



## Marcello Lappa

Department of Mechanical and Aerospace Engineering, University of Strathclyde, James Weir Building, 75 Montrose Street, Glasgow, G1 1XJ, UK

### *Plenary lecture*

#### **Stationary Solid-particle Attractors in non-equilibrium conditions under thermovibrational stimuli**

**Abstract:** It is shown that, despite the intrinsic non-equilibrium features of the involved thermofluid-dynamic phenomena, the application of time-periodic mechanical stimuli to a fluid containing dispersed inertial solid particles, in combination with a fixed imposed temperature difference, can support the emergence of stationary particle structures if the disturbing influence of steady gravity is removed. This line of inquiry stems from a theory formulated more than a decade ago about the existence of specific particle “attractee” (attractors) in the fluid domain driven by the unique interplay established among purely (particle-related) inertial effects, the influence of the container boundary and the thermovibrational flow itself. Such theoretical predictions have recently been confirmed through dedicated experiments conducted on board the ISS using the Selectable Optical Diagnostic Instrument (SODI) in conjunction with the Microgravity Science Glovebox (MSG). Supporting numerical simulations conducted in the framework of a one-way coupled Eulerian-Lagrangian (liquid-solid) approach have confirmed that the non-equilibrium nature of the host flow is instrumental in producing local disturbances (in the particle motion) due to a mismatch between their trajectories and the streamlines of the carrier fluid. These perturbations amplify with time thereby moving the whole particle system into an unstable or metastable state where all the dispersed matter collapses on well-defined surfaces or accumulation loci. Additional numerical simulations, taking into account the back influence of particles on fluid flow (two-way coupling), indicate that reverse momentum transfer is not a necessary ingredient; however, it can cause the complete suppression of these phenomena as soon as a critical particle concentration is exceeded. An increased level of coupling, where particle-to-particle effects are even accounted for (through a multi-particle gas-like kinetic model or more sophisticated strategies), finally demonstrates that, although not strictly required for the existence of particle attractors, inter-particle stresses can trigger symmetry-breaking mechanisms and cause compaction or dilation of the effectively formed particle structures.

Perm State University

Institute of Continuous Media Mechanics  
of the Ural Branch of Russian Academy of Science

International Symposium

# **NON-EQUILIBRIUM TRANSITIONS IN CONTINUOUS MEDIA**

**Symposium program**

2024 October 1-4, Perm

Under Patronage of Ministry of Education and Science of Perm Krai

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## General Schedule of the Symposium

<b>October 1</b>		
<b>8:15-8:45</b>	<i>Registration, Chamber of Academic Council</i>	
<b>8:45-9:00</b>	<b>Conference opening, Chamber of Academic Council</b>	
<b>9:00-11:00</b>	<b>Fluid and Plasma Mechanics. Session 1</b>	<b>Solid State Mechanics. Session 1</b>
<b>11:00-11:30</b>	<i>Coffee break, Chamber of Academic Council</i>	
<b>11:30-13:15</b>	<b>Fluid and Plasma Mechanics. Session 2</b>	
<b>13:15-14:00</b>	<i>Lunch</i>	
<b>14:00-15:20</b>	<b>Plenary lectures 1, 2. Chamber of Academic Council</b>	
<b>15:25-17:40</b>	<b>Fluid and Plasma Mechanics. Session 3</b>	
<b>October 2</b>		
<b>8:40-10:40</b>	<b>Fluid and Plasma Mechanics. Session 4</b>	<b>Solid State Mechanics. Session 2</b>
<b>10:40-11:00</b>	<i>Coffee break, Chamber of Academic Council</i>	
<b>11:00-12:15</b>	<b>Fluid and Plasma Mechanics. Session 5</b>	
<b>12.15-12.55</b>	<b>Plenary lecture 3. Chamber of Academic Council</b>	
<b>12:55-13:40</b>	<i>Lunch</i>	
<b>13:40-15:00</b>	<b>Plenary lectures 4, 5. Chamber of Academic Council</b>	
<b>15:00-17:00</b>	<b>Fluid and Plasma Mechanics. Session 6</b>	
<b>17.05-17.45</b>	<b>Plenary lecture 6, Lecture Room 341</b>	

<b>October 3</b>	
<b>8:40-10:00</b>	<b>Plenary lectures 7, 8. <i>Chamber of Academic Council</i></b>
<b>10:00-10:30</b>	<i>Coffee break, Chamber of Academic Council</i>
<b>10:30-12:00</b>	<b>Fluid and Plasma Mechanics. Session 7</b>
<b>12:00-13:00</b>	<i>Lunch</i>
<b>13:00-15:15</b>	<b>Fluid and Plasma Mechanics. Session 8</b>
<b>15:15-16:45</b>	<b>Poster session. Student Club building</b>
<b>16:50-17:30</b>	<b>Plenary lecture 9. Chamber of Academic Council</b>
<b>17.30</b>	<b>Buffet</b>

