Toward 100 Anniversary of I.P. Pavlov's Physiological Society

Russian Conference
with International Participation

EXPERIMENTAL AND COMPUTATIONAL BIOMEDICINE

in memory of Professor Vladimir S. Markhasin

PROGRAM

Ural Federal University
named after the first President of Russia B.N.Yeltsin

Ekaterinburg, April 10-12, 2016

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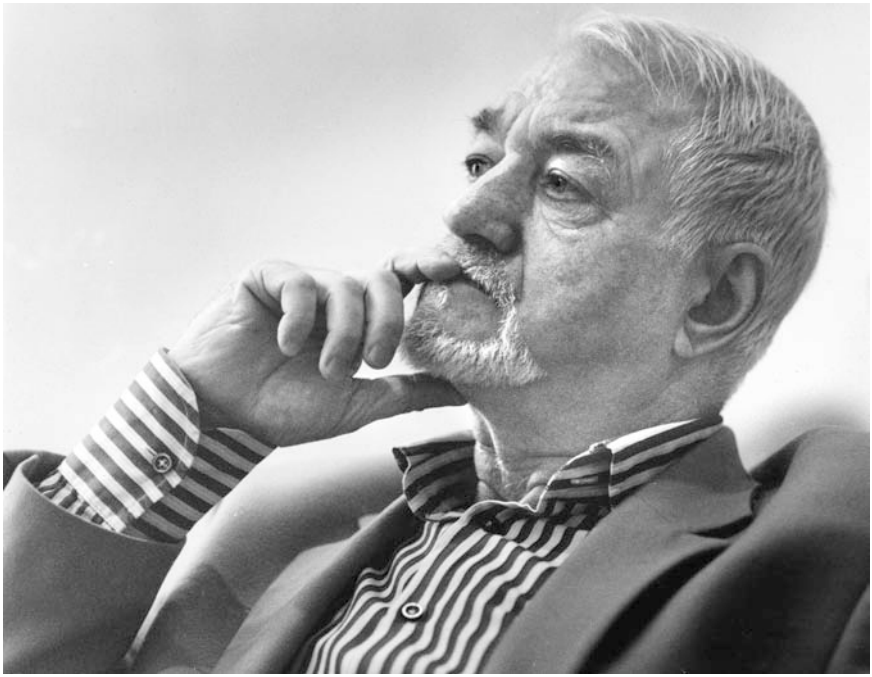
Organizers

Ural Federal University (UrFU)
Institute of Immunology and Physiology (IIP)
Ural Branch of the Russian Academy of Sciences
Federal Agency of Scientific Organizations

Ekaterinburg, April 10-12, 2016



Мархасин Владимир Семенович
(1941-2015)

Год назад, 11 апреля 2015 г., ушел из жизни член-корреспондент Российской академии наук, профессор, доктор биологических наук, заслуженный деятель науки РФ Владимир Семёнович Мархасин, выдающийся специалист в области физиологии и биофизики сердечной мышцы. Так случилось, что и другие важные даты его жизни были связаны с апрелем: 23 апреля – день его рождения, в 2016 г. ему исполнилось бы 75 лет, в апреле 2003 г. его избрали в РАН.

Владимир Семёнович родился в местечке Партала на границе с Финляндией в семье кадрового офицера. В 1964 г. окончил лечебный факультет Свердловского медицинского института и всегда гордился полученным образованием. Хоть он и выбрал делом своей жизни физиологию, ему было легко сотрудничать с врачами, ставить и решать задачи фундаментальной медицины. Его докторская диссертация посвящена изучению механизмов нарушений ритма у больных врожденными и приобретенными пороками сердца.

В 1974 г. Владимир Семёнович и Валерий Яковлевич Изаков (он тоже родился в 1941 г., 28 апреля, они вместе учились, работали и дружили) организовали исследовательскую группу, изучавшую физиологию сердечной мышцы. Эта группа потом переросла в лабораторию, а затем стала отделом Института физиологии Коми НЦ УрО РАН. В то время они были одними из немногих в СССР, кто изучал механизмы

электрогенеза и сократимости в миокарде, одними из первых начали заниматься математическим моделированием сердечной мышцы. Коллектив приобрел заслуженную известность и авторитет. После смерти В.Я. Изакова в 1990 году отдел возглавил В.С. Мархасин. Он инициировал новое направление исследований в физиологии сердца – изучение феномена неоднородности миокарда. Под его руководством были разработаны оригинальные экспериментальные и теоретические методы исследования и описан новый класс явлений в биомеханике неоднородного миокарда. Научным коллективом под его руководством выполнены новаторские работы мирового уровня по математическому моделированию в физиологии сердца. В Институте иммунологии и физиологии УрО РАН, организованном на базе его отдела, Владимир Семёнович создал лабораторию математической физиологии. Здесь он работал главным научным сотрудником до своих последних дней. В конце 2014 г. стартовал его последний, масштабный проект «Персонифицированные компьютерные модели в кардиологии», поддержанный Российским научным фондом. В рамках этого проекта математики и физики вместе с физиологами и кардиологами разрабатывают модели сердца, которые должны помочь ранней диагностике и лечению заболеваний сердца. Профессор Мархасин был настоящим Учителем – ярким преподавателем, заботливым наставником, - под его руководством защищено 11 кандидатских и 3 докторских диссертации. Владимир Семёнович Мархасин был и останется в нашей памяти истинно преданным науке, глубоким и принципиальным Ученым, честным и порядочным Интеллигентом, неравнодушным, жизнерадостным и остроумным Человеком. Научная школа физиологии, биомеханики и биофизики миокарда, основоположниками которой были Валерий Яковлевич Изаков и Владимир Семёнович Мархасин, успешно работает и развивается, молодые исследователи защищают диссертации, студенты начинают свой путь в науке, результаты исследований широко публикуются и признаются международным сообществом.

