



МИНИСТЕРСТВО
НАУКИ И ВЫСШЕГО
ОБРАЗОВАНИЯ
РОССИЙСКОЙ
ФЕДЕРАЦИИ



ВЛАДИВОСТОКСКИЙ
ГОСУДАРСТВЕННЫЙ
УНИВЕРСИТЕТ
ЭКОНОМИКИ И СЕРВИСА

II International Workshop and School of Young Scientists

«Theory, experiments and numerical simulations
of reaction-diffusion systems in applications
for biotechnology, biomedicine
and energy production»

Supported by

Institute for Applied Mathematics Far Eastern Branch of Russian Academy of Sciences
Vladivostok State University of Economics and Service
Combustion Institute Russian Branch
Ministry of Science and Higher Education of the Russian Federation

PROGRAM

27 September – 1 October 2021

Vladivostok, Russia

MAJOR TOPICS

- **Modelling and computational issues of combustion phenomenon**
- **Dynamic behavior, pattern formation in biological systems in the flows**
- **Modeling of gas bubbles dynamics in liquid under laser radiation in applications for laser surgery and others**
- **Direct numerical simulations of turbulence from the first principles**
- **Modern computational methods and modeling of nonequilibrium dynamics of inhomogeneous media and quantum informatics**

SCIENTIFIC COMMITTEE:

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|---------------------------|--|
| Mikhail A. Guzev | (IAM FEB RAS, Vladivostok, Russia) |
| Junnosuke Okajima | (IFS Tohoku University, Japan) |
| Kaoru Maruta | (IFS Tohoku University, Japan) |
| Nikolay N. Smirnov | (MSU, Moscow, Russia) |
| Sergey S. Minaev | (IAM FEB RAS, Vladivostok, Russia) |
| Vladimir V. Gubernov | (P.N.Lebedev Physical Institute, Moscow, Russia) |
| Roman V. Fursenko | (ITAM SB RAS, Novosibirsk, Russia) |
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| Gennady V. Alekseev | (IAM FEB RAS, Vladivostok, Russia) |
| Aleksander Yu. Chebotarev | (IAM FEB RAS, Vladivostok, Russia) |
| Konstantin V. Nefedev | (FEFU, Vladivostok, Russia) |
| Denis A. Knyazkov | (ICKC SB RAS, Novosibirsk, Russia) |

ORGANIZING COMMITTEE:

Sergey S. Minaev, Vladimir V. Gubernov, Evgenii P. Dats

LOCAL ORGANIZING COMMITTEE:

Evgenii Dats, Evgeniya Abrosimova (VSUES, Russia)

