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**Programme of the British Council Researcher Links Workshop**

**“Mathematical and Computational Modelling in Cardiovascular Problems”**

**April 15 (INM RAS) "Heart, patient-specific modelling"**

**Section I Chairman Perumal Nithiarasu**

9.30–9.35 Opening

9.35–10.15 Rubin Aliev (Moscow Institute of Physics and Technology) Computer simulations of electrical activity in the SAN

10.15–10.55 Xiaoyu Luo (University of Glasgow) Dynamic finite-strain modelling of the human left ventricle in health and disease using an immersed boundary-finite element method

10.55–11.20 *Coffee break*

**Section II** **Chairman Rubin Aliev**

11.20–12.00 Andrey Tsaturyan (Lomonosov Moscow State University) A simple kinetic model of cardiac muscle mechanics

12.00–12.40 Olga Solovyova (Institute of Immunology and Physiology RAS) Electro-mechanical and mechano-electrical coupling in myocardium from molecules to tissue: model predictions and experimental verifications

12.40–13.30 *Lunch*

**Section III Chairman Xiaoyu Luo**

13.30–14.00 Jordi Alastruey (King’s College London) Arterial pulse wave propagation: modelling and analysis

14.00–14.20 Claudio Capelli (University College London) Translating patient-specific simulations into clinics: early results and current challenges

14.20–14.40 Ramón Casero Cañas, (University of Oxford) Building a detailed anatomical model of the rat heart

14.40–15.00 Hao Gao (University of Glasgow) Fluid structure interaction of left ventricle modelling from diastole to systole based on in-vivo CMR

15.00–15.20 Giovanni Biglino (University College London) Imaging-based wave intensity analysis and statistical shape analysis to unravel the problem of ventriculo-arterial coupling in congenital heart disease

15.20–15.40 Adelaide de Vecchi (King’s College London) A novel methodology to simulate ventricular dynamics in congenital heart disease from advanced 3D+t echocardiography data

15.40–16.00 Spyridon Tzamtzis (University College London) Numerical simulations in the development of new generation TAVI devices

16.00–16.20 *Coffee break*

**Section IV Chairman Olga Solovyova**

16.20–16.40 Roman Syunyaev (Institute of Theoretical and Experimental Biophysics RAS) Computer simulations of reentrant activity in SAN

16.40–17.00 Svyatoslav Solodushkin (Ural Federal University) Statistical analysis of predictors of myocardial infarction after total hip replacement in patients over 60 years

17.00–17.20 Alexander Danilov (Institute of Numerical Mathematics RAS) High resolution human body computational models

17.20–17.30 Svetlana Maltseva (Sobolev Institute of Mathematics RAS) Reconstruction of the mouse brain vasculature according to the tomographic data

17.30–17.40 Yuri Ivanov (Institute of Numerical Mathematics RAS) Patient specific reconstruction of vascular network for haemodynamic modelling

17.40–17.50 Alexander Kursanov (Institute of Immunology and Physiology RAS) Effect of mechanical factors on rhythm disturbances in mathematical model of cardiac fiber with local Ca2+-overloading

17.50–18.00 Yulia Korneva (Smolensk State Medical Academy) Morphometric parameters of myocardium as substrate for mathematical modeling of myocardial infarction healing

18.00–18.10 Fedor Syomin (Lomonosov Moscow State University) A cylindrical model of contraction of left ventricle of the heart

**Discussion**

18.10–18.30 Early Career Ideas

**April 16 (INM RAS) "Blood flows, patient-specific modelling"**

**Section V Chairman Sergey Mukhin**

 9.30–10.10 Igor Sazonov (Swansea University) Constructing geometries for the patient specific modelling

10.10–10.50 Yun Xu (Imperial College London) Computational modelling of type B aortic dissection: predicting the need for intervention

10.50–11.10 *Coffee break*

**Section VI Chairman Yun Xu**

11.10–11.50 Sergey Mukhin (Lomonosov Moscow State University) Hemodynamic modeling: fundamental and practical approaches

11.50–12.30 Perumal Nithiarasu (Swansea University) 1D systemic circulation models for clinical applications

12.30–13.20 *Lunch*

**Section VII Chairman Jordi Alastruey**

13.20–13.50 Xianghua Xie (Swansea University) Computer vision in biomedical applications

13.50–14.10 Rhodri Bevan (University of Bristol) Investigation of wall shear stress derived risk factors on patient-specific cardiovascular geometries

