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CONTINUOUS MEDIA
MECHANICS UB RAS

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3rd International Workshop on Advanced Dynamics and Model Based Control of Structures and Machines

September 18-22, 2017

Perm, Russia



HOSTING ORGANISATION

Institute of Continuous Media Mechanics of the Ural Branch of Russian Academy of Sciences,
Perm National Research Polytechnic University

CHAIRPERSONS

Valerii P. Matveenko, Institute of Continuous Media Mechanics of the Ural Branch of RAS,
Perm, Russia

Hans Irschik, Institute for Technical Mechanics, Johannes Kepler University Linz, Austria

Michael Krommer, Institute of Mechanics and Mechatronics, Vienna University of Technology,
Austria,

Alexander K. Belyaev, Institute for Problems in Mechanical Engineering of Russian Academy
of Sciences, St. Petersburg, Russia

ORGANIZING COMMITTEE

Valerii P. Matveenko, Institute of Continuous Media Mechanics of the Ural Branch of RAS,

Anatoly A. Tashkinov, Perm National Research Polytechnic University



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WORKSHOP CHAIRPERSONS

Valerii P. Matveenko	Institute of Continuous Media Mechanics of the Ural Branch of Russian Academy of Sciences, Perm, Russia
Hans Irschik	Institute for Technical Mechanics, Johannes Kepler University Linz, Austria
Michael Krommer	Institute of Mechanics and Mechatronics, Vienna University of Technology, Austria
Alexander K. Belyaev	Institute for Problems in Mechanical Engineering of Russian Academy of Sciences, St. Petersburg, Russia

AIMS, SCOPE AND OBJECTIVES

Mechanics is one of the backbones of several engineering sciences, like mechanical, automotive or aerospace engineering. It is concerned with the motion of material bodies, either solids or fluids, and with the causes of the motion: forces, couples and physical effects like thermal, electrical and magnetic fields. Control theory is a system science, where dynamic systems are investigated to control their behavior and control algorithms are designed. The combination of mechanics and control aims to design the motion of material bodies by a proper distribution of causes. To reach this goal one combines computer based control devices with sensor and actuator systems; hence, a so-called *Cyber-Physical System* is put into practice. The sensor and actuator systems may constitute themselves as attached components or more advanced as embodied multifunctional materials capable of converting mechanical energy into information mainly by electronic components and vice versa. Since mechatronical engineering is the integration of mechanical and electrical engineering with computer sciences and control theory, mechatronical engineering provides the physical foundation for the design of the cyber-physical system, with mechanics and control theory playing an integral and imperative role within the design process.

Mechanical engineering and automatic control allow us to describe, analyze and control the motion of material bodies, which we understand in the sense of complex material processes, of components of structures and machines as well as of machines and structures themselves. Hence, mechanics and model based control are key disciplines within mechatronical engineering; yet, the proper interaction of both requires the systematic incorporation of the effects of the attached sensor and actuator components in complex mechanical systems or of the embodied sensing and actuation authority on the dynamic behavior into the systematic study of the controllability of the motion of material bodies. Therefore, the workshop will focus on the interaction of mechanics with automatic control on three different levels; process, component and system.

The general goal of the 3rd International Workshop on Advanced Dynamics and Model Based Control of Structures and Machines is to present and discuss the frontiers in the mechanics of controlled machines and structures. The present workshop continues a series of international

workshops, the Russia-Austria Joint Workshop on Control of Structures and Machines, Mechanics and



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Model Based
Workshop on



Model Based Control of Smart Materials and Structures and the first two editions of the International Workshops on Advanced Dynamics and Model Based Control of Structures and Machines.

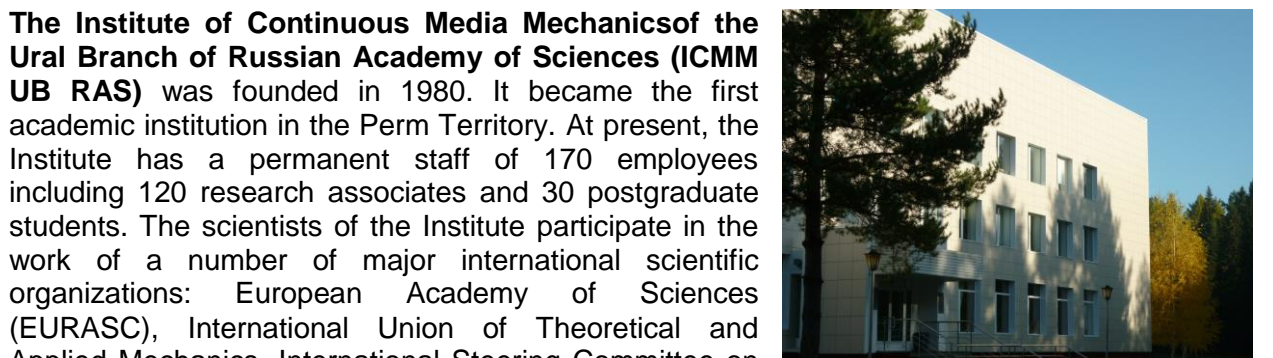
The previous workshops took place in Linz, Austria in September 2008 and April 2010, in St. Petersburg, Russia in July 2012, and in Vienna, Austria in September 2015. We believe that the current edition will result into the creation of research teams with participation not only from Austria, Japan and Russia but also from other countries. Such teams should push the frontiers of mechanics and control of advanced structures and machines to new dimensions.