Автор фотопортрета С. Г. Новиков

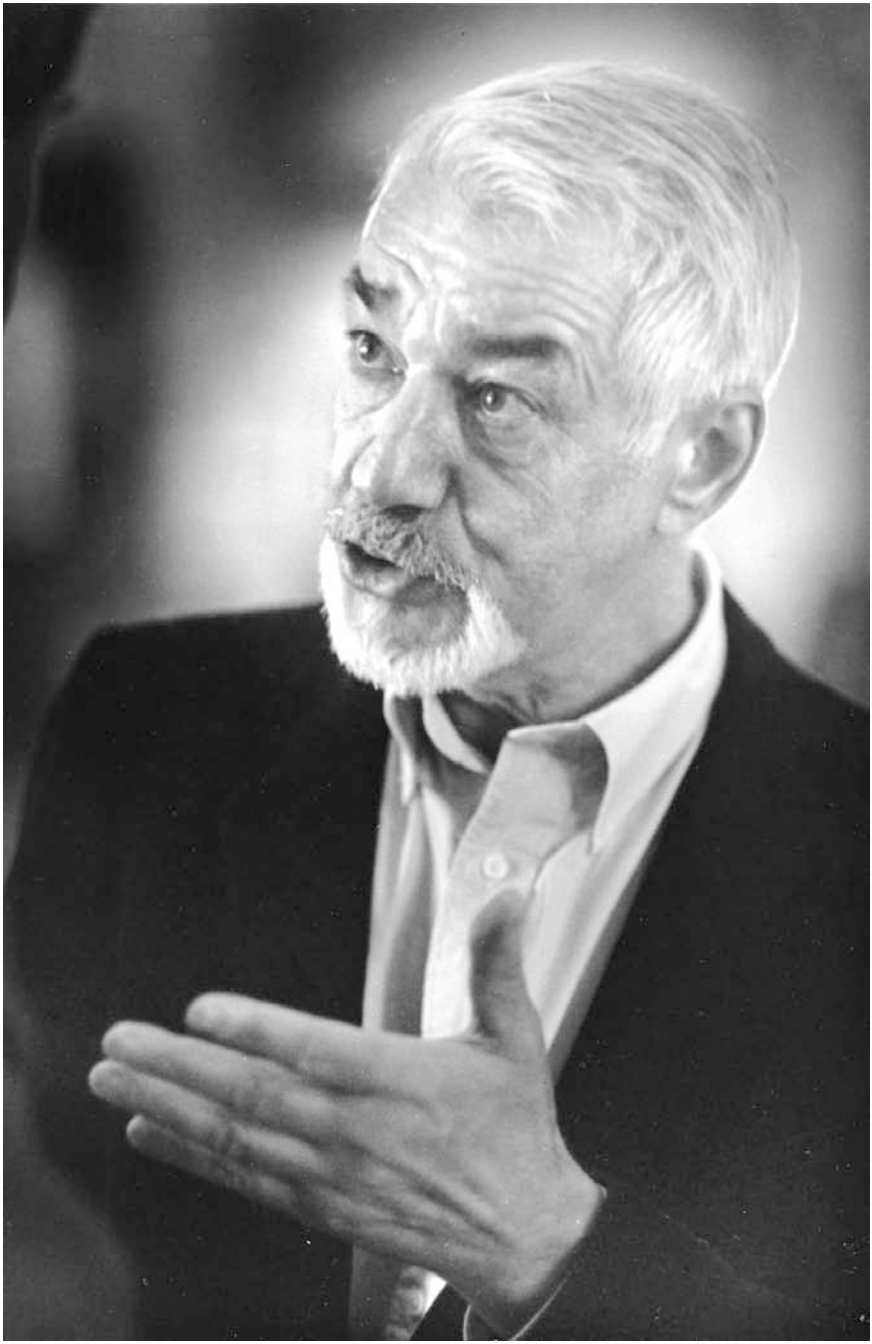


Photo by S.G. Novikov

Markhasin Vladimir Semenovich
(1941-2015)

A year ago, April 11, 2015 a corresponding member of the Russian Academy of Sciences, Professor, Doctor of Biological Sciences, Honored Scientist of the Russian Federation Vladimir Semenovich Markhasin has passed away. He was a leading expert in the field of physiology and biophysics of the heart muscle in Russia. As it happened, some other important dates of his life also took place in April: his birthday was in April 23, in 2016 he would have turned 75 years old, in April 2003 he was elected to the Russian Academy of Sciences.

Vladimir Semenovich was born in the village Partala on the border with Finland in the family of army officer. In 1964 he graduated from Sverdlovsk Medical Institute, acquired excellent education, which he was proud of all his life. Though he chose physiology as the vocation, he was easy to work with doctors, formulate and solve problems of basic medical science. His doctoral thesis was devoted to the mechanisms of arrhythmias in patients with congenital and acquired heart diseases.

In 1974, Vladimir S. Markhasin and Valery Y. Izakov (he was also born in 1941, 28 April, they studied together, were close colleagues and friends) organized a research group to study physiology of the heart muscle. This group developed into a lab, and then became a department of the Institute of Physiology, Komi Science Centre. At that time, they were one of the few groups in the USSR, who studied the mechanisms of electrogenesis and contractility in the myocardium, and among the first started mathematical modeling of the heart muscle. The team has gained a well-deserved reputation and recognition. After the death of VY Izakov in 1990, the department was headed by VS Markhasin. He initiated a new direction of research in the physiology of the heart - the study of the myocardium heterogeneity phenomenon. His team developed original experimental and theoretical research methods and identified a new class of phenomena in the biomechanics of heterogeneous myocardium. They also carried out pioneering works on mathematical modeling in heart physiology. VS Markhasin organized a laboratory of mathematical physiology in Institute of Immunology and Physiology, Ural Branch of Russian Academy of Sciences. Here he worked as a senior researcher until his last days. At the end of 2014 he launched his last project "Personalized computational models in cardiology" supported by the Russian Science Foundation. Under this project, mathematicians and physicists together with physiologists and cardiologists develop models of the heart to contribute to the early diagnosis and treatment of heart disease.

Professor Markhasin was a real teacher - a bright lecturer and caring mentor. Eleven candidate and three doctoral dissertations were defended under his supervision. Vladimir Semenovich Markhasin will always remain in our memory as a perceptive, astute and principle Scientist, innate Intelligent, cheerful, scintillating and witty Man.

Scientific school of physiology, biomechanics and biophysics of the myocardium, which was launched by Valery Y. Izakov and Vladimir S. Markhasin, has been successfully developed: young researchers defend the dissertation, students begin their careers in the science, research results are widely published and recognized by the international community.

The General Sponsor

Thank you for your support

Нойкем - эксклюзивный дистрибьютор в России и Казахстане

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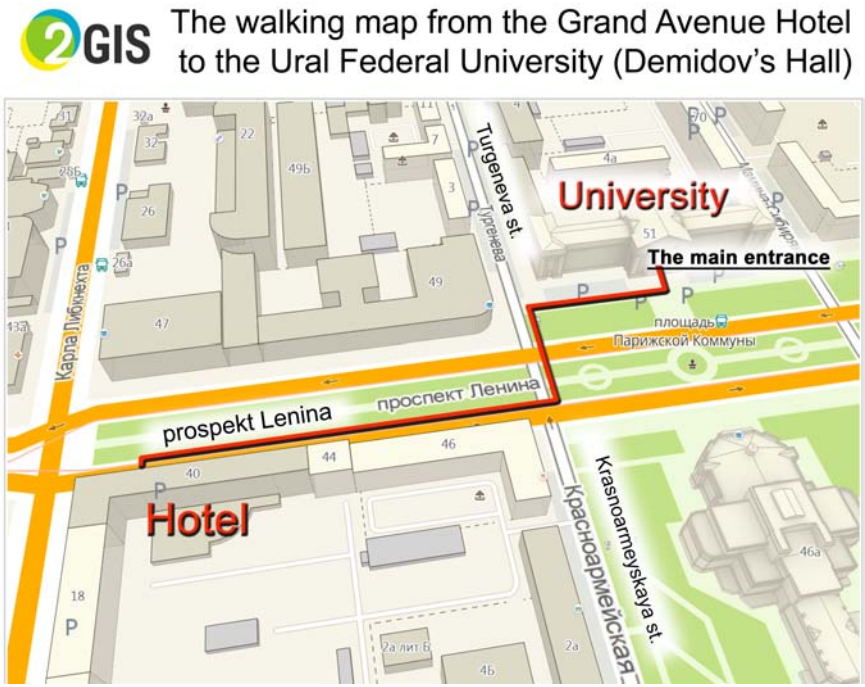
Conference Venue, Map

