

## **SCIENTIFIC PROGRAM**

### **5th International Young Scientists School «System Biology and Bioinformatics», SBB'2013**

Institute of Cytology and Genetics SB RAS  
Chair of Informational Biology of Natural Sciences Department (NSU)  
Scientific Council on the Genetics and Breeding RAS  
The Vavilov Society of Geneticists and Breeders

Novosibirsk, Russia, June **23-26** (extended program 21-30), 2013

Languages: **English, Russian**

#### **Science sections:**

- 1) Development biology and stem cells**
- 2) Neurobiology**
- 3) Human origin and evolution. Paleogenomics**
- 4) Bioinformatics and analysis of genome sequencing data**

**Outstation School meeting (June 26-30) "Prospects of System Biology, Ethnogenomics and Paleogenomics"**

The main problem of system biology is the complex experimental and computational study of patterns in organization and function of biological systems on the molecular-genetic, cell, tissue, organ levels on the base of information encoded by genomes. The every past International Young Scientists School of System Biology was oriented to the most important issues of its time. In the preservation and development of this tradition SBB'2013 is devoted to Bioinformatics and System Biology with the focus on such actual problems like: (1) development biology with the emphasis on the stem cells; (2) neurobiology using the organization of molecular-genetic systems of brain and cognitive processes; (3) human origin and evolution according to the latest discoveries in Archeology and Paleogenomics; (4) Bioinformatics and analysis of the whole genome sequencing data using high performance supercomputers. The results of the latest research in these fields will be presented on the SBB'2013.

**22 June 2013, Saturday** - arrival, registration start

**17-00 – 21-00** Registration in the hotel "Zolotaya Dolina"

**23 June 2013, Sunday**

**9.00-10.00** Registration

**10.00-10.30** Official opening ceremony.

- Academician N.A. Kolchanov, ICG SB RAS, Novosibirsk, Russia
- Prof. K.V. Anokhin, National Research Centre "Kurchatov Institute", Moscow, Russia
- Prof. E.I. Rogaev, University of Massachusetts Medical School, Massachusetts, USA
- Prof. H. Bai, National University of Inner Mongolia, China

**10.30-13.05 MORNING SESSION. Lectures.**

**Section: DEVELOPMENT BIOLOGY AND STEM CELLS**

**10.30-11.30**

- **Prof. S.L. Kiselev**, M.A. Lagarkova, A.N. Bogomazova, M.V. Shutova, E. Nekrasov, V. Naumov, D. Ischenko, E. Kaznacheeva, V. Vigont  
N.I.Vavilov Institute of General Genetics, Moscow, Russia  
*«Pluripotent stem cells»*

**11.30-11.50 Coffee-break**

**11.50-12.35**

- **Prof. O.L. Serov**, ICG SB RAS, Novosibirsk  
*«Embryonic stem cells: origin and properties»*

**12.35-13.05**

- **S.P. Medvedev**, S.M. Zakian, ICG SB RAS, Novosibirsk  
*«New methods of genome editing in pluripotent stem cells»*

**13.05-14.30 Lunch (the bus to the Academgorodok mall; the bus to ICG at 14.15)**

**14.30-16.10 DAY SESSION. Lectures.**

**Section: DEVELOPMENT BIOLOGY AND STEM CELLS (CONTINUE)**

**14.30-15.20**

- **Prof. N.N. Dygalo**, ICG SB RAS, Novosibirsk  
*«Information content of signal molecule: humoral code»*

**15.20-16.10**

- **Prof. M.G. Samsonova**, St.Petersburg State Polytechnic University, St.Petersburg  
*«Variability and robustness in biological systems»*

**16.10-16.40 Coffee-break. Poster session**

**16.40-18.10 Short reports**

**16.40-17.10**

- **E.V. Dementieva**, E.V. Grigor'eva, A.V. Vyalkova, S.P. Medvedev, A.I. Shevchenko, S.M. Zakian, ICG SB RAS, Novosibirsk  
*«Studying long QT syndrome using patient-specific induced pluripotent stem cells»*

**17.10-17.40**

- **I.S. Zakharova**, ICG SB RAS, Novosibirsk  
*«Directed vascular differentiation of human stem cells for application in engineering of vascular grafts»*

**17.40-18.10**

- **Battulin N.R.**, ICG SB RAS, Novosibirsk  
*«3D organization of stem cell genome»*

