

## Editorial

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Composite materials appear almost everywhere – from aerospace applications, through civil and environmental engineering, to electronic and biomedical products. Although many multi-component materials and structures are well documented with regard to their theoretical, experimental and computational aspects, some innovative, more optimal solutions are still appearing along with additional verification methods. Meanwhile, new experimental tools, computational techniques and mathematical methods are being employed to analyse both existing and emerging materials.

The papers included in the present themed issue reflect recent trends, and are extensions of presentations at the 17th International Conference on Composite Materials (ICCM-17) held in Edinburgh, Scotland.

In addition to the aluminium matrix composites (AMC) that originate from the widely used metal matrix composites discussed in the paper by Wielage *et al.* (2011), experimental analyses related to carbon-fibre-reinforced plastics are presented by Belcher *et al.* (2011). By adopting similar experimental research techniques to those for reinforced concrete structures strengthened with steel profiles, Langdon and Rowe (2011) verify the steel-composites interface strength limit.

Pirrer *et al.* (2011) describe a numerical approach to the bi-stability problem via Rayleigh–Ritz method, whereas Kamiński (2011) considers the computational homogenisation of fibre-reinforced composites subjected to stochastic ageing processes. Both approaches are based on the classical finite-element method, which remains the standard tool for the computational modelling of composites.

Furthermore, independent of the response function method considered in the previous paper, Monte Carlo simulation methods are demonstrated as also being useful and efficient, especially when comparing experimental against numerical statistics as demonstrated in the paper by Rollin and Davies (2011).

Finally, Motamedi and Milani (2011) document the importance of optimisation of composites not only in elasticity or thermo-

elasticity, but also in the context of electric and electromagnetic fields.

This issue presents an overview of certain key topics considered in ICCM-17, and highlights open research problems that are important from both theoretical and technological points of view. Composites engineering remains a very interesting, challenging and attractive discipline.

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