Main conference venue: Grand Avenue Hotel, Prospekt Lenina, 40
Registration (10-12 April),
Plenary Lectures (11-12 April),
Oral Sessions (10-12 April),
Poster Sessions (10-11 April)

Demidov's Hall at Ural Federal University (UrFU), Prospekt Lenina, 51
Opening Ceremony and First Plenary Lectures
10 April, 14-00 – 18-30
NOTE: NO registration at UrFU.
Participants are requested to register and get conference badges
at the main venue (Grand Avenue Hotel Lenin Str., 40)
PRIOR to the Opening ceremony.

Conference Map



Keynote speakers

Amiran Revishvili
Academician of RAS, professor, director of the A.V. Vishnevsky Institute of Surgery, Moscow, Russia

Atrial fibrillation. Noninvasive diagnostic and treatment: from fundamental studies to clinical practice

Irina Roshchevskaya
Corresponding member of RAS, head of Laboratory of Comparative Cardiology, Komi Scientific Center UB RAS, Syktyvkar, Russia

Regularities of the depolarization of an atria: an experimental comparative-physiological study

Sergei Fedotov
Professor of Applied Mathematics, School of Mathematics, The University of Manchester, Manchester, UK

Non-Markovian random walks and anomalous transport in biology

Alfons Hoekstra
Associate Professor, University of Amsterdam, Netherlands.
Professor in Computational Biomedicine,
ITMO University, Saint Petersburg, Russia

Multiscale Modelling in Vascular Disease

Keynote speakers

Peter Kohl
Chair in Cardiac Biophysics and Systems Biology,
Faculty of Medicine, National Heart & Lung
Institute, Imperial College London, London, UK.
Director of the Institute for Experimental Cardiovascular
Medicine, University of Freiburg, Freiburg, Germany

Systems Biology of the Heart: Why Bother?

Andreas Meyerhans
ICREA Research Professor, Pompeu Fabra University,
Barcelona, Spain.

On the regulation of virus infection fates

Alexander Panfilov
Professor, Departement of Physics
and Astronomy, Ghent University, Ghent, Belgium.

Systems approach to studying mechanisms of ventricular fibrillation using anatomically accurate modeling

John Jeremy Rice
Manager, Multiscale Systems Biology and Modeling Group,
IBM Research, Yorktown Heights, USA

Life Sciences Research at IBM

Program Overview

April 10 (Sunday)		
08:30-20:00	Registration	Grand Avenue hotel
10:00-12:00	Oral session	Grand Avenue hotel
Hall 1 Experimental and computational models in cardiovascular physiology and cardiology		Hall 2 Medical chemistry
12:00-14:00	Poster session & Coffee break	Grand Avenue hotel, Hall3
	Moving to Ural Federal University (UrFU)	
14:00-14:30	Opening Ceremony	Demidov's Hall, UrFU
14:30-16:00	Plenary lectures	Demidov's Hall, UrFU
16:00-16:30	Break	
16:30-18:00	Plenary lectures	Demidov's Hall, UrFU
18:00-18:30	Music session	Demidov's Hall, UrFU
18:30 -19:00	Moving to Grand Avenue hotel	
19:00	Reception	Grand Avenue hotel
April 11 (Monday)		
08:00-19:00	Registration	Grand Avenue hotel
09:00-11:00	Oral session	Grand Avenue hotel
Hall 1 Electrophysiology. Experimental and computational models. Clinical studies		Hall 2 Molecular basis of biological motility
11:00-11:30	Coffee break	Grand Avenue hotel
11:30-13:30	Oral session	Grand Avenue hotel
Hall 1 Experimental and computational models in cardiovascular physiology and cardiology		Hall 2 Experimental and computational models in immunology
13:30-15:00	Poster session	Grand Avenue hotel, Hall3
15:00-15:30	Intel Sponsor Lecture	Grand Avenue hotel
15:30-16:30	Plenary lectures with online Internet access	Grand Avenue hotel
16:30-17:00	Coffee break	Grand Avenue hotel
17:00-18:00	Plenary lectures with online Internet access	Grand Avenue hotel
18:00-19:30	Student poster competition (with free student beverages)	Grand Avenue hotel, Hall3

April 12 (Tuesday)		
08:00-15:00	Registration	Grand Avenue hotel
09:00-11:00	Oral session	Grand Avenue hotel
Hall 1	Hall 2	Hall 3
Experimental and computational models in cardiovascular physiology and cardiology	Biomedical technology	Biomechanics. Experimental and mathematical models
11:00-11:30	Coffee break	Grand Avenue hotel
11:30-13:30	Plenary lectures	Grand Avenue hotel
13:30-14:30	Lunch time	
14:30-17:00	Oral session	Grand Avenue hotel
Hall 1 Translational medicine. From basic science to clinical practice	Hall 2 Medical bioinformatics	Hall 3 Biomechanics. Experimental and mathematical models
17:10-17:30	Closing Ceremony. The Best student Talk and Poster Awards	Grand Avenue hotel

Sunday, April 10, 2016 — Grand Avenue Hotel

08:30 -20:00 **Registration**

10:00 - 12:00 **Experimental and computational models in cardiovascular physiology and cardiology**

The session is dedicated to the 75th anniversaries of Valery Yakovlevich Izakov (28.04.1941-28.02.1990) and Vladimir Semenovich Markhasin (23.04.1941-11.04.2015), who were the founders of scientific school of physiology and biophysics in Ekaterinburg.