**18.30-20.00 Welcome party (ICG Hall)**

**24 June 2013, Monday**

**9.30-13.00 MORNING SESSION. Lectures.**

**Section: NEUROBIOLOGY AND COGNITIVE PROCESSES**

**9.30-10.30**

- **Prof. K.V. Anokhin**, National Research Centre "Kurchatov Institute", Moscow  
*«Molecular, cellular and systemic neuroscience of memory»*

**10.30-11.00 Coffee-break**

**11.00-12.00**

- **Prof. E.I. Rogaev**, University of Massachusetts Medical School, Massachusetts, USA  
*«The molecular mechanisms of Alzheimer's disease»*

**12.00-13.00**

- **Prof. T.V. Chernigovskaya**, St.Petersburg State University, St.Petersburg  
*«Neuroscience in the XXI Century: How can we study language and mind?»*

**13.00-14.00 Lunch**

**14.00-16.30 DAY SESSION. Lectures.**

**Section: NEUROBIOLOGY AND COGNITIVE PROCESSES (CONTINUE)**

**14.00-15.00**

- **Prof. A.S. Ratushnyak**, Design Technological Institute of Digital Techniques SB RAS, Novosibirsk  
*«The molecular function of the neuron cognitive reactions»*

**15.00-16.00**

- **Prof. E.E. Vityaev**, Sobolev Institute of Mathematics, Novosibirsk  
*«Neuroinformatics. Mathematical models of learning neuron, the functional systems and animat models»*

**16.00-16.30**

- **Prof. E.K. Khusnutdinova**, Ufa Institute of Biochemistry and Genetics, Ufa Scientific Centre of Russian Academy of Sciences, Ufa, Russia  
*«Genetics of personality traits and aggressive behavior»*

**16.30-17.00 Coffee-break. Poster session**

**16.30-18.30 Presentations by young scientists. Short reports. Contest. Part I.**

**17.00-17.20**

- **Kao L.P.**, Ovchinnikov D.A., Prescott M., Tra T., Turner J.P., Cooper-White J.J., Wolvetang E.J.  
*Australian Institute for Bioengineering and Nanotechnology; the University of Queensland, St Lucia, Australia*  
*«Regulation of mitochondrial biogenesis in human embryonic stem cells»*

**17.20-17.40**

- **Ilyaskin A.V.**

*Institute of Cytology and Genetics SB RAS, Novosibirsk, Russia*  
«Experimental and theoretical study of water and electrolyte balance of renal collecting duct principal cells»

**17.40-18.00**

- **Demin A.V.**, Vityaev E.E.

*A.P. Ershov Institute of Informatics Systems SB RAS, Novosibirsk, Russia*  
«Learning of locomotion and chemotaxis in 3D model of the *C. elegans* nematode»

**18.00-18.20**

- **Maksimova K.Y.**

*Siberian State Medical University, Tomsk, Russia*  
«Neuronal loss in senescence-accelerated OXYS rats hippocampus: histological examination»

**19.00-21.00 Social program. Football. NSU stadium.**

**25 June 2013, Tuesday**

**9.30-13.00 MORNING SESSION. Lectures.**

**Section: HUMAN ORIGIN, EVOLUTION AND GENETIC VARIATION.**

**9.30-10.10**

- Prof. V.I. Molodin, **A.S. Pilipenko**, Institute of Archeology and Ethnography SB RAS, ICG SB RAS, Novosibirsk  
*«Human origin and evolution»*

**10.10-10.50**

- **K.V. Gunbin**, N.A. Kolchanov, ICG SB RAS, Novosibirsk  
*«High throughput sequencing and computer analysis of molecular evolution on example of Homo Denisova genome»*

**10.50-11.20 Coffee-break**

**11.20-12.10**

- **Prof. N.K. Yankovsky**, Vavilov Institute of General Genetics RAS, Moscow  
*«Gene Geography and Ethnography»*

**12.10-13.00**

- **Prof. A.M. Samsonov**, S.A. Rukolaine, Ioffe Physical Technical Institute, St.-Petersburg  
*«Modeling of transport process in biological systems»*

**13.00-14.00 Lunch**

**14.00-18.30 DAY SESSION. Lectures.**

**Section: BIOINFORMATICS AND ANALYSIS OF GENOME SEQUENCING DATA**

**14.00-15.00**

- **Prof. Ming Chen**, Zhejiang University, Hangzhou, China  
*«Towards a microRNA interactome network»*

**15.00-16.00**

- **Dr. N.N. Vtyurin**, Moscow  
*«Protein 3D-structure homology modeling based on their amino acid sequence. Myths and Realities»*

