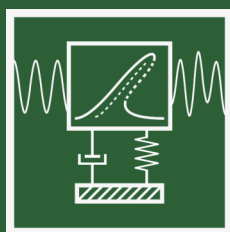


# The 58th International JVE Conference

Ventspils, Latvia  
August 25-26, 2022





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## **The 58th International JVE Conference**

**Chaos, non-linear dynamics and applications**

**August 25-26, 2022, in Ventspils, Latvia**



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**58th International JVE Conference** is an integral part of Vibroengineering Series Conferences and will be held in Ventspils, Latvia.

The main theme of the conference focuses on (but not limited to):

**Chaos, non-linear dynamics and applications**

**General Topics of the Conference:**

- Rare Phenomena in Nonlinear Engineering Systems and Vibromechanics
- Nonlinear Rotor Dynamics. Rare Attractors and Transient Processes
- Rare Regular, Quasi-periodic and Chaotic Attractors in Nonlinear Dynamics
- Bifurcation Techniques and Stability Analysis of Strongly Nonlinear Systems
- Vibro-Impact Systems and Dynamical Systems with Discontinuities
- Synchronization Problems and Rare Attractors. Multiplicity and Control
- Rare Dynamical Phenomena in Earth and Celestial Mechanics
- Rare Phenomena in Nature, Economics, Social and History Sciences
- Complexity and Rare Phenomena in Nano-Science and Molecular Dynamics
- Dynamical and Rare Dangerous Diseases. Rare Phenomena in Medicine and Biology
- Paradoxes, Riddles and Unsolved Problems of Nonlinear Dynamics and Chaos
- Controlling Chaos. Theory and Applications

Conference is dedicated to researchers, scientists, engineers and practitioners throughout the world to present their latest research results, foster discussion, new ideas and develop partnerships. All JVE Conferences are integral part of the Series of Vibroengineering Conferences started in 1999. Vibroengineering Procedia is indexed in major scientific databases: Scopus, EI Compendex, Inspec, Gale Cengage, Google Scholar and EBSCO.

JVE conferences feature a broad range of high-level technical presentations, vibrant discussions and key experts and scientists from all over the world. The conference provides an opportunity to communicate your recent research advances, exchange ideas in innovative engineering technologies and enjoy endless networking advantages.

On behalf of the Organizing Committee, we would like to welcome the delegates to the 58th International JVE Conference. We hope that you would enjoy the conference and find the program of the Conference exciting. We look forward to meeting you in August 2022 in Ventspils.

*This conference is supported by the European Regional Development Fund project No. 1.1.1.5/18/I/009 "Support to the Ventspils University of Applied Sciences in preparation of international cooperation projects for research and Innovation".*

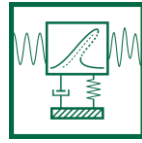


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**Chairs:**

Dr. Aleksejs Klokovs      Director of VIRAC, Leading Researcher, Guest Lecturer, Latvia  
Prof. Minvydas Ragulskis      Kaunas University of Technology, JVE International, Lithuania

**Scientific Organizing Committee Members**

J. Vība      Theoretical Mechanics and Strength of Materials, Riga Technical University, Corresponding member of the Academy of Sciences in mechanics, Latvian Science Council expert in Mechanics and Mechanical Engineering, Head of the Mechanical Expertise Centre, Latvia  
G. Panovko      Head of Vibroengineering Laboratory in A. A. Blagonravov Institute for Problems in Mechanical Engineering Research Institute of the Russian Academy of Sciences (IMASH RAN), Russia  
J. Zagars      Leading researcher in Ventspils International Radio Astronomy Center, Latvia  
S. Hilkevics      Dr. sc. phys., Professor, Leading Researcher in VSRC, Ventspils, Latvia

