

Preface

The 10th International Conference on Wave Mechanics and Vibrations (10th WMVC) was announced by the Von Karman Society for Advanced Study and Research in Mathematical Sciences and held at Lisbon's city centre, in Portugal, at VIP EXECUTIVE ZURIQUE hotel, 4 – 6 July 2022.

The 10th WMVC was jointly organised by the Department of Civil Engineering of the NOVA School of Science and Technology, NOVA University of Lisbon, (DEC/FCT/UNL) and IDMEC, Institute of Mechanical Engineering of the Instituto Superior Técnico of the University of Lisbon (IDMEC/IST/UL).

The WMVC series has its roots in India; it was founded by Prof. Paritosh Biswas from University of North Bengal, India, as an annual national conference. Due to the pandemic situation, the 9th edition was cancelled. The 10th edition, held in Lisbon, elevated the WMVC series to the international level. Given the current situation, the organizers chose a hybrid in-person/remote format, which proved to be the most suitable.

The Scientific Programme consisted of 4 Plenary lectures given in-person, 3 Keynote lectures given remotely, 105 in-person regular presentations and 96 remote ones, grouped according to 25 Mini-Symposia and a General Conference Topic. The conference was attended by 88 remote participants including 3 keynote speakers and 127 in-person participants. The total number of represented countries was 36.

The organization was closely linked to the Journal of Vibration Engineering & Technologies (JVET, Springer Nature), with the support of the editor-in-chief Prof. C. Nataraj, Director of Villanova Center for Analytics of Dynamic Systems, Villanova University, Pennsylvania, USA. Springer Nature issued certificates for the Best Paper Award for Ph.D. students, handed to the best 3 students by Associate Editor Mrs. Sonal Choudhary. A special issue in JVET will be organized from selected contributions.

The main objective of the conference was to bring together academicians, engineers, scientists, researchers, mathematicians, and technologists devoting their work to wave mechanics and vibration-related problems in different areas of scientific and engineering applications on a common platform. Wave mechanics and vibration problems are frequently encountered in various areas of mechanical, civil, aeronautical, robotics, marine, nuclear, biology and earthquake engineering, science and technology. Mathematical theories, numerical simulations, machine intelligence techniques, physical experiments and their engineering and science applications have been presented in this event, providing an outstanding opportunity to university teachers, researchers, and industry experts for sharing new ideas and experience. We strongly believe that the 10th WMVC had a significant impact on the development of contemporary analytical, numerical and experimental methods in wave mechanics and vibration technology and created an opportunity for opening a forum for discussion and collaboration amongst the participants.

The submission of full-length papers was not mandatory, but several authors who presented their work at this conference chose to prepare them. These submissions were subjected to peer-review. We are very pleased to announce that this resulted in a total of 125 accepted papers linked to regular presentations and one to a keynote lecture. It is sincerely hoped that the readers will find in

this volume of **Recent Trends in Wave Mechanics and Vibrations** purposeful, challenging and stimulating new ideas related to all areas of science and engineering in general and to wave mechanics and vibration in particular.

We would like to thank to the organizing institutions DEC/FCT/UNL and IDMEC/IST/UL for their support, to the VIP EXECUTIVE ZURIQUE hotel staff for the excellent service and to the travel Agencies TOP Atlântico and Abreu for managing the reservations and registrations.

We wish to thank to all participants for contributing to a diverse set of topics covered by their research presentations and full-length articles, and for recreating the spirit of a conference by their presentations and active discussions inside as well as outside the presentation rooms.

We extend our thanks to the supporting staff responsible for registration and clarifying any participants' doubts and questions. The valuable help provided by our undergraduate students and research fellows responsible for maintaining the programme schedule and ensuring a smooth switch between remote and in-person presentations is also gratefully acknowledged.

Acknowledgments are also extended to the Ph.D. students who responded to our appeal and participated in the Best Paper Award competition, and to the judging panel, for their assessment.

We are grateful for the contributions of the Plenary and Keynote Speakers for their rich and high scientific quality presentations.

We wish to thank to the Mini-Symposia organizers for attracting participants to their topics and chairing the respective sessions. Our thanks are extended to the reviewers who, together with the Mini-Symposia organizers, contributed to the scientific quality of this volume. The papers in this volume are ordered according the Mini-Symposia listed in alphabetical order of their abbreviation. Within each Mini-Symposium, the papers order is also alphabetical, according to the paper title.

Last but not least, the Editors express profuse thanks to Springer Nature for taking up the responsibility to publish this volume.

Zuzana Dimitrovová (Conference Chairperson)
NOVA School of Science and Technology, NOVA University of Lisbon
IDMEC, Instituto Superior Técnico, University of Lisbon, Portugal

Rodrigo Gonçalves (Local Organizing Committee)
NOVA School of Science and Technology, NOVA University of Lisbon
CERIS, Instituto Superior Técnico, University of Lisbon, Portugal

Tiago Silva (Local Organizing Committee)
NOVA School of Science and Technology, NOVA University of Lisbon
UNIDEMI, NOVA.id.FCT, Lisbon, Portugal