Conference email: minaevss@yahoo.com

PROGRAM

27 SEPTEMBER MONDAY

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| 8:30 – 10:00 | Participants Registration |
| 10:10 – 10:30 | Opening Address |
| 10:30 – 12:00 | Plenary Lectures |
| 10:30 – 11:00 | <i>Prof. Junnosuke Okajima</i> (IFS Tohoku University, Japan), «Fundamental aspect of boiling phenomena for its direct numerical simulation». Chair: <i>Dr.Sergey Minaev</i> (On-line presentation) |
| 11:00 – 11:25 | <i>Prof. Gennady Y. Chitov</i> (Institut quantique Département de physique Université de Sherbrooke, Québec, Canada) «Infinite cascades of percolative transitions and multiple connectivity patterns in cellular automata, contact processes, and networks» (On-line presentation). Chair: <i>Dr. Vladimir Gubernov</i> |
| 11:25 – 11:50 | <i>Dr. Vyacheslav Bykov</i> (Karlsruher Institut für Technologie (KIT), Germany) «Chemical kinetics-from the time scales to the hierarchy of models and their reduction» (Live presentation). Chair: <i>Dr. Denis Knyazkov</i> |
| 11:50 – 12:15 | <i>Denis Knyazkov</i> (ICKCP SB RAS, Novosibirsk, Russia) Chemistry of cations in flames: mass spectrometric and kinetic modeling study (Live presentation) Chair: <i>Vladimir V. Gubernov</i> (Live presentation) |
| 12:15 – 13:30 | Lunch |
| 13:30 – 16:20 | Sections Modelling and computational issues of combustion phenomenon. Chairs: <i>Dr. Roman Fursenko, Dr. Vladimir Gubernov</i> |
| 13:30 – 13:50 | <i>Anatoly Maznoy</i> (TSC SB RAS, Tomsk), «Performance characteristics of a thin-layered cylindrical porous burner with different fuel mixture supply strategies» (Live presentation) |
| 13:50 – 14:10 | <i>Dr. E.V. Sereshchenko</i> (ITAM SB RAS, Novosibirsk, Russia), <i>R.V. Fursenko</i> (ITAM SB RAS, Novosibirsk, Russia), «Flame balls dynamics in straight channel» (Live presentation) |
| 14:10 – 14:40 | <i>Mr. V.A. Kosyakov</i> (ITAM SB RAS, Novosibirsk, Russia), «Numerical study of the effect of liquid fuel droplets on combustion processes under conditions typical for hybrid rocket engines» (Live presentation) |
| 14:40 – 15:00 | <i>Dr. Sergey Zambalov</i> (TSC SB RAS, Tomsk), «Numerical study of syngas fueled rotary engine» (Live presentation) |
| 15:00 – 15:20 | Break |
| 15:20 – 15:40 | <i>Dr. A.A.Ponomareva</i> «Thermogravimetry of coal» (Live presentation) |
| 15:40 – 16:00 | <i>Dr. Anatolii Chernov</i> «On the –Bareblatt’s Applicability of Zeldovich–Bareblatt’s Theory to estimation of Markstain Coefficient» (Live presentation) (Live presentation) |
| 16:00 – 16:20 | <i>Mr. Sergey Mokrin</i> (IAM FEB RAS, FEFU, Vladivostok), «Behavior of stretched flames in planar channels» (Life presentation) |
| 16:20 – 18:30 | Break |
| 18:30 – 22:00 | Welcome party |