Hall 1

Chairs: Kapelko V (Moscow, Russia), Nigmatullina RR (Kazan, Russia), Protsenko YL (Ekaterinburg, Russia)

10:00 - 10:20 **Tribute Introduction**

10:20 - 10:40 **Models of chronic heart failure with acute and gradual onset**
Kapelko VI, Shirinsky VP, Lakomkin V, Lukoshkova E, Gramovich V, Vyborov O, Abramov A, Undrovinas N, Ermishkin V (Moscow) **Ru**

10:40 - 11:00 **Valid method for estimation of pulmonary hypertention degree in children**
Nigmatullina RR*, Zemskova SN, Bilalova DF, Mustafin AA, Kuzmina OI, Chibireva MD, Nedorezova RS (Kazan) **Ru**

11:00 - 11:15 **Aging dynamics of cardio-vascular parameters aboriginal system and alien population of the Russian North**
Filatova OE*, Rusak SN, Maystrenko EV, Dobrynina IY (Surgut) **Ru**

11:15 - 11:30 **Sex-related effects of stretch on isometric twitch and Ca2+ transient in healthy and failing right ventricular myocardium of adult and impuberal rats**
Lookin O*, Protsenko YuL (Ekaterinburg) **Ru**

Students talks

11:30 - 11:40 **Basic metabolomic patterns in early hypertensive rats: MRI study**
Seryapina AA*, Shevelev OB (Novosibirsk) **Ru**

Sponsor talk

11:40 - 12:00 **Remote patient monitoring and integration of medical data**
Khassanov I*, Lomidze NN, Revishvili AS (Erlangen) **En**

10:00 - 12:00 Medical chemistry

Hall 2

Chairs: Kovalchuk LA, Rusinov VL, (Ekaterinburg, Russia)

10:00 - 10:25 **1,3,4-thiadiazine derivates – antioxidants and protein glycation blockers – for correction of experimental diabetes mellitus**
Emelianov VV*, Savateeva EA, Sidorova LP, Tseitler TA, Gette IF, Bulavintseva TS, Smirnyh S, Danilova IG, Maksimova NE, Mochulskaya NN, Chupakhin ON, Chereshnev VA (Ekaterinburg) **Ru**

10:25 - 10:50 **Biological active trace elements of medicinal leeches hirudo medicinalis l. 1758 and hirudo verbana carena, 1820, grown in artificial conditions of regional biofactories in Russia**
Chernaya LV*, Kovalchuk LA, Nokhrina ES, Nikonov GI (Ekaterinburg) **Ru**

10:50 - 11:15 **Associates of Mo72Fe30**
Tonkushina MO*, Ostroushko AA, Gagarin I (Ekaterinburg) **Ru**

Students talks

11:15 - 11:30 **Modelling of {Mo72Fe30} electrophoresis**
Gagarin I*, Tonkushina MO, Ostroushko AA, Grzhegorzhevskii KV (Ekaterinburg) **Ru**

11:30 - 11:45 **Poly(ADP-ribose)polymerase 1 is one of the targets for anti-cancer drugs search**
Kurgina TA*, Anarbaev RO, Lavrik OI (Barnaul) **Ru**

11:45 - 12:00 **On correction and prevention of magnesium deficiency**
Bozhko Y*, Bakhtin VM, Belokonova NA (Ekaterinburg) **Ru**

12:00 - 14:00 Poster session & Coffee break

Hall 3

See pages № 30 - 34

13:30 - 14:00 Moving to Ural Federal University (UrFU)

Sunday, April 10, 2016 — Demidov's Hall, UrFU

14:00 - 14:30 Opening Ceremony

14:30 - 18:00 Plenary lectures

Chairs: Chereshnev VA (Ekaterinburg, Russia), Revishvili AS (Moscow, Russia)

14:30 - 15:00 **Immunology of HIV-AIDS**
Chereshnev VA*,Chereshneva MV, Gavrilova TV (Ekaterinburg)

15:00 - 15:30 **Atrial Fibrillation. Noninvasive diagnostic and treatment: from fundamental studies to clinical practice**
Revishvili AS (Moscow)

15:30 - 16:00 **Regularities of the depolarization of an atria: an experimental comparative-physiological study**
Roshchevskaya IM*,Smirnova S, Roshchevsky MP (Syktyvkar)

16:00 - 16:30 Break

Chairs: Roshchevskaya IM (Syktyvkar, Russia), Veksler V (Paris, France)

16:30 - 17:00 **Scientific basis for development of antiviral drugs**
Rusinov VL

17:00 - 17:30 **The important questions of regeneration theory**
Yushkov BG*, Chereshnev VA (Ekaterinburg)

17:30 - 18:00 **Tribute Lecture. Mechano-electric heterogeneity of the myocardium as a paradigm of its function**
Solovyova OE (Ekaterinburg)

18:00 - 18:30 Music session

18:30 - 19:00 Moving to Grand Avenue hotel

19:00 Reception

Grand Avenue hotel

Monday, April 11, 2016 — Grand Avenue Hotel

08:00 -19:00 **Registration**

09:00 -11:00 **Electrophysiology. Experimental and computational models. Clinical studies**

Hall 1

Chairs: Agladze K (Dolgoprudniy, Russia), Prosheva V (Syktyvkar, Russia)

09:00 - 09:20 **Arrhythmia modelling in tissue culture**
Agladze KI*, Agladze NN (Dolgoprudniy) **En**

09:20 - 9:35 **New insights into the pacemaker and conduction system cells organization in the adult avian heart**
Prosheva V* (Syktyvkar) **En**

9:35 - 9:50 **Numerical methods for electrocardiography modelling**
Danilov A.A.* (Moscow) **En**

9:50 - 10:05 **Pharmacological analysis of transmembrane action potential's morphology of myoepitelial cells in the spontaneously beating heart of ascidia Styela rustica**
Golovko V*, Gonotkov MA (Syktyvkar) **Ru**

10:05 - 10:20 **The electrical resistivity of a segment of the tail, lungs, liver, intercostal muscles of grass snakes during cooling**
Kolomeyets NL*, Roshchevskaya IM (Syktyvkar) **Ru**

10:20 - 10:35 **Simulation of the fibroblasts effect on synchronization and rhythmogenesis in the sinoatrial node**
Syunyaev RA*, Karpaev AA, Aliev RR (Dolgoprudniy) **En**

10:35 - 10:50 **Ventricular lead position and mechanical dyssynchrony in response to cardiac resynchronization therapy**
Lebedeva V*, Lubimceva T, Trukshina M, Lyasnikova E, Lebedev D (St. Petersburg) **Ru**

Student talk

10:50 - 11:00 **Interplay of membrane and calcium oscillators in cardiac pacemaker cells**
Zorin NM*, Ryvkin AM, Moskvin AE (Ekaterinburg) **Ru**

09:00 -11:00 Molecular basis of biological motility

Chairs: Bershitsky SY, (Ekaterinburg, Russia), Shenkman BS (Moscow, Russia), Shirinsky VP (Moscow, Russia)

09:00 - 9:20 **Spatiotemporal activity profiling of key myosin regulators in endothelial cells with regard to control of cell stiffness and barrier dysfunction**
Shirinsky VP*, Kazakova OA, Samsonov MV, Khalisov MM, Khapchaev AY, Penniyaynen VA, Ankudinov AV, Krylov B (Moscow) **En**

9:20 - 9:40 **Mutations in the central part of tropomyosin molecule affect the actomyosin interaction**
Bershitsky SY*, Nabiev S, Kopylova G, Shchepkin D, Matyushenko AM, Koubassova NA, Levitsky DI, Tsaturyan AK (Ekaterinburg) **En**

9:40 - 10:00 **Nitric oxide in unloaded muscle: powerless guard of stability**
Shenkman B*, Nemirovskaya TL, Lomonosova YN, Lyubimova KA, Ptitsyn KG (Moscow) **En**