<b>October 4</b>	
<b>9:00-11:25</b>	<b>Fluid and Plasma Mechanics. Session 9</b>
<b>11:25-11:45</b>	<i>Coffee break, Chamber of Academic Council</i>
<b>11:45-13:15</b>	<b>Fluid and Plasma Mechanics. Session 10</b>
<b>13:15-14:00</b>	<i>Lunch</i>
<b>14:00-14:40</b>	<b>Plenary lectures 10. <i>Chamber of Academic Council</i></b>
<b>14.40-15.40</b>	<b>Session dedicated to the 95th anniversary of Prof. G.Z. Gershuni and the 75th anniversary of Prof. D.V. Lyubimov</b>
<b>15:45-17:30</b>	<b>Fluid and Plasma Mechanics. Session 11</b>
<b>17:30</b>	<b>Symposium closing, Chamber of Academic Council</b>

All oral presentations will be held in Building #1 of Perm State University, 15 Bukireva str. (Timezone: UTC+5):

- Section «Fluid and Plasma Mechanics» meets in Chamber of Academic Council
- Section «Solid State Mechanics» meets in lecture room 341

<b>October 1</b>			
<b>08:15-08:45</b>	<b>Registration, Chamber of Academic Council</b>		
<b>08:45-09:00</b>	<b>Conference opening, Chamber of Academic Council</b>		
<b>Fluid and Plasma Mechanics. Session 1</b> <b>Chamber of Academic Council, 09:00-11:00</b>			
09:00-09:15	<b>D.A. Bratsun,</b> V.Y. Utochkin	On the Coriolis buoyancy in a rotating Hele-Shaw cell	Perm National Research Polytechnic University, Perm
09:15-09:30	<b>V.Y. Utochkin,</b> D.A. Bratsun.	Nonlinear dynamics of convective motions induced by Coriolis buoyancy in a rotating Hele-Shaw cell	Perm National Research Polytechnic University, Perm
09:30-09:45	<b>I.B. Palymskiy</b>	About linear analysis of convective stability of compressible gas	Siberian State University of Geosystems and Technologies, Novosibirsk
09:45-10:00	<b>E.Y. Prosviryakov,</b> O.A. Ledyankina, L.S. Goruleva	A family of exact solutions for describing solution flows with internal heat release	Ural Federal University named after the first President of Russia B.N. Yeltsin, Yekaterinburg
10:00-10:15	<b>K.Y. Rysin,</b> A.A. Vjatkin, V.G. Kozlov	Supercritical dynamics of averaged thermoconvective structures in a vertically rotating layer	Perm State Humanitarian and Pedagogical University, Perm
10:15-10:30	<b>A.I. Gordeeva,</b> A.R. Kornilitsyn	Experimental study of thermo convection impact at the proton exchange on lithium niobate crystal on process for waveguides fabrication	Perm State National Research University, Perm
10:30-10:45	<b>A.M. Mezentseva,</b> B.L. Smorodin	Onset of bioconvection in a horizontal layer in conditions of positive gravitaxis	Perm State National Research University, Perm
10:45-11:00	<b>E.V. Laskovets</b>	Study of the influence of system geometry on the nature of liquid and gas two-layer flows in a horizontal channel	Altai State University, Barnaul
<b>11:00-11:30</b>	Coffee break		

**October 1**

**Solid State Mechanics. Session 1**

**Lecture room 341, 09:00-10:55**

09:00-09:40	<b>O.B. Naimark</b>	<b>Keynote talk.</b> Nonequilibrium transitions in matter with defects in wide range of load intensities	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
09:40-09:55	<b>T.N. Pomortseva,</b> A.L. Svistkov.	Possibility of Using Cyanogen Ether Resins for Curable Inflatable Structures in Outer Space	Perm State National Research University, Perm
09:55-10:10	<b>N.V. Kharin,</b> O.A. Sachenkov, K.N. Aki-fiev, P.V. Bolshakov	Compressive testing of porous samples by computer tomography	Kazan Federal University, Kazan
10:10-10:25	<b>M.A. Sokovikov,</b> M.Y. Simonov, V.V. Chudinov, V.A. Oborin, S.V. Uvarov, A.N. Balakhnin, O.B. Naimark	Study of Mechanisms of plastic flow localization under different types of loading as a result of selfsimilar behavior of defect ensembles	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
10:25-10:40	<b>P.A. Russkikh,</b> G.S. Boltachev	Increasing the brittle fracture limit of Inductors due to the formation of gradient surface profiles	Institute of Electrophysics, Ural Branch of the Russian Academy of Sciences, Yekaterinburg
10:40-10:55	<b>P.A. Russkikh,</b> G.S. Boltachev	Increasing the amplitude of Pulsed Magnetic Fields generated without failure of the Steel Inductor due to the parameters of the discharge circuit	Institute of Electrophysics, Ural Branch of the Russian Academy of Sciences, Yekaterinburg
<b>11:00-11:30</b>	Coffee break		