28 SEPTEMBER TUESDAY

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| 10:30 – 12:00 | Plenary Lectures |
| 10:30 – 11:00 | <i>Prof. Aleksander Chebotarev</i> «Boundary-value, inverse and extremum problems for the equations of radiation heat transfer» (Live presentation). Chair: <i>Prof. Sergey Minaev</i> |
| 11:00 – 11:20 | <i>Prof. Gennadiy Alekseev</i> , <i>Dr. Roman Briziskii</i> , <i>Zh.Saritskaia</i> (IAM FEB RAS, Vladivostok, Russia), «Multiplicative control problems for nonlinear reaction-diffusion-convection model» (Live presentation). Chair: <i>Prof. Aleksander Chebotarev</i> |
| 11:20 – 11:40 | <i>Dr. Ivan Yarovenko</i> , <i>Igor Prokhorov</i> , «Improving quality of tomographic images of medium using irradiation with pulses of different duration» (IAM FEB RAS, Vladivostok, Russia) (Live presentation). Chair: <i>Prof. Aleksander Chebotarev</i> |
| 11:40 – 12:00 | <i>Julia E. Spivak</i> , <i>G.V. Alekseev</i> , «Optimization methods for solving some inverse problems for three-dimensional models of magnetostatics» (Live presentation). Chair: <i>Prof. Aleksander Chebotarev</i> |
| 12:00 – 13:30 | Lunch |
| 13:30 – 16:00 | Section Mechanics for medicine and biological systems. Chairs: <i>Dr. Sergey Minaev</i> , <i>Dr. Vladimir Gubernov</i> |
| 13:30 – 14:00 | Plenary Lectures <i>Dr. Vladimir M. Chudnovskii</i> (IAM FEB RAS), «Mechanism of high velocity jet formation after a gas bubble collapse near the micro fiber immersed in a liquid» (Live presentation). Chair: <i>Dr. Roman Fursenko</i> |
| 14:00 – 14:30 | Plenary Lectures <i>Dr. Alexey E. Medvedev</i> (ITAM SB RAS, Novosibirsk, Russia), <i>Gafurova P.S.</i> (ITAM SB RAS, Novosibirsk, Russia) «Mechanics for medicine. Numerical simulation of breathing and precipitation of aerosol form of drugs in the human respiratory tract» (Live presentation). Chair: <i>Dr. Sergey Minaev</i> |
| 14:30 – 15:00 | Plenary Lectures <i>Dr. Florian Kogelbauer</i> (AIST Sendai, Japan), «Barriers to Diffusive and Stochastic Transport» (On-line presentation). Chair: <i>Dr. Vladimir Gubernov</i> |
| 15:00 – 15:30 | Break |
| 15:30 – 16:30 | Section Mechanics for medicine and biological systems. Chairs: <i>Dr. Sergey Minaev</i> , <i>Dr. Vladimir Gubernov</i> |
| 15:30 – 15:50 | <i>Dr. Galina Neverova</i> , <i>prof. Efim Frisman</i> (IACP FEB RAS, Vladivostok, Russia) (Live presentation) «Shift in dynamics modes of structured population with density dependent regulation of growth rate due to changing parameters, multimodality and environmental factor influence» |
| 15:50 – 16:10 | <i>Dr. Evgenii Dats</i> (IAM FEB RAS, Vladivostok, Russia), <i>S. S.Minaev</i> , <i>J. Okajima</i> , <i>T. Miroshnichenko</i> , «Sporadic Propagation of Spatiotemporal Patterns in a Plankton Model» (Live presentation) |
| 16:10 – 16:30 | <i>Dr. Taisia Miroshnichenko</i> (P.N.Lebedev Physical Institute, Moscow, Russia), «Modeling the dynamics of phytoplankton in the chain of vortexes» (On-line presentation) |
| 17:00 – 20:00 | Excursions to Vladivostok |

29 SEPTEMBER WEDNESDAY

Excursion, Barbeque, Boat trip

30 SEPTEMBER THURSDAY

10:30 – 12:00 Plenary Lectures

10:30 – 12:00 *Dr. Andrey M. Shevchenko* (ITAM SB RAS, Novosibirsk, Russia), «On the techniques, misinterpretations and errors in experiments on 3D unsteady flows with vortices and shock waves» (Live presentation).
Chair: *Dr. Roman Fursenko*

11:00 – 11:30 *Boris S. Mazurok, Alexander I. Cherepanov* (Institute of Automation and Electrometry SB RAS, Novosibirsk, Russia), «Background extraction system based on a combination of chromium keying, differential keying, z-cameras and optical flow analysis using neural networks. Theoretical aspects» (Live presentation). **Chair:** *Sergey Minaev*

11:30 – 12:00 *Aleksei N. Tarasovskii, Boris S. Mazurok, Alexander I. Cherepanov* (Institute of Automation and Electrometry SB RAS, Novosibirsk, Russia), «Background extraction system based on a combination of chromium keying, differential keying, z-cameras and optical flow analysis using neural networks. Applications» (Live presentation). **Chair:** *Sergey Minaev*

12:00 – 13:30 Lunch

13:30 – 15:00 Section Filtrational gas combustion in porous media.
Chairs: *Dr. Sergey Minaev, Dr. Vladimir Gubernov*

13:30 – 13:50 *Dr. Igor Yakovlev* (TSC SB RAS, Tomsk), «Pore-scale flame dynamics in one-layer porous burner» (Live presentation)

13:50 – 14:10 *Dr. Alexander Kirdyashkin* (TSC SB RAS, Tomsk), «Combustion synthesis of condensed inorganic materials» (Live presentation)

14:10 – 14:30 *Egor S. Odintsov* (ITAM SB RAS), «Development of laboratory systems for measuring and controlling moderate and small gas flow rates» (Live presentation)

