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## Preface

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**Biographical notes:** C. Lakshmana Rao is from the Department of Applied Mechanics at the Indian Institute of Technology Madras, Chennai, India. He is the Founder Secretary of the Indian Society for Applied Mechanics. His research interests are in the area of impact mechanics, modelling of material response, piezoelectric actuation and control of structural response. He teaches courses such as impact mechanics, constitutive modelling of materials and engineering mechanics. He has co-authored books on *Engineering Mechanics – Statics and Dynamics*, *Modeling of Engineering Materials* and *Applied Impact Mechanics* besides several journal and conference publications.

V. Narayanamurthy is a Scientist from the Research Centre Imarat, a premier laboratory under the Defence Research and Development Organisation based at Hyderabad, India. His research interests include theoretical and computational impact mechanics, modelling of hybrid structural elements, flight structures and mechanisms and mechanics of fastenings. He has co-authored a book on *Applied Impact Mechanics* besides several journal and conference publications.

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Greetings from the special issue of *IJMSI*.

The papers appearing in this special issue are selected from more than 100 peer-reviewed papers presented in the field of solid mechanics at the Indian Conference on Applied Mechanics (INCAM 2017) held at the Motilal Nehru National Institute of Technology (MNNIT), Allahabad, India, during July 3–5, 2017. This conference was held under the auspices of Indian Society for Applied Mechanics (ISAM). About 38 papers were recommended by sessions chairs based on technical content, originality and presentations by authors. Subsequently, extended version of the papers was invited from authors and was subjected to two independent peer reviews. Based on reviewers' comments and recommendations, 13 papers were selected for publication in this special issue.

Before going to a brief report on all papers published in this special issue, we would like to express our sincere gratitude to Prof. Cemal Basaran, University of Sunny Buffalo, for kindly agreeing to bring out a special issue from selected papers of INCAM 2017. We thank all 76 reviewers who reviewed all 38 papers and helped us in narrowing on to

13 best papers. Although this publication has exceeded its original deadline by more than nine months, all authors have been very cooperative and patiently waited for their revised manuscripts to appear in this special issue. This publication would not have been possible without a constant support and background work carried out by Prof. Yang Ping, Associate Editor-in-Chief of *IJMSI*, and Mr. Richard Sharp and Ms. Jade, Journal Managers, for which we are very thankful.

The papers in this special issue cover a broad range of topics, including computational solid mechanics, mechanics of impact, fracture mechanics, material modelling and experimental mechanics.

There are five papers related to computational solid mechanics. One discusses the formulation of higher order shear deformation theory including nonlinear strain terms for the flexural analysis of the functionally graded plates. The second addresses the occurrence of computational instability due to localised nonlinear response of interaction forces in simulation of adhesive contact problems. The third one explores the capabilities of existing displacement control algorithms in handling geometric and material nonlinearities in solving several 1D and 2D formulations in solid mechanics. The fourth paper presents a wavelet-based adaptive technique for simulation of multiple harmonics in wave propagation which eliminates the need for very large number of nodes in finite element method. The fifth one addresses the problem of volumetric locking in finite element meshes exhibited by nearly incompressible solids, such as rubber, by proposing a displacement-based 3D finite element within isotropic hyperelasticity.

There are two papers in the area of impact mechanics. The first one discusses the effect of filler shape and volume fraction on the dynamic post-yield compression behaviour of glass-filled polymer composites through numerical simulations and split-Hopkinson pressure bar experiments. The second paper presents the effect of obliquity on ballistic impact response of plain-woven fabric subjected to a high-velocity.

There are two papers in fracture mechanics. One computes the mixed mode stress intensity factors of slanted edge cracked plate with a circular hole subjected to various in-plane loadings, using XFEM under plane strain condition. The second discusses the ductile crack growth behaviour in 316LN stainless steel weld joint using Gurson-Tvergaard-Needleman damage model.

Two papers in material modelling focus on nickel-based alloys and on electro-polymers. Life extension of nickel-based alloys used in high temperature applications requires a reliable creep model. This is addressed by the first paper, which proposes a crystal plasticity-based creep model for these alloys. The second one presents a constitutive model that captures the cyclic electromechanical response of poly(vinylidene fluoride).

Finally, there are two papers on experimental mechanics. One studies the effect of soot on tribological properties of different tribo-couples of bearing steel, silicon nitride and zirconia. The second paper presents an experimental setup to study the leak characteristics of an elastomeric seal system consisting of two different rubbers and an elastomer specimen.

Thus this special issue has a mix of research papers in mechanics pertaining to computational, impact, fracture, material and experimental. We sincerely thank all involved for giving us the opportunity to bring out this special issue in *IJMSI*.