The key objectives of the workshop are:

- Enabling the interchange of ideas from advanced mechanics of structures and control theory.
- Clarification of expectations of research in the field of mechanics from advanced control theory and vice versa.
- Ideas for and development of bilateral research proposals.

HOSTING ORGANISATION

The Institute of Continuous Media Mechanics of the Ural Branch of Russian Academy of Sciences (ICMM UB RAS) was founded in 1980. It became the first academic institution in the Perm Territory. At present, the Institute has a permanent staff of 170 employees including 120 research associates and 30 postgraduate students. The scientists of the Institute participate in the work of a number of major international scientific organizations: European Academy of Sciences (EURASC), International Union of Theoretical and Applied Mechanics, International Steering Committee on Magnetic Fluids, Royal Society of Chemistry, European Low Gravity Research Association, European Geosciences Union, American Physical Society and enter into the working groups of European Space Agency. Ten research associates are members of Russian National Committee on Theoretical and Applied Mechanics and serve on the Editorial boards of 22 foreign and Russian scientific journals, included in the International and Russian Science Citation Index database on the Web of Science, Scopus and RISC platform. ICMM UB RAS is situated ten kilometers away from the center of Perm in the picturesque pine forest on the right bank of the Kama River.



European Low Gravity Research Association, European Geosciences Union, American Physical Society and enter into the working groups of European Space Agency. Ten research associates are members of Russian National Committee on Theoretical and Applied Mechanics and serve on the Editorial boards of 22 foreign and Russian scientific journals, included in the International and Russian Science Citation Index database on the Web of Science, Scopus and RISC platform. ICMM UB RAS is situated ten kilometers away from the center of Perm in the picturesque pine forest on the right bank of the Kama River.

Perm National Research Polytechnic University was founded in 1953 as Perm Polytechnic Institute. In 2007 the University became one of the winners of the innovational education programs contest. In 2009 together with other 29 universities in Russia awarded the status “National



Research University” by the Russian Ministry of
competitive selection. University has
centres



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for advanced training, 29 research and education centers, 36 teaching and research laboratories, 5 engineering centers. PNRPU possesses modern high-tech facilities, including an integrated equipment complex, which supports all stages of research and development – from idea to creation of prototypes of innovative products.

Perm National Research Polytechnic University has cooperation agreements with Vienna University of Technology and Institute of German Studies of the University of Vienna.

VENUE

Perm was founded in 1723. Today's Perm is a large multisectoral industrial center and a third largest city in Russia after Moscow and Saint-Petersburg (799.68 sq km). Perm is stretched along the Kama River for 70 km. By its stretch, it is a third city after Saint-Petersburg and Sochi. Its population is about 1 million people.

The Kama River is the fourth longest river in Europe. It is 1,805 km in length. The Kama River is the main waterway, which through the system of canals provides the Perm river port with an access to five seas - Azov, Black, Caspian, White and Baltic.

The intersection of transcontinental roads, railways and airlines makes Perm a large transportation hub and a big logistic center of the Urals.

Perm is one of the largest industrial centers of Russia. The main branches of the city's economy are machine-building, oil and gas processing, electrical energy industry, chemistry and petroleum chemistry, food industry, timber industry and printing industry.

In Perm, there are a great number of higher education institutions, including Perm State University (celebrating its 100th anniversary in 2016), Perm National Research Polytechnic University, Perm State medical University named after E.A. Vagner, Perm State Pharmaceutical Academy, Perm State Agricultural Academy named after D.N. Pryanisnikov, Perm State Humanitarian Pedagogical University, etc.

13 museums operate in Perm. The Perm State Art Gallery is one of the best-known art galleries in Russia. It is renowned for its collection of Permian wooden sculpture. The gallery is also home to a rich collection of Russian icon painting (collection of Stroganov's school icons) and paintings (original pictures by Repin, Levitan, Savrasov and Serov).

The Perm Local History Museum collections include unique objects in the Perm Animal Style that cannot be met anywhere in the world, G.T. Mayer's paleobotany collection, a library stock of rare books, ethnographical, numismatic and other collections.

Perm has 4 state theatres: Perm Academic Opera and Ballet Theatre named after P. I. Tchaikovsky, Perm Academic Theatre, Perm Youth Theatre and Perm Puppet Theater. Theatrical performances also take place on the stages of municipal and amateur theaters, among which in different years the Evgeny Panfilov Ballet Theatre and the Perm Theatre «By the Bridge» were the winners of the National Theatre Award «The Golden Mask».



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IMPORTANT DATES & GENERAL SCHEDULE

Arrival and Welcome Reception:	Sunday, September, 17 th , 2017
Technical Meeting days	Monday, September, 18 th , 2017 to Friday, September, 22 th , 2017
Guided City Tour & Workshop dinner	Wednesday, September 20 th , 2017

Presentations

The presentations are scheduled
for Monday morning (09:30 - 12:30) and afternoon (13:30 - 17:30),
for Tuesday morning (09:30 - 12:30) and afternoon (13:30 - 17:30),
for Thursday morning (09:30 - 12:30) and afternoon (13:30 - 17:30),
and Friday morning (09:30 - 12:30).

Proceedings

The proceedings will be published as a bound volume by Springer WienNewYork.

Contact

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