

## Preface

The “Mathematical Modeling and Computational Physics” 2015 (MMCP 2015) was held during 13–17 July 2015 at the Academy Congress Center in the picturesque resort of Stará Lesná (the High Tatras, Slovakia). Organized in common by the Joint Institute for Nuclear Research (JINR), Dubna, Russia, the Slovak Physical Society, three Institutions from Košice, Slovakia (the Technical University, the Institute of Experimental Physics SAS, and the Pavol Josef Šafárik University), and the Horia Hulubei National Institute for Physics and Nuclear Engineering, Bucharest, Romania, the conference was dedicated to the 60-th Anniversary of JINR. It continued the tradition of the previous MMCP conferences of providing an open forum for exchange of ideas, strengthening personal relations, finding incentives for future cooperation, learning and communicating within a wide range of topics:

- mathematical methods and tools for modeling complex physical and technical systems, computational chemistry, biology, and biophysics;
- methods, software and computer complexes for experimental data processing; methods, algorithms and software of computer algebra (quantum and analytic computing);
- distributed scientific computing and big data;
- parallel and hybrid calculations, extra massive parallelism.

The interest to the conference highly exceeded the expectations of the organizers, reaching an attendance of 90 participants from 13 countries. A total of 17 invited plenary lectures and 62 oral communications (in two parallel sections) were delivered.

A short, HybriLIT based (<http://hybrilit.jinr.ru>), tutorial on modern parallelization techniques completed the scientific program.

Most speakers submitted manuscripts for publication. The present issue of EPJ-WoC collects together the 58 contributions which passed all the steps of the reviewing process. There is a twofold message emerging from the lecture of the accepted papers. First, the computing has become an intricate indelible part of the modern physics research. Second, the inherent inner technicalities left aside, there is a powerful cross-fertilization message pointing to the fact that the derivation of sound solutions needs merging a deep understanding of the underlying physics with the rigour of the mathematical arguments and the reality of the hardware and software environments.

The success of the conference and the publication of the present volume are due to the joint efforts and abnegations of many colleagues from various institutions. We express our deep gratitude to the members of the International Program Committee for their valuable contributions to the definition of the basic aims and the scope of the conference, the proposal, selection, and promotion of the highest standard invited lectures, and, last but not least, a significant contribution to the reviewing process. The contribution of 56 independent referees to the expert assessment of difficult submitted manuscripts is gratefully acknowledged as well. The list of significant contributors to the success of MMCP 2015 cannot omit the efforts of the local Slovak team who professionally solved all the arising practical matters and created excellent conference surrounds.

The editors express their hope that the readers of the papers collected under the covers of this volume will find valuable information for their current and future activity as well as interest for participation in the future MMCP conferences.

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Ján Buša (FEI TU),  
Michal Hnatič (BLTP JINR, NScF UPJŠ, IEP SAS).



# MMCP 2015

July 13 – 17, 2015

Stará Lesná, Slovakia

## Organizers

Joint Institute for Nuclear Research, Dubna

Institute of Experimental Physics SAS, Košice

Slovak Physical Society

University of Pavol Jozef Šafárik, Košice

Technical University, Košice

IFIN-HH, Bucharest, Romania

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