**October 1**

**Fluid and Plasma Mechanics. Session 2**  
**Chamber of Academic Council, 11:30-13:15**

11:30-11:45	<b>B.L. Smorodin</b>	The onset of Marangoni convection in a binary mixture under modulation of temperature gradient on the substrate	Perm State National Research University, Perm
11:45-12:00	<b>E.Y. Prosviryakov,</b> O.A. Ledyankina, L.S. Goruleva	Class of exact solutions with non-linear dependence of hydrodynamic fields on two spatial coordinates for the Oberbeck-Bussinesq equations	Ural Federal University named after the first President of Russia B.N. Yeltsin, Yekaterinburg
12:00-12:15	<b>V.A. Sharifulin,</b> T.P. Lyubimova	Convective jet in a melted glass near its density maximum	Institute of Continuous Media Mechanics of the Ural Branch of the Russian Academy of Sciences, Perm
12:15-12:30	<b>M.I. Karakcheeva,</b> E.A. Mosheva	Mixing of liquids in a flow microchannel under conditions of Rayleigh-Taylor instability development	Perm State National Research University, Perm
12:30-12:45	<b>M.R. Khabin,</b> B.S. Maryshev	The emergence of concentration convection in a long rectangular region of a porous medium with modulation of the external filtration flow	Institute of Continuous Media Mechanics of the Ural Branch of the Russian Academy of Sciences, Perm
12:45-13:00	<b>S.A. Prokopen,</b> T.P. Lyubimova	Three-dimensional convection modes of a binary liquid in an inclined layer	Institute of Continuous Media Mechanics of the Ural Branch of the Russian Academy of Sciences, Perm
13:00-13:15	<b>I.Y. Krutova,</b> A.A. Bugaenko, A.O. Kazachinsky	Mathematical modeling of upward twisting tornado-type flows	Snezhinsk Institute of Physics and Technology of the National Research Nuclear University MEPhI, Snezhinsk
13:15-14:00	Lunch		



# October 1

14:00 - 14:40	<b>Plenary lecture 1, Chamber of Academic Council</b> <b>A.N. Osiptsov</b> , A.I. Ageev (Research Institute of Mechanics, Lomonosov Moscow State University, Moscow) <b>Macro- and microhydrodynamics of viscous fluid near superhydrophobic surfaces.</b>		
14:40 - 15:20	<b>Plenary lecture 2, Chamber of Academic Council</b> <b>N.V. Nikitin</b> (Research Institute of Mechanics, Lomonosov Moscow State University, Moscow) <b>Problem of transition to turbulence in a pipe: laboratory and numerical experiment.</b>		
<b>Fluid and Plasma Mechanics. Session 3</b> <b>Chamber of Academic Council, 15:25-17:40</b>			
15:25- 15:40	<b>V.M. Parfenyev</b> , M.I. Blumenau, I.S. Nikitin	Inferring parameters and reconstruction of fluid flows with physics-informed neural networks	Landau Institute for Theoretical Physics, Moscow
15:40- 15:55	<b>V.V. Konovalov</b>	Acoustic vibrations of a vapor film on the surface of a hot ball	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
15:55- 16:10	<b>A.A. Starostin</b> , A.L. Gurashkin, A.N. Kotov, P.V. Skripov	Study of rapid processes in the course of boiling-up of liquid in a Bubble chamber	Institute of Thermal Physics, Ural Branch of the Russian Academy of Sciences, Yekaterinburg
16:10- 16:25	<b>K.A. Busov</b>	Experimental investigation of boiling-up water jets	Institute of Thermal Physics, Ural Branch of the Russian Academy of Sciences, Yekaterinburg
16:25- 16:40	<b>A.V. Kostyrya</b> V.A. Demin	Dynamics of a submerged gas-liquid jet of various dispersity	Perm National Research Polytechnic University, Perm
16:40- 16:55	<b>M.A. Pakhomov</b>	Modeling of flow structure by blowing of an annular radial gas-droplet wall jet into a turbulent flow	S.S. Kutateladze Institute of Thermal Physics, Siberian Branch of the Russian Academy of Sciences, Novosibirsk
16:55- 17:10	<b>E.S. Sadilov</b>	Water jet in nozzle	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
17:10- 17:25	<b>D.A. Tukmakov</b>	Mathematical modeling of the gassuspension flow in channel	Institute of Mechanics and Mechanical Engineering, Kazan Scientific Center of the Russian Academy of Sciences, Kazan
17:25- 17:40	<b>A. Isakhov</b> , N. Rysmambetov, A. Sabyrkulova, A. Abylkasymova	Forecasting the value of concentration from enterprise emissions using machine learning and computational fluid dynamics methods	Al-Farabi Kazakh National University, Almaty, Republic of Kazakhstan