10:00 - 10:15 **Smooth muscle titin forms aggregates with amyloid-like dye-binding properties**
Yakupova EI*, Bobylev AG, Vikhlyantsev IM, Podlubnaya ZA (Pushchino) **Ru**

10:15 - 10:30 **Study of biphasic tension rise in contracting muscle fiber during ramp stretch**
Kochubey PV*, Bershitsky SY (Ekaterinburg) **Ru**

Student talks

10:30 - 10:40 **Functional studies of tropomyosin mutations associated with dilated and hypertrophic cardiomyopathy**
Borovkov DI *, Kopylova G, Shchepkin D, Nabiev S, Matyushenko AM, Levitsky DI (Ekaterinburg) **Ru**

10:40 - 10:50 **The role of glutamate NMDA-receptor-NO synthase axis in the effect of 24-hydroxycholesterolon synaptic vesicle exocytosis at the mouse neuromuscular junctions**
Fatkhrakhmanova MR*, Mukhutdinova KA, Kasimov MR, Petrov AM (Kazan) **Ru**

11:00 - 11:30 Coffee break

11:30-13:30 **Experimental and computational models in cardiovascular physiology and cardiology**

The session is dedicated to the 75th anniversaries of Valery Yakovlevich Izakov (28.04.1941-28.02.1990) and Vladimir Semenovich Markhasin (23.04.1941-11.04.2015), who were the founders of scientific school of physiology and biophysics in Ekaterinburg.

Hall 1

Chairs: Seemann G (Freiburg, Germany), Tsaturyan A (Moscow, Russia)

11:30 - 11:50 **Cause and effects of cardiac heterogeneity: insights from experimental and computational models**
Seemann G (Freiburg) **En**

11:50 - 12:10 **A simple model of cardiac muscle: mechanics, actin-myosin interaction and Ca-activation**
Tsaturyan A (Moscow) **En**

12:10 - 12:25 **A numerical simulation of changes in the performance of the left ventricle of the heart under various hemodynamic conditions**
Syomin F*, Zberiya MV (Moscow) **En**

12:25 - 12:40 **A mathematical model of the cardiac left ventricle anatomy and morphology**
Pravdin S (Ekaterinburg) **En**

12:40 - 12:55 **Computational study of the haemodynamic significance of the stenosis during multivessel coronary disease**
Simakov S*, Gamilov T, Kopylov P (Moscow) **En**

12:55 - 13:15 **Localization of TRPC3 channels estimated by in-silico and cellular functional experiments**
Iribe G (Okayama) **En**

Students talks

13:15 - 13:30 **First results of fully coupled 3D models of in-stent restenosis**
Zun PS*, Hoekstra A, Anikina TS (Saint-Petersburg) **En**

11:30-13:30 Experimental and computational models in immunology

Hall 2

Chairs: Bocharov G (Moscow, Russia), Yushkov BG (Ekaterinburg, Russia)

11:30 - 11:50 **Systems approach to modelling the "virus-host organism" interaction in infectious diseases**
Bocharov G (Moscow) **En**

11:50 - 12:10 **Oral and maxillofacial manifestations of primary immunodeficiency syndromes**
Tuzankina IA*, Sarkisyan N, Bolkov M, Tihomirov LB, Bass EA (Ekaterinburg) **Ru**

12:10 - 12:25 **Modelling of T cell extravasation into a lymph node: from morphological basics towards clonal selection theory**
Polevshchikov AV, Bondar AV*, Gumovskaya JP (Vladivostok) **Ru**

12:25 - 12:40 **The role of mast cells in the regulation of repair testicles**
Khramtsova Y (Ekaterinburg) **Ru**

12:40 - 12:55 **A mathematical model of the functioning and mutual regulation of the immune and neuroendocrine systems in response to viral exposure under the impact of environmental factors, taking into account the evolution of synthetic function impairment**
Chigvintsev VM (Perm) **Ru**

12:55 - 13:10 **Impact of immobilization stress on change of protein fractions hemoglobin of bone marrow in rats**
Brilliant SA (Ekaterinburg) **Ru**

13:10 - 13:30 **The features of biochemical properties of extracellular matrix of bone marrow in rats in conditions which stimulate granulocytopoiesis**
Bykova M (Ekaterinburg) **Ru**

13:30 - 15:00 Poster session

Hall 3

See pages № 30-34

Monday, April 11, 2016 — Grand Avenue Hotel

15:00 - 15:30 — **Sponsor lecture**

Hall 1

Intel parallel studio - prescribed remedy for developing high performance applications

Petunin D **Ru**

15:30 - 16:30 — **Plenary lectures with online Internet access**

Supported by Institute of Mathematics and Mechanics, UB RAS

Hall 1

Chairs: Fedotov S (Manchester, UK), Panfilov A (Ghent, Belgium)

15:30 - 16:00 **Systems Biology of the Heart: Why Bother?**

Kohl P (London, Freiburg) **En**

16:00 - 16:30 **Life Sciences Research at IBM**

Rice JJ (Yorktown) **En**

16:30-17:00 Coffee break

17:00 -17:30 **Multiscale modelling in vascular disease**

Hoekstra A (Amsterdam, St. Petersburg) **En**

17:30 - 18:00 **On the regulation of virus infection fates**

Meyerhans A (Barcelona) **En**

18:00 - 19:30 — **Student poster competition (with free student beverages)**

Hall 3

See pages № 30-34

Tusday, April 12, 2016 — Grand Avenue Hotel

08:00 -15:00 **Registration**

9:00 - 11:00 **Experimental and computational models in cardiovascular physiology and cardiology**

The session is dedicated to the 75th anniversaries of Valery Yakovlevich Izakov (28.04.1941-28.02.1990) and Vladimir Semenovich Markhasin (23.04.1941-11.04.2015), who were the founders of scientific school of physiology and biophysics in Ekaterinburg.