14:30 – 14:50 *Nikita Pichugin* (TSC SB RAS), «The role of cellulose wrapping layers on porous structure formation during combustion synthesis of Ni-Al intermetallics»

14:50 – 15:10 *Alexander Zaharov* (ITAM SB RAS), «Determination of the parameters of global chemical kinetics mechanisms using optimization methods»

15:10 – 15:30 Break

15:30 – 16:15 Section Modern computational methods and quantum informatics, (15 minute's presentations). **Chairs:** *Prof. Konstantin Nefedev, Dr. Yurii Shevchenko*

15:30 – 15:45 *Dr. Yurii A. Shevchenko* (FEFU, Vladivostok, Russia), «Unusual thermodynamic properties of magnetic macrospins on a rhombic lattice» (Live presentation)

15:45 – 16:00 *Dr. Kapitan D. Y.* (FEFU, Vladivostok, Russia) (Live presentation), «Optimization of the hybrid Monte Carlo for the Edwards Anderson model» (Live presentation)

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| 16:00 – 16:15 | <i>Rybin A.E.</i> (FEFU, Vladivostok, Russia), «Optimization of Parallel Tempering Monte-Carlo Algorithm on 2D Ising Model» (Live presentation) |
| 18:00 – 18:30 | Plenary Lecture <i>Dr. A. Lapin</i> (Germany), “Coarse graining of Transport Phenomena (GENERIC, Synchronization, Ostwald ripening)» (On-line presentation) Chair: <i>Dr. Vladimir Gubernov</i> (On-line presentation) |
| 19:00 – 22:00 | Banquet |

01 OCTOBER FRIDAY

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| | <i>FEFU Energy Centre and IC&E Lab</i> |
| 10:30 – 11:30 | Plenary Lectures <i>Prof. Konstantin Shtym</i> (FEFU, Vladivostok, Russia), «Perspective combustion technology for energy production». Chair: <i>Dr. Sergey Minaev</i> (Live presentation) |
| 11:00 – 11:30 | <i>Dr. Anatoly Maznoy, Dr. Kirdyashkin</i> (TSC SB RAS, Tomsk), «Current status and prospective application of radiant burners» (Live presentation). Chair: <i>Sergey Minaev</i> |
| 11:30 – 12:00 | <i>Dr. Sergey Minaev, Dr. Vladimir Gubernov</i> (FIAN, Moscow), «Flame diagnostic and applications for energy production» (Live presentation) |
| 12:00 – 14:00 | Lunch, Barbeque |
| 14:00 – 18:00 | Round table discussions and Farewell party |
| | Farewell party |

SUPPORTED BY

**Institute for Applied Mathematics Far Eastern Branch
of Russian Academy of Sciences
Vladivostok State University of Economics and Service
(VSUES, Russia)
Combustion Institute Russian Branch
Ministry of Science and Higher Education of the Russian
Federation (project №075-15-2019-1878)**

ANNOUNCEMENT:

We would like to invite you to participate in the workshop and school of young scientists:

«Theory, experiments and numerical simulations of reaction-diffusion systems in applications for biotechnology, biomedicine and energy production» which will be held in Vladivostok, Vladivostok State University of Economics and Service (VSUES), Russia from 27 September to 1 October 2021. The hybrid conference assumes on-line and personal presentations. The main idea of the conference is to bring together the leading experts in the field of modelling and computation of reaction-diffusion systems and to facilitate collaboration between them. The development of a universal approach in simulations of different reaction-diffusion systems is the focus of the conference. The conference will be held in the centre of Vladivostok city, which has great opportunities for sightseeing, yachting, fishing and many more. The program of the seminar will allow the participants to enjoy these possibilities alongside with discussing scientific problems. The working language is English



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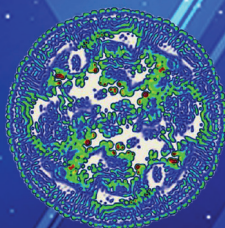
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27 September – 1 October 2021

Vladivostok, Russia