**October 2**

**Fluid and Plasma Mechanics. Session 4**  
**Chamber of Academic Council, 08:40-10:40**

08:40-09:05	<b>M.D. Krivilyov</b> , E.S. Voroshilov, S.A. Gruzd, R.M. Mosina, A.O. Ivantsov, O.A. Khlybov, T.P. Lyubimova	Consolidation dynamics of powders during laser melting in additive manufacturing	Udmurt State University, Izhevsk
09:05-09:20	<b>A.O. Gusev</b> , O.S. Mazhorova	Implementation of geometric conservation law in numerical simulation of Czochralski crystal growth	Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences, Moscow
09:20-09:35	<b>A.R. Shikanian</b> , V.M. Parfenyev	Effect of no-slip boundaries on two-dimensional turbulent flow in a square cell	Higher School of Economics, Landau Institute for Theoretical Physics, Moscow
09:35-09:55	<b>X.G. Koss</b> , I.I. Lisina, O.F. Petrov	Dynamic entropy and fractal dimension of the trajectory of a single dust particle in plasma: numerical simulation	Joint Institute for High Temperatures of the Russian Academy of Sciences, Moscow
09:55-10:10	<b>K.A. Mizeva</b> , X.G. Koss, E.A. Kononov, M.M. Vasiliev, O.F. Petrov	Dependence of dynamics entropy and fractal dimension of trajectories of a colloidal particle in plasma on the frequency of video registration	Moscow Institute of Physics and Technology, Moscow
10:10-10:25	<b>M.I. Petukhov</b>	Ionic admixtures transport in the benzoic acid melt and structure of boundary layers	Perm State National Research University, Perm
10:25-10:40	<b>D.A. Kornilin</b> , R.S. Ponomarev, V.A. Demin	Shape and length of lensed optical fiber in dependence on buffer layer thickness	Perm State National Research University, Perm
10:40-11:00	Coffee break		

**October 2****Solid State Mechanics. Session 2****Lecture room 341, 08:40-10:25**

08:40-08:55	<b>E.R. Sharifullina,</b> A.I. Shveykin, P.V. Trusov	Multi-level constitutive model for describing superplastic deformation of metal alloys	Perm National Research Polytechnic University, Perm
08:55-09:10	<b>Y.V. Pirogova,</b> I.V. Vindokurov, N.V. Elenskaya, A.S. Shalimov, A.S. Tarasova, M.A. Tashkinov	Comparative analysis of mechanical response and morphometric characteristics of lattice bone scaffolds	Perm National Research Polytechnic University, Perm
09:10-09:25	<b>N.V. Elenskaya,</b> M.A. Tashkinov	Effect of morphological characteristics on the mechanical response of lattice scaffolds for bone replacement	Perm National Research Polytechnic University, Perm
09:25-09:40	<b>O.V. Gerasimov,</b> D.E. Khmzin, D.V. Berezhno, O.A. Sanchenkov	CT-based restoration of elastic properties of inhomogeneous material using the finite element method	Kazan Federal University, Kazan
09:40-09:55	<b>D.V. Efremov,</b> S.V. Uvarov, O.B. Naimark	Hydroluminescence as manifestation of the mechanism of localized shear in liquids	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
09:55-10:10	<b>O.S. Stolbova,</b> A.A. Rogovoy	Numerical modeling of reorientation of martensite variants in Ni <sub>2</sub> MnGa alloy in magnetic and force fields	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
10:10-10:25	<b>V.A. Aleksandrov</b>	Accelerating flow of microwave energy in a waveguide with open cavity ends	Udmurt Federal Research Center, Ural Branch of the Russian Academy of Sciences, Izhevsk
10:40-11:00	Coffee break		

**October 2**

**Fluid and Plasma Mechanics. Session 5.  
Chamber of Academic Council, 11:00-12:15**

11:00-11:15	<b>A.V. Erilin,</b> X.G. Koss, E.A. Kononov, M.M. Vasiliev, O.F. Petrov	Investigation of dynamics of colloidal particles in chain structure in DC plasma discharge	Moscow Institute of Physics and Technology, Moscow
11:15-11:30	<b>I.V. Kolesnichenko</b>	Numerical study of transit helical flow of liquid metal	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
11:30-11:45	<b>A.O. Poluyanov,</b> I.V. Kolesnichenko	Investigation of transit flow of submerged jet of electrically conductive liquid in a cylindrical cell placed in alternating magnetic field	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
11:45-12:00	<b>R.F. Rakhimov,</b> N.Y. Pyatnitskaya, E.A. Belavina	Investigation of the lifting flow of a salt melt simulator in a pipe with a transverse magnetic field in the RANS turbulence model	Joint Institute for High Temperatures, Russian Academy of Sciences, Moscow
12:00-12:15	<b>B.S. Maryshev,</b> L.S. Klimenko	Solutal convection in an inclined layer of a porous medium taking into account clogging for wide range of impurity concentrations	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
12:15-12:55	<b>Plenary lecture 3, Chamber of Academic Council</b> <b>M. Lappa</b> (University of Strathclyde, Glasgow, UK) <b>Stationary Solid-particle Attractors in non-equilibrium conditions under thermovibrational stimuli.</b>		
12:55-13:40	Lunch		