Hall 1

Chairs: Moskvin A (Ekaterinburg, Russia), Vassilevski YV (Moscow, Russia)

9:00 - 9:20 **Personalized 3D models and applications**
Vassilevski YV*, Pryamonosov R, Gamilov T (Moscow) **En**

9:20 -9:40 **Electron-conformational model of the ligand-activated ion channels**
Moskvin A (Ekaterinburg) **Ru**

9:40 - 9:55 **Adaptivity of the alternating direction method for fractional reaction diffusion equation with delay effects in electrocardiology**
Pimenov VG, Hendy A* (Ekaterinburg) **En**

9:55 - 10:10 **Deriving of macroscopic intracellular conductivity of deformed myocardium based on its microstructure**
Vasserman IN*, Shardakov I, Shestakov AP (Perm) **Ru**

10:10 - 10:25 **Markov chain for an indicator passing throughout cardio-vascular system (CVS).**
Kislukhin V (Moscow) **Ru**

10:25 - 10:40 **T-wave area along with tpeak-tend interval is the most accurate index of the dispersion of repolarization**
Arteyeva N (Syktyvkar) **En**

Students talks

10:40 - 10:50 **Calcium-current dominated upstroke in severe hyperkalemia**
Tsvelaya VA*, Krasheninnikova A, Kudryashova N, Agladze KI (Moscow) **En**

10:50 - 11:00 **Dynamics of scroll wave filaments in personalized models of the left ventricle of the human heart**
Ushenin KS*, Pravdin S, Chumarnaya TV, Alueva YS, Solovyova OE (Ekaterinburg) **En**

9:00 - 11:00 Biomedical technology

Hall 2

Chairs: Ivanov VY, Tuzankina IA, Kublanov VS (Ekaterinburg, Russia)

9:00 - 9:20 **Training for biomedical engineering at the Ural Federal University**
Ivanov VY*, Antsygin IN, Sedunova IN, Myshkina AV (Ekaterinburg) **Ru**

9:20 - 9:40 **The method of dynamic correction of the neck nerve structures conduction activity and its place in modern medicine**
Petrenko T*, Danilova IG, Kublanov VS, Retyunskiy KY (Ekaterinburg) **Ru**

9:40 - 9:55 **Morphological assessment of efficiency of pharmaceutical composition based on silicon organic glycerogidrogel**
Sarkisyan N*, Tuzankina I, Ron G, Chonina T, Drozdova L, Solomatina L (Ekaterinburg) **Ru**

9:55 - 10:10 **The changes in morphofunctional state of cultured cells under the influence of polyoxometalates**
Ulitko MV*, Medvedeva SY, Gubaeva OV, Tonkushina MO, Ostroushko AA (Ekaterinburg) **Ru**

10:10 - 10:25 **Drosophila as a tool for unravelling microRNA biomarkers of neurodegenerative diseases**
Savvateeva-Popova EV*, Nikitina EA, Medvedeva AV, Zhuravlev AV, Zakharov GA, Zatsepina OA, Funikov SP, Ryazansky S, Evgen`ev MB (Saint Petersburg) **Ru**

Students talks

10:25 - 10:35 **The interaction between the cell culture and bimodal nanoparticles with structure: fluorescent core - silica - magnetic nanoparticles**
Minin AS*, Belousova A, Smoluk LT (Ekaterinburg) **Ru**

10:35 - 10:45 **CD45RA+ T-lymphocytes levels evaluation in thymus of rats of various age groups in relation to dietary regimen**
Klyueva Y (Ekaterinburg) **Ru**

10:45 - 10:55 **Ceria nanoparticle cytotoxicity research**
Myshkina AV*, Sedunova IN (Ekaterinburg) **Ru**

9:00 - 11:00 Biomechanics. Experimental and mathematical models

Chair: Nyashin YI, Shardakov IN (Perm, Russia)

9:00 - 9:20 **Development of the conception "Virtual Physiological Human"**
Nyashin YI*, Lokhov VA (Perm) **Ru**

9:20 - 9:35 **Mathematical modelling of airflow in human respiratory tract**
Tsinker M (Perm) **Ru**

9:35 - 9:50 **Simulation of digestion processes in antroduodenum: food particles dissolution in consideration of functional disorders**
Kamaltdinov MR (Perm) **Ru**

9:50 - 10:05 **Occlusion correction based on biomechanical modelling**
Nikitin VN*, Tverier VM, Krotkikh AA. (Perm) **Ru**

10:05 - 10:20 **A study of the edge segments of saccadic eye trajectory**
Kruchinina AP*, Yakushev AG (Moscow) **Ru**

Students talks

10:20 - 10:30 **Development of the biomechanical approach to tooth movement under the orthodontic treatment**
Dubinin AL*, Nyashin YI, Osipenko MA (Perm) **Ru**

10:30 - 10:40 **Automatic control model of the three-tier arm type manipulator in the aimed-movement task**
Belousova MD*, Kruchinina AP, Chertopolokhov VA (Moscow) **Ru**

10:40 - 10:50 **Mathematical modeling of alveolar ventilation and gas exchange during treadmill stress tests**
Golov AV*, Simakov S, Timme EA (Moscow) **Ru**

10:50 - 11:00 **3D FEA simulation of the proximal human femur**
Shulyatev AF*, Akulich YV, Akulich AY, Denisov AS (Perm) **Ru**

11:00 - 11:30 Coffee break

Tusday, April 12, 2016 Grand Avenue Hotel

11:30 - 13:30 Plenary lectures

Hall 1

Chairs: Kohl P (London, UK; Freiburg, Germany), Hoekstra A (Amsterdam, Netherlands; St.-Petersburg, Russia)

11:30 - 12:00 **Systems approach to studying mechanisms of ventricular fibrillation using anatomically accurate modeling**
Panfilov A*, Dierckx H, Kazbanov I, Vandersickel N (Ghent) **En**

12:00 -12:30 **Myocardial energy starvation in chronic heart failure: perspectives for metabolic therapy**
Veksler V (Paris) **En**

12:30 -13:00 **Non-Markovian random walks and anomalous transport in biology**
Fedotov S (Manchester) **En**

13:00 -13:30 **Fetal cardiac assessment using new methods of ultrasound examination**
Wladimiroff JW (Rotterdam, Cambridge) **En**

13:30-14:30 Lunch time

14:30 - 17:00 Translational medicine. From basic science to clinical practice

Hall 1

Chairs: Beykin YB, Danilova IG, Tsyvian PB (Ekaterinburg, Russia)

14:30 -14:45 **Hemodynamics and regulation of angiogenesis in human embryo conceived by in vitro fertilization**
Tsyvian PB (Ekaterinburg) **Ru**

14:45 - 15:00 **Electron microscopy in the diagnosis of male infertility**
Pichugova SV*, Komarova SY, Beykin YB (Ekaterinburg) **Ru**

15:00 -15:15 **Features of the regenerative processes in the rat liver exposed to alloxan diabetes with stimulation of macrophages functional activity**

Blinkova NB*, Danilova IG, Gette IF, Abidov MT, Pozdina VA (Ekaterinburg) **Ru**

15:15 - 15:30 **Genetic and epigenetic aspects of neurodegenerative diseases etiopathogenesis**

Nikitina EA*, Zhuravlev AV, Zakharov GA, Medvedeva AV, Dolgaya YF, Ivanova PN, Tokmacheva EV, Savvateeva-Popova EV (Saint-Petersburg) **Ru**

15:30 - 15:45 **Specific features of the functional geometry of the left ventricle in myocardial diseases**

Chumarnaya TV*, Alueva YS , Kochmasheva VV, Mikhailov SP, Ostern OV, Sopov OV, Solovyova OE (Ekaterinburg) **Ru**

15:45 - 16:00 **Multiscale modeling of angiogenic tumor growth and progression**

Kolobov AV*, Kuznetsov MB, Simakov S, Gorodnova N (Moscow) **Ru**

16:00 - 16:15 **Deficiency of regulatory functions as a risk factor in the occurrence of weakness in the understanding of grammar in children of preschool age**