**Local Organizing Committee Members:**

A. Klokovs      Chairman of Local Organizing Committee, Leading researcher of VIRAC, Latvia  
S. Polukoshko      Scientific Secretary of Local Organizing Committee, Leading researcher of VIRAC, Latvia  
V. Jevstignejevs      Co-chairman of Local Organizing Committee, Riga Technical University, Latvia  
R. Smirnova      Daugavpils Study and Science Center, Riga Technical University, Latvia  
A. Martinovs      Rezekne University of Applied Sciences, Latvia  
V. Bedīķe-Gauja      Ventspils International Radio Astronomy Centre (VIRAC), Latvia  
E. Meijere      Ventspils International Radio Astronomy Centre (VIRAC), Latvia



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## Conference Program

Day 1: August 25

D104

09:00-10:00	Arrival, registration and coffee
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Day 1: August 25

D104

	<b>Welcome and opening event</b>
10:00-10:05	Opening the event <b>Prof. Kārlis Krēšlīņš</b> (Rector of the Ventspils University of Applied Sciences, Latvia)
10:05-10:10	Welcome speech by the member of Organizing Committee <b>Dr. Aleksejs Kļokovs</b> (Director of VIRAC, Leading Researcher, Guest Lecturer, Latvia)
10:10-10:15	Welcome speech by the member of Organizing Committee <b>Prof. Minvydas Ragulskis</b> (Kaunas University of Technology, JVE International, Lithuania)

Day 1: August 25

D104

	<b>SESSION 1</b> Session Chair: <b>Dr. Aleksejs Kļokovs</b>
10:15-10:35	<i>Invited Keynote Lecture</i> Infinite unstable periodic orbits to infinite homoclinic orbits in the Lorenz system <b>Prof. Albert C. J. Luo</b> (Southern Illinois University, USA)
10:35-10:55	<i>Invited Keynote Lecture</i> Sensor fabrication with 3D printing technique <b>Prof. Sezgin Ersoy</b> (Marmara Universitesi, Turkey)
10:55-11:10	<b>Coffee break</b>



11:10-11:25	The use of ultrasonic vibrations in an innovative freeze-drying apparatus equipped with physical screen <b>Janis Baronins</b> (Latvian Maritime Academy, Latvia)
11:25-11:40	Dynamics analysis and structural synthesis of wind energy production device with closed loop conveyor <b>Marina Cerpinska</b> (Riga Technical University, Latvia)
11:40-11:55	A deep learning-based approach for automatic detection of concrete cracks below the waterline <b>Ugnė Orinaitė</b> (Kaunas University of Technology, Lithuania)

**Day 1: August 25**

12:00-13:00	<b>Lunch</b>
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**Day 1: August 25**

**D104**

	<b>SESSION 2</b> Session Chair: <b>Prof. Minvydas Ragulskis</b>
13:00-13:20	<i>Invited Keynote Lecture</i> Global bifurcation analysis of nonlinear dynamical systems. How to find rare attractors? <b>Dr. Aleksejs Klokovs</b> (Director of VIRAC, Leading Researcher, Guest Lecturer, Latvia)
13:20-13:35	Reading and playing musical notes with image processing techniques with mobile application <b>Sezgin Ersoy</b> (Marmara Universitesi, Turkey)
13:35-13:50	Dynamics and control of vibratory finishing machine with translational motion of lapping-polishing plates <b>Vitaliy Korendiy</b> (Lviv Polytechnic National University, Ukraine)
13:50-14:05	Mathematical modeling and computer simulation of the wheeled vibration-driven in-pipe robot motion <b>Vitaliy Korendiy</b> (Lviv Polytechnic National University, Ukraine)
14:05-14:20	<b>Coffee break</b>
14:20-14:35	Genetic engineering – construction of a network of four dimensions with a chaotic attractor <b>Inna Samuilik</b> (Daugavpils University, Latvia)
14:35-14:50	Design and accuracy test of polar moment of inertia measuring equipment for projectile and rocket <b>Liwei Sun</b> (Changchun University of Science and Technology, China)