**16.00-16.30 Coffee-break**

**16.30-18.30 Presentations by young scientists. Short reports. Contest. Part II.**

**16.30-16.50**

- **Wang Y.**, Chen M.  
*Department of Bioinformatics, College of Life Sciences, Zhejiang University, Hangzhou, China*  
*«An evaluation of the software tools for plants microRNA deep-sequencing data analysis»*

**16.50-17.10**

- **Jin D**, Zhao Y, Chen M.  
*Department of Bioinformatics, College of Life Sciences, Zhejiang University, Hangzhou, China*  
*«Differential expression analysis of microRNAs in the root of *M.truncatula* when symbiosis with *S.meliloti* and *G.intraradices*»*

**17.10-17.30**

- **Bari A.**, Pinsky I., Sagaidak A.  
*Al-Farabi Kazakh National University, Almaty, Kazakhstan*  
*«Binding of miR396 family with mRNA of growth-regulating factors in rice and maize»*

**17.30-17.50**

- **Berillo O.**, Moldagalieva A., Baidildinova G.  
*National nanotechnology laboratory, al-Farabi Kazakh National University, Almaty, Kazakhstan*  
*«MicroRNAs binding sites in mRNAs of some oncogenes»*

**17.50-18.10**

- **Bogdanov M.R.**, Zakharov A.V.  
*Bashkir State Pedagogical University, Ufa, Russia*  
*«Electrocardiogram recognition with wavelet analysis»*

**18.10-18.30**

- **Yazeva A.S.**, Gorbunova V.Y., Vorobyova E. V.  
*Bashkir State Pedagogical University named after M. Akmullah, Ufa, Russian Federation*  
*«Examination of the cardiovascular system and cell cycle genes interaction»*

**19.00-21.00 Social program. Table tennis.**

26 June 2013, Wednesday

**9.30-11.00 MORNING SESSION. BIOINFORMATICS AND ANALYSIS OF GENOME SEQUENCING DATA**

**9.30-10.00**

- **Dr. Palyanov A.Y.**, A.P.Ershov Institute of Informatics Systems, Novosibirsk  
*«Building computer simulation of C. elegans nematode to investigate its nervous system: results and perspectives»*

**10.00-10.30**

- **Prof. A.V. Kukekova**, L.N.Trut, Yu.E. Herbeck ICG SB RAS, Novosibirsk, Russia; University of Illinois, USA  
*«New sequencing technologies and transcriptome analysis»*

**10.30-11.00**

- **Dr. K.N. Kozlov**, St.Petersburg State Polytechnic University, St.Petersburg  
*« Model adaptation using Differential Evolution Entirely Parallel method»*

**11.00-11.30 Coffee-break**

**11.30-13.10 Presentations by young scientists. Short reports. Contest. Part III.**

**11.30-11.50**

- **Vaskin Y.Y.**, Khomicheva I.V., Vityaev E.E.  
*Novosibirsk State University, “UniPro” Company, Novosibirsk, Russia*  
*«Recognition of liver promoters with EXPERT DISCOVERY and UGENE integrated system»*

**11.50-12.10**

- **Safronova N.S.**, Orlov Y.L.  
*Institute of Cytology and Genetics SB RAS, Novosibirsk State University, Novosibirsk, Russia*  
*«Computer programs for complexity estimation and oligonucleotide analysis of regulatory DNA»*

**12.10-12.30**

- **Akinshin A.A.**  
*Altai State Technical University, Barnaul, Russia*  
*«Analysis of phase portraits in some gene networks models»*

**12.30-12.50**

- **Ermak T.**, Akberdin I., Timonov V., Khlebodarova T.M., Likhoshvai V.A.  
*Institute of Cytology and Genetics SB RAS, Novosibirsk, Russia*  
*«KiNET – a new web database on kinetics data and parameters for E.coli»*

**12.50-13.10**

- **Komyshv E.G.**, Genaev M.A., Afonnikov D.A.  
*Institute of Cytology and Genetics SB RAS, Novosibirsk, Russia*  
*Novosibirsk State University, Novosibirsk, Russia*  
*«Generation of web services - the unification of access to bioinformatics resources»*

### 13.10-14.00 Lunch

### 14.00-16.00 DAY SESSION.

#### Presentations by young scientists. Short reports. Contest. Part IV.

#### 14.00-14.20

- **Mulyukova R.V.**, Vorobyova E.V., Gorbunova V.U.  
*Bashkir State Pedagogical University named after M.Akmullah, Ufa, Russian Federation*  
«The functional role of genes involved in lipid metabolism in the course of metabolic syndrome»