Kiselev S (Ekaterinburg) **Ru**

16:15 - 16:30 **Methodological approaches to identification of Systemic Inflammation under sepsis**

Zotova N (Ekaterinburg) **Ru**

16:30 - 16:45 **Mathematical modelling of the kidney transplant outcomes**

Solodushkin S*, Stolyar A (Ekaterinburg) **Ru**

16:45 - 17:00 **Laser flash photolysis in investigation of breast cancer at different stages of tumor development**

Maryakhina VS*, Ovechkin MV, Spirina VI (Orenburg) **Ru**

14:30 - 17:00 Medical bioinformatics

Hall 2

Chairs: Eskov VM (Surgut, Russia), Lookin NA (Ekaterinburg, Russia)

14:30 - 14:50 **Homeostasis and the evolution of complex biological systems**
Eskov VM*, Khadartsev AA, Gavrilenko TV, Filatov MA (Surgut) **Ru**

14:50 - 15:10 **Towards to the bio-computer: from serial von Neumann architecture to systolic computer system in one chip**
Lookin NA (Ekaterinburg) **Ru**

15:10 - 15:25 **Hybrid technology of cohort rate of conditional lifetime risk trend assessment**
Obesnyuk VF (Ozyorsk) **Ru**

15:25 - 15:40 **Stoichiometric modeling of oxygen transport through the surface of the isolated perfused rat liver at various oxygenation conditions**
Shadrin KV*, Pakhomova V, Rupenko A (Krasnoyarsk) **Ru**

15:40 - 15:55 **Probabilistic theory of ions binding to RyR-channel within the improved Electron-Conformational model**
Ryvkin AM*, Moskvin AS (Ekaterinburg) **Ru**

15:55 - 16:10 **Theoretical modelling of magnetic hyperthermia**
Zubarev AYu (Ekaterinburg) **Ru**

16:10 - 16:25 **Analytical methods for diagnostics of cerebral aneurysms**
Parshin DV*, Cherevko A, Chupakhin A, Orlov K, Ufimtseva I, Krivoshapkin A (Novosibirsk) **Ru**

Students talks

16:25 - 16:35 **Limit of applicability the theorem of Glansdorf-Prigogine in the describing homeostatic systems**
Gorbunov DV*, Garaeva GR, Sinenko DV, Grigorenko VV (Surgut) **Ru**

16:35 - 16:45 **Parathyroid hypertensive factor (PHF) - ß2-adrenergic receptor potential antagonist**
Rudenko E*, Shchegolev B (Saint-Petersburg) **Ru**

16:45 - 16:55 **Electron-conformational transformations govern the temperature dependence of the RyR2 gating**
Iaparov BY*, Moskvin A, Solovyova OE (Ekaterinburg) **Ru**

14:30 - 17:00 Biomechanics. Experimental and mathematical models

Chairs: Gurev V (Yorktown, USA), Wilde MV (Saratov, Russia)

14:30 - 14:50 **Strain prediction in 3D finite element models of cardiac mechanics**
Gurev V*, Rice J (Yorktown) **En**

14:50 - 15:10 **Influence of artificial initial and boundary conditions in biomechanical models of blood vessels**
Wilde MV (Saratov) **En**

15:10 - 15:25 **Transmural gradient in mechanical properties of isolated subendocardial and subepicardial cardiomyocytes**
Khokhlova A*, Iribe G, Solovyova OE (Ekaterinburg) **En**

15:25 - 15:40 **The mechanics of a discrete multi-cellular model of arterial in-stent restenosis**
Melnikova NB*, Hoekstra A (Saint Petersburg) **En**

15:40 - 15:55 **Modelling of soft tissue deformation for static elastometry**
Murashova DS, Murashov SA*, Bogdan OP, Muravieva OV, Yugova SO (Izhevsk) **En**

15:55 - 16:10 **Accuracy of 1D blood flow simulations in relation to level of detail of the arterial tree model**
Svitenkov A*, Rekin O, Hoekstra A (Saint-Petersburg) **Ru**

16:10 - 16:25 **Modelling viscoelastic hysteresis of passive myocardial sample**
Smoluk AT*, Smoluk LT, Balakin A, Protsenko YL, Lisin RV (Ekaterinburg) **Ru**

16:25 - 16:40 **The 'length-tension' loop in isolated myocardial preparations of the right ventricle of normal and hypertrophied hearts of male rats**
Balakin A*, Kuznetsov D, Protsenko YL (Ekaterinburg) **Ru**

Students talks

16:40- 16:50 **Reaction-diffusion waves in mathematical model of blood coagulation**
Galochkina T*, Volpert V (Moscow) **En**

16:50 - 17:00 **Mathematical modeling of the left atria mechanical action with mitral regurgitation**
Svirepov PI (Perm) **Ru**

17:10 - 17:30 Closing Ceremony

Poster sessions

12:00-14:00 Experimental and computational models in cardiovascular physiology and cardiology

Hall 3

Characteristics of the accuracy of calculation of values of systemic blood pressure using transfer functions in experimental blood loss and its compensation
Erkudov VO*, Pugovkin AP, Verlov NA, Sergeev IV, Ievkov SA, Mashood S, Bagrina JV (Saint.Petersburg)

Photocontrol of voltage-gated ion channel activity by azobenzene trimethylammonium bromide in neonatal rat cardiomyocytes
Frolova S*, Agladze KI, Tsvelaya VA, Gaiko O (Moscow)

Modeling of cardiac arrhythmia generation caused by pathological distribution of myocardial conductivity
Shestakov AP*, Vasserman IN, Shardakov IN (Perm)

Student posters

Competition is open on Tuesday, 11 April, 18:00 (Hall 3)

The stochastic and chaotic estimation of parameters of cardiorespiratory system of students of Ugra
Elman KA*, Filatova DYu , Bashkatova YuV , Beloschenko DV (Surgut)

The designing of vectorcardiograph prototype
Kamalova Y (Izhevsk)

Mathematical modeling of the cardiovascular system under the influence of environmental factors
Parfenov A (Perm)

12:00-14:00 Biomechanics. Experimental and mathematical models

Mathematical modeling of dynamics of development of Parkinson's disease on the tremor parameters
Berestin DK*, Bazhenova AE, Chernikov NA, Vokhmina YV (Surgut)

Experimental study of the intramyocardial slow force response
Lisin RV*, Balakin A, Protsenko YL (Ekaterinburg)

Load-dependence of intramyocardial slow force response in heterogeneous myocardium
Kursanov A*, Khamzin S, Solovyova OE (Ekaterinburg)

Optimal control problem and indexes of stabilometric "test with the visual step input"
Kruchinin PA (Moscow)

Student posters

Competition is open on Tuesday, 11 April, 18:00 (Hall 3)

Load-dependence of the electromechanical function of myocardium in a 1D tissue model
Khamzin S*, Kursanov A, Solovyova OE (Ekaterinburg)