## October 2

13:40-14:20	<b>Plenary lecture 4, Chamber of Academic Council</b> <b>O. N. Goncharova</b> (Altai State University, Barnaul), V. B. Bekezhanova. <b>Three-dimensional convective regimes with evaporation: comparative analysis of theoretical and experimental results.</b>		
14:20-15:00	<b>Plenary lecture 5, Chamber of Academic Council</b> <b>N.M. Zubarev</b> (Institute of Electrophysics, Ural Branch of the Russian Academy of Sciences, Yekaterinburg) <b>Model of formation of conical cusps on the surface of a conducting liquid in an electric field</b>		
<b>Fluid and Plasma Mechanics. Session 6</b> <b>Chamber of Academic Council, 15:00-17:00</b>			
15:00-15:15	<b>V.B. Bekezhanova,</b> N.I. Gilev, I.A. Shefer	Influence of the gas flow rate on characteristics of flows of a volatile liquid sheared by a gas flux	Institute of Computational Modeling SB RAS, Krasnoyarsk
15:15-15:30	<b>S.V. Rusakov,</b> V.G. Gilev, N.M. Kolchanov	Investigation of the process of impregnation of a polydisperse medium with an epoxy composition	Perm National Research University, Perm
15:30-15:45	<b>M.O. Kuchinskiy,</b> K.A. Rybkin, T.P. Lyubimova	A study of cavitation activity in a sonochemical reactor using three-dimensional heat maps	Institute of Continuous Media Mechanics UB RAS, Perm
15:45-16:00	<b>M.A. Pakhomov,</b> O.Y. Otmakhov, N.P. Skibina, I.A. Chokhar, V.I. Terekhov	Experimental and numerical study of ejector with COANDA effect	S.S. Kutateladze Institute of Thermal Physics SB RAS, Novosibirsk
16:00-16:15	<b>D.R. Pospelov,</b> S.N. Peschcherenko	Optimization of water-jet pump with two-stage mixing camera	JSC Novomet-Perm, Perm
16:15-16:30	<b>R.R. Siraev,</b> S.S. Vlasov	Numerical simulation of convective polymerase chain reaction using the Euler multiphase model	Perm National Research Polytechnic University, Perm
16:30-16:45	<b>E.I. Ponkin</b>	Creation of the sound-velocity surface in the problem of compression of a special prismatic volume	Snezhinsk Institute of Physics and Technology of the National Research Nuclear University MEPhI, Snezhinsk
16:45-17:00	<b>S.V. Mingalev,</b> V.V. Mingalev	Numerical study of bone projectile points from the hillfort of Chernovskoe I	JSC UEC-Aviadvigatel, Perm
17.05-17.45	<b>Plenary lecture 6, Lecture Room 341</b> <b>V. Ajaev</b> (Southern Methodist University, Dallas, Texas, USA), O.A. Kabov, D. V. Zaitsev, D. P. Kirichenko, J. E. Davis <b>Levitation and self-organization of microscale droplets</b>		

# October 3

08:40-09:20	<b>Plenary lecture 7, Chamber of Academic Council</b> <b>M.V. Flamarion</b> (Pontifical Catholic University of Peru, Lima, Peru), E. Pelinovsky, E. Didenkulova. <b>Solitary wave interactions and soliton turbulence in non-integrable systems.</b>		
09:20-10:00	<b>Plenary lecture 8, Chamber of Academic Council</b> <b>A.A. Nepomnyashchy</b> (Technion, Haifa, Israel), A.B. Mikishev. <b>Marangoni convection in non-isothermal surfactant solutions.</b>		
10:00-10:30	Coffee break		
<b>Fluid and Plasma Mechanics. Session 7</b> <b>Chamber of Academic Council, 10:30-12:00</b>			
10:30-10:45	<b>V.G. Kozlov,</b> O.A. Vlasova, V.V. Dyakova	Faraday waves at the boundary of immiscible liquids oscillating in a vertical slot channel	Perm State Humanitarian and Pedagogical University, Perm
10:45-11:00	<b>S.S. Vergeles,</b> D.D. Tumachev, S.V. Filatov, A.A. Levchenko	Stable anticyclone in rotating fluid maintained by inertial waves	Landau Institute for Theoretical Physics of the Russian Academy of Sciences, Moscow
11:00-11:15	<b>M.A. Shiryayeva,</b> S.V. Subbotin	Nonlinear dynamics of inertial waves in a rotating cylinder with inclined ends	Perm State Humanitarian and Pedagogical University, Perm
11:15-11:30	<b>A.A. Vyatkin,</b> V.G. Kozlov, S.A. Petuhov	Averaged convection caused by inertial modes in a rotating horizontal cylindrical layer with boundaries of different temperatures	Perm State Humanitarian and Pedagogical University, Perm
11:30-11:45	<b>A.N. Sukhanovskii,</b> A.A. Gavrilov, A.Y. Vasiliev, E.N. Popova	Impact of arctic warming on mid-latitude baroclinic Wave characteristics and temperature distribution	Institute of Continuous Media Mechanics of the Ural Branch of the Russian Academy of Sciences, Perm
11:45-12:00	<b>A.R. Troshkin,</b> D.Yu. Khanukaeva, P.A. Aleksandrov, A.N. Filippov	Modeling of stationary thermopervaporation separation of two-component mixture	Gubkin Russian State University of Oil and Gas, Moscow
12:00-13:00	Lunch		