14.10–14.30 Chang Park (Institute of Biomedical Engineering, Oxford) Estimating changes to brain oxygenation delivery through multi-scale modelling of the cerebral microvasculature

14.30–14.50 Etienne Boileau (Swansea University) A novel computational framework to study arterial vasomotion

14.50–15.10 Alistair Revell (University of Manchester) Towards embedded simulation of turbulent flow structure interaction, and possibilities for interactive CFD

15.10–15.25 *Coffee break*

**Section VIII Chairman Andrey Tsaturyan**

15.25–15.55 Sergey Simakov (Moscow Institute of Physics and Technology) Computational haemodynamics for clinical practice

15.55–16.15 Victoria Salamatova (Moscow Institute of Physics and Technology) Modelling of soft tissue deformation

16.15–16.35 Alexander Khe (Lavrentyev Institute of Hydrodynamics RAS) Time series analysis using persistent homology methods

16.35–16.50 Tatyana Dobroserdova (Institute of Numerical Mathematics RAS) Numerical simulation of blood flow in the vascular network with pathologies or implants

16.50–17.05 Alexander Cherevko (Lavrentyev Institute of Hydrodynamics RAS) Сerebral aneurysm blood vessel unsteady hemodynamic simulation

17.05–17.20 *Coffee break*

**Section IX Chairman Yuri Vassilevski**

17.20–17.35 Dmitry Kulikov (Moscow Regional Research & Clinical Institute “MONIKI”) Development of the method for evaluating the status of blood microcirculation system and the risk of microvascular complications development at diabetes mellitus based on optical spectroscopy

17.35–17.50 Dmitry Nechipurenko (Lomonosov Moscow State University) Modelling initial stages of thrombus growth using revised platelet-platelet interaction model

17.50–18.05 Aleksey Rukhlenko (Moscow Institute of Physics and Technology) Mathematical modeling of blood coagulation processes in intensive blood flow conditions

18.05–18.20 Aleksey Tokarev (National Research Centre for Hematology) Erythrocytes – platelets – fibrin mesh interactions in blood flow as basic elements of the hemostatic and thrombotic processes

18.20–18.30 Elena Pogorelova (Center for Theoretical Problems of Physicochemical Pharmacology RAS) A mathematical model for blood clot growth based on “advection—diffusion” equations

18.30–18.40 Igor Gudich (Federal Research and Clinical Centre of Pediatric Hematology, Oncology and Immunology) One computational approach to the high level model of platelet thrombus formation in the flow

18.40–18.50 Timur Gamilov (Moscow Institute of Physics and Technology) Modelling of passive blood flow stimulation

18.50–19.00 Denis Lapitan (Moscow Regional Research & Clinical Institute “MONIKI”) Development of backscattered optical radiation model for measuring parameters of the blood microcirculation system

19.00–19.10 Vasily Kramarenko (Moscow Institute of Physics and Technology) Natural user interfaces for mathematical models dealing with real human anatomy

**19.30–21.30 *Dinner***

**April 17 (MIPT, metro Tretyakovskaya, Klimentovsky pereulok 1, bld.1)**

**International Round Table** *"Mathematical and Computational Modelling in Cardiovascular Problems: Forms of International Collaboration"* **Chairman Igor Sazonov**

 9.30– 9.55 Yuri Vassilevski (Institute of Numerical Mathematics RAS) Working group on mathematical models and numerical methods in biomathematics

 9.55–10.20 Permural Nithiarasu (Swansea University) Conferences, journals and funding opportunities in the area of biomedical modelling

10.20–10.45 Ospan Mynbaev (New European Surgical Academy) Translational medicine & biomodeling: the bonding force for multidisciplinary researches

10.45–11.10 Andrey Tsaturyan (Lomonosov Moscow State University) Long-term Russian-British collaboration in studying structure-function relation in muscle

11.10–11.30 Inna Trusova (Moscow Institute of Physics and Technology) Simulational medicine

11.30–11.50 Marina Sokolova (UK Science & Innovation Network, British Embassy) UK-Russia collaboration in science and funding opportunities

11.50–12.20 Discussion

12.30–13.30 *Lunch*

13.45–15.00 *Excursion to Tretyakov gallery (collection of Russian art)*

15.00–17.00 *Walking tour in the city centre*

**April 18**

12.00-13.30 *Excursion inside Kremlin*