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Institute of Strength Physics
and Materials Science SB RAS

International Workshop
**Multiscale Biomechanics and Tribology
of Inorganic and Organic Systems**
Institute of Strength Physics and Materials Science SB RAS

October 2, 2019

in Memory of Professor Sergey Psakhie



INTERNATIONAL ORGANIZERS

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GENERAL INFORMATION

The International Workshop “Multiscale Biomechanics and Tribology of Inorganic and Organic Systems” will be held as part of the International Interdisciplinary Symposium “Hierarchical Materials: Development and Applications for New Technologies and Reliable Structures” on October 2, 2019 in Tomsk, Russia.

This Workshop is dedicated to the memory of Sergey Psakhie. He passed away on December 22, 2018 – unexpectedly, full of energy and with many plans for the future of the Institute of Strength Physics and Materials Science which he had been heading since 2002.

Sergey Psakhie was a remarkable person and the great scientist. He was a visionary, a theoretician and practitioner all in one person. He used his empathy and expertise to help other people find and develop their talents and did his best to support them. People who had the chance to get to know him on a personal level found in him a constant source of inspiration. He was an exciting contributor to professional discussions, a real analyst and philosopher. His death came as an enormous, incredible loss for science, for the institute and for all his colleagues and friends across the globe.

With this upcoming workshop, we wish to celebrate the remarkably diverse field of Sergey Psakhie’s scientific interests and projects, and discuss ways in which they can be continued in the future. In his last years, Sergey Psakhie developed a particular interest in the biomedical applications of materials science and tribology. For example, he led several highly successful projects on the bioactive properties of low-dimensional metal oxide nanoparticles, with applications including wound healing, tumor suppression and antibiotic properties. Shortly before his untimely death, he initiated a further interdisciplinary project on “Active Bio Contact Mechanics”, with the goal of developing non-invasive methods of stabilizing and regenerating natural joints and cartilage, as an alternative to surgical intervention. For this reason, biomedical applications of materials science and tribology form the focus of the workshop.

However, medical applications were the tip of the iceberg of Sergey Psakhie’s research interests. They included various topics in nanotechnology, but also geotribology and earthquake dynamics; classical materials science and fracture mechanics; computer simulation methods, including the Method of Cellular Automata and Molecular Dynamics methods for the simulation of soft matter – hard matter interactions; various technological developments in aerospace and other branches, including nondestructive testing and additive manufacturing. These and other topics, which are too numerous to be listed here, are also welcomed at the workshop.

OBJECTIVES

The Workshop aims to continue and further develop the studies initiated and supported by Prof. Sergey Psakhie in the fields of active biocontact mechanics, mechanics and tribology of organic and inorganic media, biological effects of nanomaterials and low-dimensional structures, nanoscale effects within the interfaces of hard matter–soft matter, new additive manufacturing methods and non-stationary metallurgy, biotechnology and related topics.

KEY TOPICS

I –Active bio contact mechanics and nanobioengineering

- Contact mechanics of cartilage
- Models for wear and mechanically induced growth of bones and cartilage
- Lubrication of natural joints
- Contact mechanics of porous fluid-filled media
- Transport of nutrition in cartilage
- Biomolecular mechanisms of cell and tissue growth
- Interaction between nanomaterials and bio-objects
- Hierarchical nanomaterials for biomedical applications

II – Mechanics and tribology of organic and inorganic media

- Tribology of ductile and brittle materials
- Physics of soft matter and hard matter – soft matter interfaces
- Adhesion of biomatter and selective adsorption of biomolecules
- Physics of nanoconfined matter
- Particle and discrete element methods
- Geomechanics and earthquakes
- Hierarchically organized structures in molecular biology
- Hierarchical organization of geodynamic objects
- Numerical simulation methods for multi-scale and multi-field problems
- New hierarchically organized materials in mechanical engineering and related technological achievements

WORKING LANGUAGE

English

TYPES OF PRESENTATIONS

The Workshop will consist of plenary lectures (30 min), oral presentations (15 min) and poster presentations.

REGISTRATION

All Workshop participants are welcome to register online at the symposium website <http://www.ispms.ru/en/ispmsconf/10/> on the events page.

WORKSHOP PROCEEDINGS

Selected presentations will be published in the **AIP Conference Proceedings**. Paper template and submission guidelines are available at the symposium website (www.ispms.ru/en/ispmsconf/10/).

DEADLINES

June 20, 2019: Registration and abstract submission

July 1, 2019: Notification of abstract acceptance

July 20, 2019: Paper submission

September 3, 2019: Payment transfer

REGISTRATION FEE

For foreign participants:

- **130 €** with paper publication in AIP Conference Proceedings;
- **50 €** without paper publication in AIP Conference Proceedings.

For Russian participants:

- **9000 RUB** with paper publication in AIP Conference Proceedings;
- **3500 RUB** without paper publication in AIP Conference Proceedings.

ABSTRACT SUBMISSION INSTRUCTIONS

The book of abstracts will be published by the beginning of the Workshop, with DOI assignment and registration in the RSCI database. The abstract should be prepared in MsWord and have no more than two pages of A4 paper size. Please use the following format:

- top and bottom margins 2.4 cm, the left and right margins 2 cm;
- font Times New Roman, font size 12 pt; single line spacing; 1 cm indentation (automatic);
- justified text alignment; automatic hyphenation;
- width of tables and figures no more than 17 cm, font size of headings and contents of tables 10 pt;
- figures in TIFF, JPG or PNG formats with resolution of 300 dpi;
- equations in a separate line should be written without indenting.

An abstract template can be downloaded from the symposium website (<http://www.ispms.ru/en/ispmsconf/10/>). Abstracts should be submitted on-line as an attached file on registration at the Workshop website. The file name should include the presenter's surname and initials (e.g., Ivanov_VM.doc).

Please send a copy of the abstract to: v.popov@tu-berlin.de.

ACCOMMODATION

The nearest hotel to the Workshop venue is the Congress Centre "Rubin", <http://rubin.tomsk.ru>, phone/fax: (3822) 49-26-89, 49-25-59, e-mail: rubin@mail.tomsknet.ru. Please specify the name of the Workshop on reservation.

CONTACTS

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