**October 3**

**Fluid and Plasma Mechanics. Session 8**  
**Chamber of Academic Council, 13:00-15:15**

13:00-13:15	<b>T.P. Lyubimova,</b> D. V. Lyubimov, S. Meradji, B. Roux	Interaction of a wall and a bubble in an oscillating liquid under zero gravity conditions	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
13:15-13:30	<b>E.I. Borzenko,</b> A.S. Usanina	Dynamics of rising of a single bubble in a viscous liquid with a dissolved surfactant	Tomsk State University, Tomsk
13:30-13:45	<b>M.O. Denisova,</b> K.G. Kostarev	Development of a neutralization reaction in a droplet that extracts surfactant. Results	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
13:45-14:00	<b>N.V. Pankov,</b> A. I. Mizev	Interaction of the averaged flow generated by a semi-submerged oscillating sphere with an adsorbed layer of a surfactant	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
14:00-14:15	<b>A.V. Bushueva,</b> D.A. Polezhaev	Experimental study of the effect of the steady flow on solute mass transfer in fluid saturated porous medium	Perm State Humanitarian and Pedagogical University, Perm
14:15-14:30	<b>A.A. Alabuzhev</b>	Influence of surface heterogeneity on the dynamics of a bubble on a substrate	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
14:30-14:45	<b>S.V. Subbotin,</b> M.A. Shiryayeva, V.G. Kozlov	Experimental study of oscillatory and averaged dynamics of a droplet inclusion in a liquid filled circular channel	Perm State Humanitarian and Pedagogical University, Perm
14:45-15:00	<b>A.E. Piskunova,</b> M.V. Piskunov	Impact of biopolymers in the form of liquid droplets and hydrogel microparticles onto homogeneous and heterogeneous surfaces	Surgut State University, Surgut, Tomsk Polytechnic University, Tomsk
15:00-15:15	<b>I.E. Karpunin,</b> V.G. Kozlov	Droplet inclusion in liquid in a radial Hele-Shaw cell: oscillatory dynamics and diffusive exchange	Perm State Humanitarian and Pedagogical University, Perm
15:15-16:45	<b>Poster session</b>		
16:50-17:30	<b>Plenary lecture 9, Chamber of Academic Council</b> <b>O. Zikanov (University of Michigan – Dearborn, Dearborn, USA)</b> <b>Emergence of high-amplitude fluctuations in flows with strong applied magnetic fields</b>		
17.30	Buffet		

**October 4**

**Fluid and Plasma Mechanics. Session 9**  
**Chamber of Academic Council, 09:00-11:25**

9:00-9:40	<b>A.N. Filippov</b>	<b>Keynote talk.</b> Influence of electroosmosis on hydrodynamic permeability of charged porous glass-like membranes	Gubkin Russian State University of Oil and Gas, Moscow
9:40-9:55	<b>A.A. Romanovskii,</b> A.N. Filippov	Flow of Newtonian fluids in a flat channel with two porous layers	Gubkin Russian State University of Oil and Gas, Moscow
9:55-10:10	<b>E.A. Frants,</b> A.A. Krylov, E.A. Demekhin	Electrophoresis modes in non-polar electrolytes	Financial University under the Government of the Russian Federation, Moscow
10:10-10:25	<b>O.O. Nekrasov,</b> B.L. Smorodin	Stability of the electroosmotic flow in an alternating electric field	Perm State National Research University, Perm
10:25-10:40	<b>I.A. Mizeva,</b> N.P. Podolyan, M.E. Vasilieva, V.A. Kashchenko, E.V. Schmidt, V.V. Zaytsev, N.B. Margaryants, P.M. Dolotovskaya, A.A. Kamshilin	Influence of skin local heating on the pulse arrival time	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
10:40-10:55	<b>A.I. Prostomolotov,</b> N.A. Verezub	Simulation of blood flow in abdominal aorta	Ishlinsky Institute for Problems in Mechanics, Russian Academy of Sciences, Moscow
10:55-11:10	<b>A.V. Belyaev</b>	Biomechanical model of platelet adhesion to inflamed microvascular endothelium	Lomonosov Moscow State University, Moscow
11:10-11:25	<b>I.V. Krasnyakov</b>	Mathematical modeling of cellular rearrangement processes during the development of epithelial tissue	Perm National Research Polytechnic University, Perm
11:25-11:45	Coffee break		



