter identification.

The final day of the conference started with a keynote lecture from Professor Paul Reynolds, Professor of Structural Dynamics and Control at the University of Exeter. The theme of this final keynote lecture was control of human-induced vibrations: an integrated approach to vibration serviceability design. During the talk, Professor Reynold showed some remarkable examples of human induced vibration of structures. He also showed how these vibrations can be mitigated using a range of vibration control devices.

The technical sessions on the final day of the conference included active and semi-active control, inerters and damping. Inerters were a notable topic in the conference this time, reflecting the current interest in this new technology. Presentation topics included; tuned-inerter-dampers; tuned-mass-damper-inerters; fluid inerters; reducing vibrations in multi-storey structures; resonant inerter based absorbers; seismically excited structures, and energy harvesting from inteter systems.

The conference dinner was held in Cutlers Hall, Sheffield.

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