

# **“Instabilities and Control of Excitable Networks. Focus on: Cardiac Biophysics and General Aspects of Excitable Media Self-organization”**

May 28-30, 2014  
Dolgoprudny, Russia

## **Conference Program:**

**May 28, Wednesday**

**9.00 Registration of participants**

**9.30 Opening Ceremony**

**9.45 Cardio biophysics (Chair: K.I. Agladze)**

I. Efimov, Washington University  
**Novel therapies for the failing human heart**

N. Bursac, Duke University, Durham, USA  
**Bioengineering Cardiac Regeneration and Repair**

*11.05 Coffee break*

**11.20 Excitable Media Self-Organization (Chair: G.Th. Guria)**

W. Ebeling, A.V. Kargovsky, Yu.M. Romanovsky, Humboldt University, Berlin; Moscow State University  
**Stochastic Motion in Active Media**

T. Yamaguchi, Nanosystem Research Institute AIST, Tsukuba, Japan  
**Application of The Belousov-Zhabotinsky Reaction**

*12.40 Lunch*

**14.00 Cardio biophysics (Chair N. Bursac)**

B.J. Caldwell, M.L. Trew, A.M. Pertsov, SUNY Upstate Medical University, Syracuse, USA, Auckland  
Bioengineering Institute, New Zealand  
**Cardiac response to electrical field stimuli challenges the functional syncytium paradigm**

K.Agladze, Moscow Institute of Physics and Technology  
**Arrhythmia modeling in tissue culture**

*15.10 Coffee break*

**15.25 Cardio biophysics (Chair I. Efimov)**

I. A. Romanetz, Ph. Yu. Kopylov, G.Th. Guria, National Research Center for Hematology, Moscow;  
Sechenov First Moscow State Medical University; Moscow Institute of Physics and Technology  
**Topological Methods of Critical States Monitoring in Human Cardiodynamics**

V. V. Kalinin, A. Kalinin, Russian Scientific Center for Surgery, Inst. for Information Transmission  
Problems, Moscow  
**Phase mapping of atrial fibrillation based on unipolar electrograms in humans**

*16.45 Coffee break*

**17.00 Press Briefing**

“Integration of Moscow Institute of Physics and Technology into World Scientific and Educational Society”

**18.30 Banquet**

**May 29, Thursday**

**9.30 Biophysics of heart and circulatory system (Chair A. Pertsov)**

E.Vigmond, University of Bordeaux  
**Effects of the Purkinje System on Cardiac Electrical Activity**

A.Yu. Naumov, S.A. Balashov, A.M. Melkumyants, Russian Cardiology Research Center, Moscow  
Institute of Physics and Technology  
**Coordination of different segments of arterial bed during organ vascular reactions**

*10.50 Coffee break*

**11.05 Excitable Media Self-organization (Chair M. Mazurov)**

O.Mornev, Institute of Theoretical and Experimental Biophysics  
**The physical mechanisms supporting movement of leading edge of an autowave: the resolution of some paradoxes**

A. Polezhaev, Lebedev Physical Institute, Moscow  
**Mechanisms of segmented pattern formation in biological and chemical systems**

*12.25 Lunch*

**14.00 Various mathematical models in biophysics (Chair A.M. Melkumyants)**

S.S. Simakov, T.M. Gamilov, E.V. Petersen, A.S. Dukh, Moscow Institute of Physics and Technology  
**Coronary flow remodeling by Enhanced External Counterpulsation therapy: Computational study**

K.E. Zlobina, O.S. Rukhlenko, G.Th. Guria, Moscow Institute of Physics and Technology, National  
Research Center for Hematology  
**Mathematical modeling of platelets activation and aging**

A. Khalyavkin, Inst. of Biochemical Physic & Inst. for Systems Analysis  
**Reversibility of cardiomyopathy as a special case of reversibility of aging**

*15.30 Coffee break*

**15.45 Cardio biophysics (Chair O. Mornev)**

I.S. Erofeev, A.K. Grebenko, N.N. Kudryashova, K.I. Agladze, Moscow Institute of Physics and Technology  
**Applications of photo-controlled cardiac tissue**

S. Frolova, O.Y. Pimenov, Y.M. Kokoz, K.I. Agladze, Moscow Institute of Physics and Technology,  
Institute of Theoretical and Experimental Biophysics  
**Study of azobenzene trimethylammonium bromide interaction with voltage-gated ion channels of adult rat cardiomyocytes**

M.E. Mazurov, I.M. Kaluzhny, Moscow State University of Economics, Statistics and Informatics  
**Vortex autowaves during fibrillation in the Atria, their origin and annihilation**

M.E. Mazurov, Moscow State University of Economics, Statistics and Informatics  
**About the evolution of mathematical models of active media**

*17.15 Coffee break*

### **17.30 Poster Session**

**May 30, Friday**

### **10.00-12.00**

Special Invitation to BFC Conference, Session “Scientific Breakthroughs of the 21st Century” with participation of Nobel Prize Laureates Michael Levitt, Robert Huber and Barry Sharpless.

*12.30 Lunch*

### **14.00 Advanced methods in biophysical research (Chair A. Polezhaev)**

S. Shevkoplyas, University of Houston

**Low-cost, point-of-care medical diagnostics based on 2D spatio-temporal pattern formation in porous media**

A.E. Efimov, I.I. Agapov, Shumakov Federal Research Center of Transplantology and Artificial Organs, SNOTRA LLC

**Scanning probe nanotomography as an advanced tool for 3D analysis of biomaterials, polymers and nanocomposites**

T. Ohzono, T. Yamamoto, J. Fukuda, Nanosystem Research Institute, AIST, Tsukuba, Japan

**Defect structures with fluctuation in liquid crystals bounded by microwrinkles**

*15.20 Coffee break*

### **15.35 Advanced methods in biophysical research (Chair S. Shevkoplyas)**

Y. Takenaka, Y. Sumino, T. Ohzono, National Institute of Advanced Industrial Science and Technology, Ibaraki; PRESTO, JST, Saitama; Tokyo University of Science, Japan  
**Spontaneous shrinking of surfactant droplet on a glass surface**

E. Khlebus, S.M. Deyev, Moscow Institute of Physics and Technology, Institute of Bioorganic Chemistry, Moscow

**Research of the dynamics of magnetic particles in a bloodstream of mice**

K.G. Guria, Sh.N. Dzhumaeva, D.A. Ivlev, S.G. Uzlova, G.Th. Guria, Moscow Institute of Physics and Technology; National Research Center for Hematology, Moscow

**Ultrasonic investigation of blood coagulation and fibrinolysis**

*16.45 Coffee break*

### **17.00 Closing Ceremony**