#### 14.20-14.40

- **Ponomarenko P.M.**, Ponomarenko M.P., Kolchanov N.A., Eisenhaber B., Eisenhaber F.  
*Institute of Cytology and Genetics SB RAS, Novosibirsk, Russia*  
*Novosibirsk State University, Novosibirsk, Russia*  
*National Research Centre "Kurchatov Institute", Moscow, Russia*  
*Bioinformatics Institute; A\*STAR; Singapore*  
*Department of Biological Sciences, National University of Singapore*  
*School of Computer Engineering, Nanyang Technological University, Singapore*  
«How multiple Nfat5 sites may impact to the Nfat5-inducible gene expression: an ill-posed inverse problem solution»

#### 14.40-15.00

- **Saik O.V.**, Demenkov P.S., Ivanisenko V.A.  
*Institute of Cytology and Genetics SB RAS, Novosibirsk, Russia*  
«Reconstruction of squamous cell carcinoma “associome” based on analysis of differential gene expression according to RNAseq data and information stored in databases»

#### 15.00-15.20

- **Savina M.S.**, Mironova V.V., Akberdin I.R., Omelyanchuk N.A., Likhoshvai V.A.  
*Institute of Cytology and Genetics SB RAS, Novosibirsk, Russia*  
*Novosibirsk State University, Novosibirsk, Russia*  
«Systems biology analysis for promoter activities of genetic constructions from deletion and linker-scanning experiments»

#### 15.20-15.40

- **Sokolov V.S.**, Likhoshvai V.A., Matushkin Y.G.  
*Institute of Cytology and Genetics SB RAS, Novosibirsk, Russia*  
«Gene expression and mRNA secondary structures in *Mycoplasma* strains»

#### 15.40-16.00

- **Medvedev K.E.**, Afonnikov D.A., Vorobjev Y.N.  
*Institute of Cytology and Genetics SB RAS, Novosibirsk, Russia*  
*Novosibirsk State University, Novosibirsk, Russia*  
*Institute of Chemical Biology and Fundamental Medicine SB RAS, Novosibirsk, Russia*  
«Molecular dynamics simulation analysis of influence of high temperature and high pressure on the NIP7 proteins from the hyperthermophilic *Archaea*»

### 16.00-16.10 Coffee-break

**16.10-16.30 Practical class**

- **Dr. Y.L. Orlov**, D.A. Afonnikov, ICG SB RAS, Novosibirsk  
«Computer databases for genome data analysis»

**16.30-17.10 Practical class**

- **Tiys E.S.**, ICG SB RAS, Novosibirsk  
«Design and analysis of genetic association networks. Computer system ANDVisio»

**17.10-17.50**

**Excursion** (short walk) for young scientists and participants to SPF-vivarium and Siberian Supercomputer Center (SSCC SB RAS).

Excursion to Geology museum

**School summary** (estimation and voting for best young scientist presentation)

**18.00-18.30****Closing ceremony****Nomination and awards for top reports by young scientists**

**Departure of the School participants**

**June, 26-30**

**Outstation school meeting****“PROSPECTS OF SYSTEM BIOLOGY, ETHNOGENOMICS AND PALEOGENOMICS”**

The meeting is devoted to the problems of systems biology and bioinformatics teaching. There will be considered new scientific disciplines – Ethnogenomics and Paleogenomics related to genomic research and sequencing of ancient DNA analysis of hominid evolution and modern humans and the use of molecular biology and bioinformatics.

**Outstation School meeting program:**

- Prof. V.I. Molodin, Institute of Archeology and Ethnography, Novosibirsk
- Prof. A.P. Derevjanko, Institute of Archeology and Ethnography, Novosibirsk
- Prof. E.K. Khusnutdinova, Institute of Biochemistry and genetics, Ufa
- Prof. K.V. Anokhin, National Research Centre "Kurchatov Institute", Moscow
- Prof. T.V. Chernigovskaya, Saint Petersburg State University, St.Petersburg
- Prof. M.G. Samsonova, St. Petersburg State Polytechnic University, St.Petersburg
- Prof. A.M. Samsonov, Ioffe Physical Technical Institute, St.Petersburg
- Prof. N.K. Yankovsky, Vavilov Institute of General Genetics RAS, Moscow