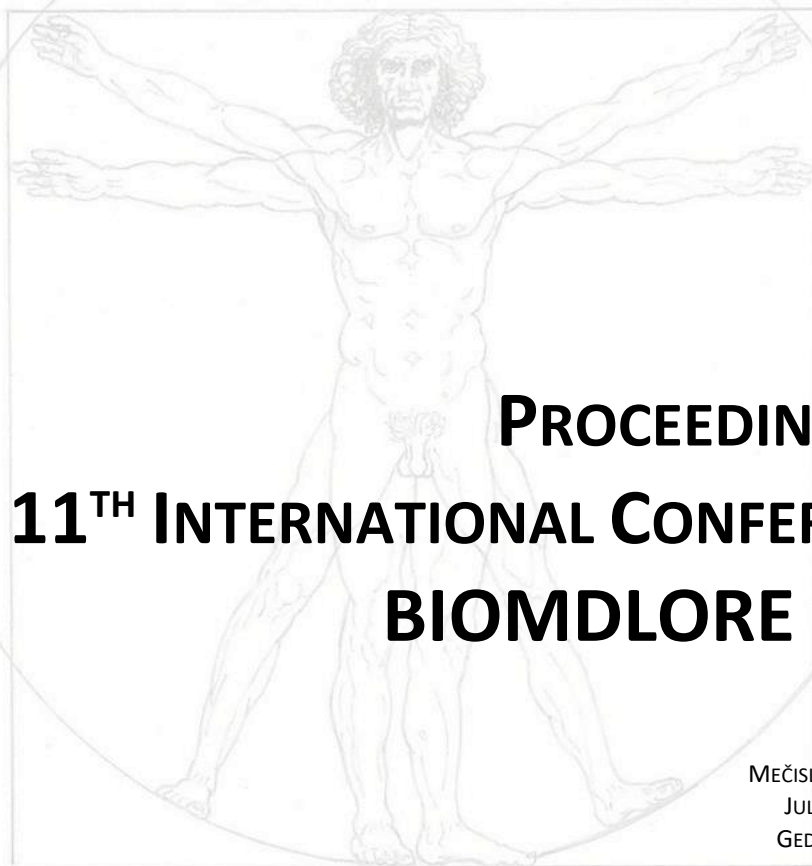


OCTOBER 20–22, 2016, DRUSKININKAI, LITHUANIA



# PROCEEDINGS OF 11<sup>TH</sup> INTERNATIONAL CONFERENCE BIOMDLORE 2016

EDITED BY  
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## **Proceedings of 11<sup>th</sup> International Conference BIOMDLORE 2016**

October 20–22, 2016, Druskininkai, Lithuania

The Conference organized by Vilnius Gediminas Technical University (Lithuania), Kaunas University of Technology (Lithuania), Bialystok University of Technology (Poland), Lithuanian Society of Biomechanics and IFToMM National Committee of Lithuania.

Edited by Mečislovas Mariūnas, Julius Griškevičius and Gediminas Gaidulis

All papers were qualified on the basis of critical reviews.

The Conference is focused on the issues of biomechanics, gait and locomotion, orthopaedics and traumatology, assistive technologies, rehabilitation, medical diagnostics, biosignals analysis, mathematical modelling.

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## **PREFACE**

On behalf of the Lithuanian Society of Biomechanics, we are pleased to welcome you to the 11th International Conference BIOMDLORE 2016. This year's Conference is being hosted by Vilnius Gediminas Technical University (VGTU), more specifically by the Department of Biomechanics, which celebrates 20th Anniversary in 2016, as it was founded in 1996 at Faculty of Mechanics of VGTU. Vilnius Gediminas Technical University is a state university, which is one of the largest higher education institutions in Lithuania, and one of the leading universities in the Baltic States.

The contents of the Proceedings largely reflect the issues which are currently explored within the field of biomedical engineering and biomechanics. These issues include investigating the biomechanical properties of various soft and hard biotissues, dynamics and modelling of musculo-skeletal system, development of various medical diagnostic tools, processing of biosignals etc. The results of the research are of interest to experts in engineering, medicine, rehabilitation, orthopaedics and other fields.

We believe that the materials which will be presented at the Conference will provide a comprehensive overview of the achievements of researchers from Poland, Latvia, Estonia, Ukraine, Belarus, Russia, United Kingdom, United States of America and Lithuania. Moreover, for the very first time in history of BIOMDLORE conference, we, organizers, are very pleased having two keynote speakers dr. James Shippen and dr. Patrick Mark Aubin presenting at the Conference. We believe that the presentations delivered by the participants of BIOMDLORE 2016 will not only inspire new avenues for research in biomedical engineering and biomechanics, but will open doors for possible cooperation in joining research forces and form new teams.

We would like to take this opportunity to express our gratitude to the persons and institutions that have helped organize the Conference, reviewers for evaluating the articles, and all authors for submitting their work.

It is our special privilege and great pleasure to welcome you to the 11th International Conference BIOMDLORE 2016. We hope that the Conference will provide an arena for fruitful discussions and building new friendships. BIOMDLORE 2016 is not only about presentation and publication. We hope that it can be something more – BIOMDLORE 2016 is about to strengthen existing relationships and form new ones.

**JULIUS GRIŠKEVIČIUS**  
Chair of Organizing Committee

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