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Editorial

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Editorial

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The annual conference organised by the UK Association for Computational Mechanics (ACM) is the main forum in the UK for computational mechanics researchers. The UKACM, formerly known as the UK Association for Computational Mechanics in Engineering (ACME), was founded in 1992 with the aim of promoting research and establishing formal links with similar international organisations. The Association held its first Conference on Computational Mechanics at the University College of Swansea, Wales in 1993. During the past 25 years, 17 UK universities have successfully hosted the conference, which proved particularly useful in bringing together researchers from different disciplines and providing young researchers with opportunities to present their work.

The University of Birmingham hosted the UKACM 25th Conference on Computational Mechanics (UKACM 2017) on 12–13 April 2017. UKACM 2017, which was attended by more than 100 participants, aimed at providing a forum for presenting and discussing research findings in many areas of mechanics, with an emphasis on interdisciplinary aspects. The scientific programme included three plenary sessions and 16 parallel sessions covering a wide range of topics including solid and structural mechanics; failure, fracture and damage; geomechanics; fluid mechanics; and biomechanics, to name but a few. Selected authors were invited, based on the originality and rigour of their submissions, to extend their conference papers and submit them for publication in a two-part themed issue of the *Proceedings of the Institution of Civil Engineers – Engineering and Computational Mechanics*.

This first part of the themed issue includes three papers on computational structural mechanics. The first paper, by Grosman and Izzuddin (2018), presents a new triangular flat shell element for modelling irregular reinforced concrete slabs subjected to extreme loading. The new shell element is based on a co-rotational framework, and combines the benefits of computational efficiency, modelling accuracy and ability to

model material and geometric nonlinearities as well as complex slab shapes and rebar orientations. The predictions of the new triangular shell element were verified against experimental and numerical results from the published literature.

In the second paper, Santos *et al.* (2018) describe a mechanics-based approach for evaluating local buckling in metal sandwich panels. For a given plate, the proposed approach utilises rotational springs to assess the geometric stiffness and takes into consideration the stiffness of adjacent plates. The authors demonstrated that this approach leads to accurate predictions of local buckling. Accordingly, they proposed design models for buckling of sandwich panels with metal cores under compressive patch loading. The predictions of the proposed design models were validated against non-linear finite-element results.

The final paper in this first part of the themed issue details a high-fidelity non-linear modelling strategy for large-scale metal sandwich panels. It is known that detailed non-linear analysis of large-scale metal sandwich panels is computationally expensive. Nordas *et al.* (2018) address this concern by utilising a domain partitioning on high-performance computing that enhances computational efficiency and overcomes memory bottlenecks. This approach, together with high-fidelity geometric and material modelling, enables the capturing of the accurate behaviour of large-scale metal sandwich panels. The paper concludes by providing practical guidance on establishing the optimal number of partitions offering maximum computational efficiency.

We trust that you will find this themed issue, which reflects the high quality of the papers presented at UKACM 2017, both interesting and enlightening. Before concluding, we would like to thank the authors who meticulously prepared their papers, as well as the reviewers who carefully considered every paper ensuring the quality of this themed issue. We would also like to

express our gratitude to the editorial panel of *Engineering and Computational Mechanics* for giving us the opportunity to guest-edit this themed issue. Last, but not least, we would like to acknowledge the logistic support provided by Ms Cherise Lopes-Baker and Mr Paul Allanson.

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