**October 4**

**Fluid and Plasma Mechanics. Session 10**  
**Chamber of Academic Council, 11:45-13:15**

11:45-12:00	<b>A.L. Vetrov</b> , A.N. Sukhanovskii, R.A. Stepanov, A.V. Bykov, N.A. Kalinin, P.G. Frick	Characteristics of midlatitude baroclinic waves in the case of zonally homogeneous boundary conditions	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm, Perm State National Research University, Perm
12:00-12:15	<b>A.V. Belyaeva</b> , A.N. Sukchanovskii	Heat transfer in urban environment on the example of the city of Krasnoyarsk	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
12:15-12:30	<b>R.A. Pleshkov</b> , P.G. Frick	Chaotic modes of Rikitake two-disc dynamo model	Perm State National Research University, Perm, Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
12:30-12:45	<b>A.D. Sadovnikova</b> , M.O. Kuchinskiy, K.A. Rybkin, T.P. Lyubimova, V.A. Galishevskiy	Experimental study of the interaction between two bubbles in the nodes of an ultrasonic wave	Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
12:45-13:00	<b>V.A. Galishevskiy</b> , M.O. Kuchinskiy, K.A. Rybkin, T.P. Lyubimova, A.D. Sadovnikova	Investigation of the behaviour of an air bubble near a solid surface under the influence of ultrasound	Perm State National Research University, Perm
13:00-13:15	<b>I.O. Sboev</b> , K.A. Rybkin, M.O. Kuchinskiy, T.P. Lyubimova	Numerical study of sound field structure and sound intensity distribution in sonochemical reactor chamber	JSC "UEC-Aviadvigatel", Perm
13:15-14:00	<b>Lunch</b>		

## October 4

14:00-14:40	<b>Plenary lecture 10, Chamber of Academic Council</b> <b>D. Y. Khanukaeva</b> , P. A. Aleksandrov, A. N. Filippov. (Gubkin Russian State University of Oil and Gas, Moscow) <b>Influence of unsteadiness of diffusion on the membrane separation of solutions.</b>		
14:40-15:20	<b>Session dedicated to the 95th anniversary of Prof. G.Z. Gershuni and the 75th anniversary of Prof. D.V. Lyubimov</b>		
14:40-14:55	<b>T.P. Lyubimova</b>		Institute of Continuum Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
14:55-15:10	<b>M.A. Zaks</b>		Humboldt-Universität zu Berlin, Berlin, Germany
15:10-15:25	<b>B.L. Smorodin</b>		Perm State National Research University, Perm
15:25-15:40	<b>D.S. Goldobin</b>		Institute of Continuum Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
<b>Fluid and Plasma Mechanics. Session 11</b> <b>Chamber of Academic Council, 15:45-17:30</b>			
15:45-16:00	<b>I.I. Potapov</b> , D.I. Potapov	River flow movement in a curve channel section	Computing Center of the Far Eastern Branch of the Russian Academy of Sciences, Khabarovsk
16:00-16:15	<b>Y.G. Silakova</b> , Potapov I.I.	Mathematical modeling of hydrodynamic processes of river beds and canals	Computing Center of the Far Eastern Branch of the Russian Academy of Sciences, Khabarovsk
16:15-16:30	<b>Y.N. Parshakova</b> , T. P. Lyubimova, A. P. Lepikhin, A. V. Bogomolov, A. Issakhov	Features of the confluence of rivers located in hydrodynamic backwater	Institute of Continuous Media Mechanics of the Ural Branch of the Russian Academy of Sciences, Perm
16:30-16:45	<b>A.P. Lepikhin</b> , T.N. Sintsova	To the assessment of spatial connectivity of fields of annual and seasonal precipitation totals	Mining Institute of the Ural Branch of the Russian Academy of Sciences, Perm
16:45-17:00	<b>A.V. Bogomolov</b> , A.P. Lepikhin, T.N. Sintsova	To the measurement of water flow in water courses by the chemical method	Mining Institute of the Ural Branch of the Russian Academy of Sciences, Perm
17:00-17:15	<b>A.I. Luchnikov</b> , A.P. Lepikhin, T.N. Sintsova	Study of the nature of drift currents in small water bodies using UAVS	Institute of Water Problems of the Russian Academy of Sciences, Moscow
17:15-17:30	<b>L.E. Lapina</b> , E.A. Dyukarev	Nonlinear wave diffusion of heat in peat soils of drained and natural bogs	Computing Center of the Far Eastern Branch of the Russian Academy of Sciences, Khabarovsk
17:30	<b>Symposium closing</b>		