12:00-14:00 Electrophysiology. Experimental and computational models. Clinical studies

The crucial role of the rapidly activating component of outward delayed rectifier K-current (IKr) in pig sinoauricular node (SAN)
Gonotkov MA*, Golovko V (Syktyvkar)

Role of TRPC1 channels in the propagation of electrical excitation in the isolated rat heart
Kharkovskaia E*, Zhidkova N, Mukhina IV, Osipov GV (Nizhni Novgorod)

Cardioelectric field in rats with experimental pulmonary hypertension during ventricular depolarization
Suslonova O*, Smirnova S, Roshchevskaya I (Surgut)

Student posters

Competition is open on Tuesday, 11 April, 18:00 (Hall 3)

Stochastics and chaotic analysis of electromyogram and electroencefalogramm
Poskina TY*, Shakirova LS, Klyus LG, Eskov VV (Surgut)

12:00-14:00 Molecular basis of biological motility

Hall 3

Measurements of the bending stiffness of reconstructed thin filament with the optical trap
Nabiev S*, Bershitsky SY, Tsaturyan A (Ekaterinburg)

The Ca2+ regulation of actin-myosin interaction in atrium and ventricle
Kopylova G*, Shchepkin D, Nabiev S, Nikitina L, Bershitsky SY (Ekaterinburg)

Structural and functional studies of tropomyosin species with cardiomyopathic mutations in the area of tropomyosin-troponin contact
Shchepkin D*, Kopylova G, Matyushenko AM, Popruga KE, Pivovarova AV, Levitsky DI (Ekaterinburg)

Student posters

Competition is open on Tuesday, 11 April, 18:00 (Hall 3)

Increasing μ-calpain activity in striated muscles of alcohol-fed rats
Gritsyna Y*, Vikhlyantsev IM, Salmov N, Bobylev AG, Podlubnaya ZA (Pushchino)

12:00-14:00 Medical chemistry

The estimate of the concentrations of macroelements and trace elements in the biological system of obese pregnant women: (blood of mother – placenta – blood of newborn babies)
Tarkhanova AE*, Kovalchuk LA (Ekaterinburg)

The study of the effects of L-arginine and taurine-contains drugs on platelet aggregation performance and lipid metabolism in patients with heart diseases
Trebukhov AV*, Shirmanova EA, Trebuhov AV (Barnaul)

Student posters

Competition is open on Tuesday, 11 April, 18:00 (Hall 3)

Synthesis and antiviral activity of nitrile-containing 1,2,4-triazolo[5,1-c]-1,2,4-triazines
Sapozhnikova IM*, Deeva EG, Konovalova NI (Ekaterinburg)

New perspective series of adenosine receptors inhibitors
Savateev K* (Ekaterinburg)

Nitroacetonitrile is the intermediate for the synthesis of azolo-6-azapurines
Voinkov E* (Ekaterinburg)

13:30-15:00 Experimental and computational models in cardiovascular physiology and cardiology

Influence of myocardial heterogeneity on scroll wave dynamics in an axisymmetrical anatomical model of the left ventricle of the human heart
Konovalov PV*, Pravdin S, Solovyova OE, Panfilov AV (Ekaterinburg)

An improved analytical model of the cardiac left ventricle
Koshelev A*, Pravdin S, Ushenin K, Bazhutina AE (Ekaterinburg)

Student posters

Competition is open on Tuesday, 11 April, 18:00 (Hall 3)

Mathematical modeling of the calmodulin effect on the RyR2 gating
Borodin N*, Iaparov BY, Moskvin A (Ekaterinburg)

The role of cooperativity between contractile and regulatory proteins in the mechano-calcium feedbacks in myocardium. Experimental discrepancy and mathematical approach to overcome it
Dokuchaev A*, Katsnelson LB, Sulman TB, Shihaleva EV, Vikulova NA (Ekaterinburg)

The application of C-TAB for excitation propagation photocontrol in cardiac tissue
Gorbunov VS*, Agladze KI, Erofeev IS (Moscow)

Conditions of the spiral wave unpinning from the heterogeneity with different boundary conditions in a model of cardiac tissue
Kachalov VN *, Tsvelaya V, Agladze KI (Moscow)

The influence of anisotropy on excitation wave propagation in neonatal rat cardiomyocytes monolayer
Kalita I*, Nizamieva AA, Tsvelaya VA, Kudryashova N, Agladze KI (Moscow)

In silico comparison of the electrical propagation wave along myocardium fibers in the left ventricle wall vs. isolation
Nezlobinsky T*, Pravdin S, Katsnelson LB (Ekaterinburg)

Influence of alcohols on excitation wave propagation in neonatal rat ventricular cardiomyocyte monolayer
Podgurskaya A*, Krasheninnikova A, Tsvelaya VA, Kudryashova N, Agladze KI (Moscow)

Contractile micro-constructs from cardiac tissue culture for the research of autowave propagation in excitable systems
Shutko AV*, Gorbunov VS, Nizamieva AA, Guriya KG, Agladze KI (Moscow)

13:30-15:00 Translational medicine. From basic science to clinical practice

Hall 3

The response of macrophage to chronic hyperglycemia before and after modulation of macrophage functional phenotype
Bulavintseva TS*, Danilova IG, Brilliant SA (Ekaterinburg)

The dynamics of the regenerative processes in the retina in rats with alloxan diabetes and after injection of tetrahydrophthalazine derivatives
Smirnyh S*, Danilova IG, Chereshneva MV (Ekaterinburg)

Student posters

Competition is open on Tuesday, 11 April, 18:00 (Hall 3)

Influence of the pericellular microenvironment to the functional liver cells damaged by toxin
Pyankova ZA*, Medvedeva SY, Gette IF, Belousova AV(Ekaterinburg)

13:30-15:00 Biomedical technology

Student posters

Competition is open on Tuesday, 11 April, 18:00 (Hall 3)

The study of cardiomyocyte structure by scanning probe nanotomography
Balashov VA*, Agladze KI, Agapov II, Efimov AE (Moscow)

Development of the way of early diagnostic of essential arterial hypertension different forms in adolescents
Chibireva MD (Kazan)

Effects of weak static magnetic field on cognition
Nikitina EA*, Gerasimenko M (Saint Petersburg)

Influence of radiation therapy on implantable cardiac pacemakers
Kurzyukova A*, Odlozhilikova A, Sepsi M, Pospisil D, Slampa P (Ekaterinburg)

RBC morphology according Atomic Force Microscopy and metabolic disorders in alloxan diabetes in rats
Leontev DV*, Emelianov VV, Ishchenko AV, Savateeva EA, Bulavintseva TS, Smirnyh S, Gette IF, Danilova IG, Chereshnev VA (Ekaterinburg)

The use of coherent superheterodyne ESR spectrometer for measuring radiation dose
Popova MA*, Vakhnin DO, Tyshchenko I, Vakhnin KO (Ekaterinburg)