

Ladies and Gentlemen, dear Readers,

theoretical and experimental solutions of technical problems using advanced approaches and modern computational and measuring engineering is nowadays only way to obtain new knowledge in all field of science and technique. Machine modelling and simulations using advanced computer and experimental technologies play an important role in many areas of industrial applications.

Our scientific meetings began on a regular footing in 1996 on the basis of an agreement between Poznan University of Technology and the University of Žilina back in 1994. Under its auspices, 21 international scientific conferences have been organized alternately in Slovakia or Poland and in one case in the Czech Republic since 1996. Today we are starting the 22<sup>nd</sup> chapter of these international meetings.

Main conference organizer is Faculty of mechanical Engineering, Department of Applied Mechanics, University of Žilina, Slovakia. The University of Žilina has more than 65 years of tradition and currently has seven faculties and over 10,000 students. The University of Žilina is a modern university providing a full range of technological, economics, management and a limited range of humanistic and natural science education at under graduate, graduate and post-graduate levels.

This scientific publication presents results of the chosen international research centres and universities, mainly from Slovakia and Poland. The publication contains eight chapters and summarized scientific activities of more than 150 authors in field of structural modelling, design, simulation and machine optimization, experimental evaluation and modelling of materials.

The scientific committee determined the following conference topics:

- Methods and systems in machine design,
- Modelling and simulation, structural optimization,
- Machine dynamics and multibody systems simulations,
- Advanced industrial, automotive and green energy applications,
- Experimental mechanics, identification and validation,
- Modelling of structural materials, composites and nanomaterials,
- Physical and chemical properties of materials,
- Theoretical and applied mathematics in engineering.