## Poster session

1. Klimenko L.S., Koltsova I.A. Concentration convection in an inclined layer of a porous medium. Perm State National Research University, Perm
2. Somov Sergey Andreevich, Ivanov A.S. Experimental study of thermal concentration convection in air-water and air-undecane gas mixtures. Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
3. Pukhovkin V.I., Babushkin I.A., Schwartz K.G. Heat and mass transfer in a liquid rotating in a cylinder with local heating on the free surface Perm State National Research University, Perm
4. Demin V.A., Demina T.V. Numerical modeling of silicon vapor distribution in a retort during siliconizing of porous carbon materials. Perm State National Research University, Perm
5. Gordeeva A.I., Krasnyakova E.A., Ponomarev R.S. Mixing liquid in a microreactor using laser radiation. Perm State National Research University, Perm
6. Volkov V.S. Efficiency assessment of a packed-type static mixer. Izhevsk State Technical University named after M. T. Kalashnikov, Izhevsk
7. Demin V.A., Demin F.V. On the Leidenfrost temperature for droplets on textured surfaces. Perm State National Research University, Perm
8. Vlasova O. A., Dyakova V.V., Kozlov V. G. Averaged flows generated by Faraday waves in a slot channel. Perm National Research Polytechnic University, Perm
9. Subbotin S.V., Kuryшева D.V., Kozlov V.G. Parametric oscillations of the interface between two immiscible liquids in a vertical conical thin layer. Perm State Humanitarian and Pedagogical University, Perm
10. Karpunin I.E. Behavior of a gas bubble in an oscillating liquid flow in a variable-size channel. Perm State Humanitarian and Pedagogical University, Perm
11. Mosheva E.A., Karpunin I.E., Kozlov N.V. Influence of vertical piston oscillations on the development of double-diffusion convection. Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
12. Vlasova O.A. Experimental study of the dynamics of a light sphere in a rotating vertical cavity with liquid. Perm State Humanitarian and Pedagogical University, Perm
13. Lyubimova T.P., Garicheva Y.V., Ivantsov A.O. Numerical modeling of the behavior of a gas bubble in a viscous liquid, in a circular cavity, under the action of translational vibrations. Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
14. Kirpichev V.A., Lyubimova T.P. Suppression of the Rayleigh-Taylor instability using vertical vibrations. Perm State National Research University, Perm
15. Kazantsev P.N., Smorodin B.L. Convective instability of a stratified ferrofluid in a Hele-Shaw cell. Perm State National Research University, Perm
16. Kolchanov N.V., Kolchanova E.A. Effects of Non-Diffusion Redistribution of NaCl Admixture in Water Flow through Porous Medium in Inclined Circular Pipe. Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
17. Govorukhin V.N., Goncharov B.K. Scenarios of Passive Particle Transfer in the Velocity Field of a Point Vortex Dipole in the Presence of a Background Flow. Southern Federal University, I.I. Vorovich Institute of Mathematics, Mechanics and Computer Science, Rostov-on-Don
18. Egorova A.A., Samoiloa A.E. Thermal Convection in Bottom Sediments with Permeability Anisotropy. Perm State National Research University, Perm
19. Krylov A.A., Franz E.A., Demekhin E.A. Instability during electrophoresis of a microparticle in a non-polar electrolyte. Kuban State University, Krasnodar

20. Petukhov S.A., Vyalkin A.A., Kozlov V.G. Convection structure and heat transfer in a rotating horizontal cylindrical liquid layer. Perm State Humanitarian Pedagogical University, Perm
21. Zimasova A.R., Kobyakov A.S., Maltseva A.A., Kozlov V.G. Influence of the contrast of liquid viscosities on the stability of the interface in a non-uniformly rotating horizontal cylinder. Perm State Humanitarian and Pedagogical University, Perm
22. Ozhgibesova N.A., Ivantsov A.O. Effect of rock permeability under a solid municipal waste landfill on the spread of filtrate at its base. Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
23. Lyubimova T.P., Shubenkov I.S., Ozhgibesova N.A. Soret convection in a layered porous medium simulating an anticlinal geological fold under the action of a geothermal gradient. Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
24. Sharifulin A.N., Naumov A.A. Hysteresis of supercritical water convection regimes in an elongated horizontal cavity generated by the movement of the cavity cover. Perm National Research Polytechnic University, Perm
25. Klimenko L.S., Maryshev B.S. Modeling the process of cleaning a microchannel with an external pulsating flow. Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
26. Starikova V.A., Perminov A.V. Effect of an air gap on the conditions for the occurrence of optical breakdown of a fiber. Perm National Research Polytechnic University, Perm
27. Gertsen T.A., Lyubimova N.Y., Lyubimova A.A. Dynamics and instability of thin colloidal films. Perm National Research Polytechnic University, Perm
28. Kuznetsova Y.L. Evaporation of a drop of brine. Institute of Continuous Media Mechanics, Ural Branch of the Russian Academy of Sciences, Perm
29. Yugov N.T., Belov N.N., Plyaskin A.S., Babarykina A.I. Dynamic Strength of Concrete under High-Speed Impact. Tomsk State University of Architecture and Civil Engineering, Tomsk

