

# Preface

We are delighted to present the proceedings of the *1st International Conference on Modern Mathematical Methods and High Performance Computing in Science & Technology* (M3HPCST-2015) held at *Raj Kumar Goel Institute of Technology, Ghaziabad, India* from *December 27–29, 2015*. The three-day conference received an excellent response from number of national and international academicians. The pre-conference souvenir had 181 abstracts. Out of 130 papers discussed, 25 were selected for plenary talk and 106 for formal paper presentation. All papers were appropriately reviewed by well-known academicians and researchers. Finally, as many as 25 papers were selected for inclusion in the conference proceedings published by Springer-Verlag.

As we all are aware, mathematics has always been a discipline of interest not only to theoreticians but also to all professionals irrespective of their specific profession. Be it science, technology, economics, high-performance computing, or even sociology, new mathematical principles and models have been emerging and helping in new research and in drawing inferences from practical data as well as through scientific computing. The past few decades have seen enormous growth in applications of mathematics in different multidisciplinary areas.

M3HPCST-2015 covered a wide range of research interests: advances in the area of high-performance computing, which is applied to complex large-scale computational problems, numerical methods for partial differential equations, nonlinear problems, linear and nonlinear optimization, orthogonal polynomials and applications, functional analysis, fluid dynamics, vibration phenomena, and last but not least, biomathematics.

New problems with large-scale computing continually arise in many scientific and engineering applications. The development of new technologies is associated with the design of efficient algorithms in high-performance computing.

The theory of computation and its applications is one of the most important developments in modern science. Three technical sessions were devoted to scientific computing and computational methods for different engineering problems.

Many phenomena in science and engineering are modeled by partial or ordinary differential equations and nonlinear systems. They are usually treated numerically; therefore it is necessary to improve algorithm in terms of stability. Four technical sessions were devoted to represent trends in these areas of research.

Theoretical and practical applications pertaining to biological mathematics, functional analysis, operator theory, and orthogonal polynomials appeared in four technical sessions in which researchers presented the latest results in this area of investigation.

A conference of this kind would not have been possible without the support from different organizations and the people across different committees. We are indebted to the *Science and Engineering Research Board, Department of Science & Technology Govt. of India, Dr. A.P.J. Abdul Kalam Technical University Lucknow, U.P.* Cloud 9, Irish-Hindon, and HP India for sponsoring the event. Their support helped in significantly raising the profile of the conference.

All logistic and general organizational aspects were looked after locally by the organizing committee members from the institute who spent their time and energy in making the conference a grand success. The Technical Program Committee and external reviewers helped in selecting the paper for presentations and working out the technical program. We acknowledge the support and help from all of them.

Last but not least, our sincere thanks to all the authors, participants, and invited speakers, who submitted their papers and contributed to the in-depth discussions.

The organizers also express their hearty thanks to Springer for agreeing to publish the proceedings in its Mathematics and Computer Science series.

We sincerely hope that the reader will find the proceedings stimulating and inspiring.

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