14:50-15:05	Dynamic response analysis of bearing-rotor system considering cage whirling motion <b>Jian Zhang</b> (Research Institute of Aero-Engine, Beihang University, China)
15:05-15:20	Study on the wetting effect of the silty clay reservoir bank sub-grade <b>Dahe Qi</b> (Chongqing Metropolitan College of Science and Technology, China)
15:20-15:35	Applications of bispectrum analysis to inspection of fatigue damage in quay cranes <b>Li Cui</b> (Chuzhou University, China)
15:35-15:50	Numerical modeling of thermophysical processes in liquid piston gas compression cylinders <b>Vladislavs Bezrukovs</b> (Ventspils International Radio Astronomy Centre, Latvia)
15:50-16:05	Study on optimization of jet forming of tandem shaped charge warhead <b>Zeyan Han</b> (Army Engineering University of PLA, China)
16:05-16:20	Computational model for the nonlinear dynamic response of MEMS-based micromirror <b>Ishak Ertugrul</b> (Department of Mathematical Modelling, Kaunas University of Technology, Lithuania)

**Day 1: August 25**

**D104**

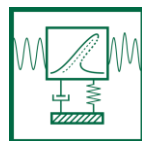
16:20-16:30	<b>Closing remarks and announcements</b>
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**Day 1: August 25**

	<b>EXCURSION</b>
16:30-16:45	<b>Virtual excursion to the Irbene radio telescope complex</b> Agris Bērziņš
16:45-17:15	<b>Trip to Irbene</b>
17:15-18:30	<b>Excursion in the Irbene radio telescope complex</b> Agris Bērziņš

**Day 1: August 25**

19:00-21:00	<b>Conference Dinner</b> (With invitations only)
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## Sponsors and Partners



**Ventspils University of Applied Sciences**, established in 1997, is a national higher education and science institution. Its basic activity is to carry out scientific research and to implement academic and professional study programmes. The university has three faculties, a library and a few scientific institutions. Students can acquire knowledge in faculties of Economics and Management, Translation Studies and Information Technologies. The university offer 14 Bachelor, Master and PhD study programmes. The scientific institutions of VeA are next: Ventspils International Radio Astronomy Centre (VIRAC) and Technology Transfer and Innovation Centre.



**Engineering Research Institute "Ventspils International Radio Astronomy Centre"** (ERI VIRAC) of Ventspils University of Applied Sciences is a science and education center specializing in the implementation of high-quality future research services in the field of space technology and signal processing. VIRAC cooperates with various Latvian, Baltic and foreign higher education institutions and organizations, it specially with European Space Agency, to implement various projects in astronomy, space and satellite technologies, electronics, high performance computing, remote sensing, signal discrete processing, etc. VIRAC is a key player in Latvian Space Industry and in fulfilment of Latvian Space Strategy as Latvia has become an Associate ESA Member State.



**Riga Technical University** is the oldest technical university in the Baltics established on October 14, 1862. It is Located in Riga, Latvia it was previously known as Riga Polytechnical Institute and Riga Polytechnicum. Riga Technical University is the largest technological university in the Baltic States with rich history and clear future vision aimed at promoting excellence in student academic results, research, and global issues in cooperation with the industry and foreign partners. RTU has become a modern internationally recognized university, which cooperates with famous research institutions, such as the European Organization for Nuclear Research CERN, European Space Agency, Royal Institute of Technology, Sweden, Fraunhofer Institute, Germany, and others.

**Riga Technical University, Daugavpils Study and Science Centre** was established more than 50 years ago. Till 1992, Daugavpils Study and Science Centre provided education in three fields: mechanics, electrical power engineering and civil engineering. Currently students can start studies in five fields: mechanical engineering, power engineering, civil engineering, economics and computer science.



**Rezekne University of Applied Sciences** (former name Rezekne Academy of Technology - RTA) is one of most fast-growing universities in Latvia. It was found in 1925 and for almost 100 years was Alma mater for many successful leaders. There are three faculties at RTA: Faculty of Economics and Management, Faculty of Engineering, and Faculty of Education, Languages, and Design offering more than 50 bachelor's, master's, and doctoral study programmes in Latvian and 14 programmes in English.