

**The program of The Third School for Young Scientists “Dynamics of  
Complex Networks and their Application in Intellectual Robotics”  
(DCNAIR 2019)**

<b>September 9, Monday</b>		
<b>9.00-9.30 – Opening of the School Room 107</b>		
<b>Time, Room</b>	<b>Speaker</b>	<b>Title of talk</b>
9.30- 10.15, <b>Room 107</b>	<b>Prof. Jürgen Kurths</b> <i>Humboldt University, Berlin, Germany</i>	<b>Lecture</b> Predictability of extreme climate events via a complex network approach
10.15- 11.00, <b>Room 107</b>	<b>Prof. Claudio Franceschi</b> <i>IRCCS Institute of Neurological Sciences Bologna and University of Bologna, Italy</i>	<b>Lecture</b> Systems biology of ageing: dynamics, nonlinearity, and stochasticity
11:00- 11:30	<i>Coffee Break</i>	
11.30- 12.15, <b>Room 107</b>	<b>Prof. Stefano Boccaletti</b> <i>ISC-Institute for Complex Systems, Italy</i>	<b>Lecture</b> Collective states of networked phase oscillators: explosive synchronization, dynamically interdependent networks and Bellerophon states
<b>12:15- 13:45, Room 320</b>	<b>Section 1 of the Young Scientists</b> <i>Dr. Nikita Frolov</i>	
12:15- 12:25	V.V. Skazkina, E.N. Mureeva, A.S. Karavaev, A.R. Kiselev, E.I. Borovkova, O.S. Panina, Yu.M. Ishbulatov, Y.V. Popova	Choosing parameters for the analysis of synchronization of the autonomic regulatory contours of blood circulation in newborns
12:25- 12:35	V.V. Skazkina, Yu.M. Ishbulatov, E.I. Borovkova, B.P. Bezruchko, A.R. Kiselev, A.S. Karavaev	Slow trends in the degree of synchronization of the elements of autonomous control of blood circulation in healthy subjects
12:35- 12:45	E.I. Borovkova, Yu.M. Ishbulatov, A.R. Kiselev, A.V. Tankanag, G.V. Krasnikov, A.S. Karavaev	Synchronization of the process of autonomous regulation of blood circulation with low-frequency components of the laser Doppler flowmetry signal
12:45- 12:55	E.I. Borovkova, E.P. Chernets, Yu.M. Ishbulatov, V.V. Skazkina, A.S. Karavaev	Experimental observation of Arnold tongues in the analysis of the signal from contour of the autonomous regulation of heart rate and respiration

12:55-13:05	Yu.M. Ishbulatov, E.I. Borovkova, A.S. Karavaev, A.R. Kiselev, B.P. Bezruchko	Comparing methods for extraction of autonomic control signals from electrocardiogram
13:05-13:15	E.V. Navrotskaya, M.V. Sinkin, A.N. Khramkov, D.M. Yezhov, B.P. Bezruchko	Development of a method for coupling detection based on the phase dynamics modeling for analyzing EEG rhythms during an epileptic seizure in patients with a reduced level of consciousness
13:15-13:25	A. Badarin	Development of a digital software platform for the study of nonlinear dynamics of electronic systems
13:25-13:35	S. Kurkin	Investigation of complex nonlinear processes in systems with intense relativistic electron beams
13:35-13:45	V.B. Baiburin, A.S. Rozov	Poisson equation numerical solution method based on bidirectional multiple passage of grid cells and parallel computations
<b>12:15-13:55, Room 305</b>	<b>Section 2 of the Young Scientists</b> <i>Prof. Semen Kurkin</i>	
12:15-12:25	V. Khorev, E. Borovkova, Yu. Ishbulatov, V. Gridnev, A. Karavaev	Asymmetry of coupling between the P3 and P4 electroencephalographic leads during the motions
12:25-12:35	A.V. Kochetkov, D.R. Malakhov, O.V. Zakharov	Optimization approach for inverse kinematic problem for manipulator with redundant degrees of freedom
12:35-12:45	A.V. Kochetkov, P.M. Salov, O.V. Zakharov	Route optimization in measuring surfaces on coordinate measuring machines
12:45-12:55	E. Pitsik, N. Frolov	Time-frequency and recurrence quantification analysis detect limb movement execution from EEG data
12:55-13:05	A.R. Miftahova, A.E. Hramov	Recurrence plot analysis of functional brain connectivity during bistable visual perception
13:05-13:15	A.A. Grishchenko, T.M. Medvedeva, C.M. van Rijn, M.V. Sysoeva, I.V. Sysoev	Application of directed connectivity measures for identifying the evolution of the interaction structure in WAG/Rij rats brain at absence epilepsy
13:15-13:25	A. Kuc, V. Nedaivozov	Influence of the sensory information ambiguity on the brain state during the decision-making task
13:25-13:35	A. Andreev, A. Pisarchik	Modeling of a brain neuronal network under visual stimulation
13:35-13:45	A. Andreev, V. Makarov, A. Balanov, A. Hramov	Chaos and hyperchaos in a chain of coupled Rydberg atoms

13:45- 13:55	O.N. Pavlova, N.M. Kupriyashkina, A.N. Pavlov	Characterization of intermittent dynamics from experimental data with DFA
<b>12:15- 13:15, Room 308</b>	<b>Section 3 of the Young Scientists</b> <i>Prof. Mikhail Prokhorov</i>	
12:15- 12:30	M.D. Prokhorov, D.D. Kulminskiy, V.I. Ponomarenko	Controlling Synchronization in Networks of Nonidentical Neuronlike Oscillators
12:30- 12:45	V.I. Ponomarenko, A.S. Karavaev, Yu.M. Ishbulatov, A.R. Kiselev, E.I. Borovkova, V.V. Skazkina, M.D. Prokhorov	Interaction of slow oscillatory processes in the human cardiovascular system and their mathematical modeling
12:45- 13:00	A. Karavaev, E. Borovkova, A. Kiselev, A. Runnova, V. Prokhorov, V. Ponomarenko, A. Hramov, V. Gridnev, B. Bezruchko	Interactions between the processes of regulation of the cardiovascular system and the brain structures
13:00- 13:15	A. Karavaev, A. Kiselev, E. Borovkova, Y. Popova, V. Gridnev, O. Posnenkova	Dynamics of low-frequency components of photoplethysmogram signals in hypertension
13.15- 14.45	<i>Lunch</i>	
<b>14:45- 15:45, Room 305</b>	<b>Section 4 of the Young Scientists</b> <i>Dr. Vladimir Maksimenko</i>	
14:45- 14:55	N. Frolov, A. Hramov	Multilayer perceptron reveals functional connectivity structure in thalamo-cortical brain network
14:55- 15:05	A.K. Alimuradov, A.Yu. Tychkov, P.P. Churakov	A novel approach to speech signal segmentation based on empirical mode decomposition to assess human psycho-emotional state
15:05- 15:15	A. Tychkov, A. Alimuradov, P. Churakov	The empirical mode decomposition for ECG signal preprocessing
15:15- 15:25	A. Petukhov	Modeling the distortions of public opinion under conditions of external influence using differential stochastic equations
15:25- 15:35	A.K. Alimuradov, A.Yu. Tychkov, P.P. Churakov	A method for noise-robust speech signal processing to assess human psycho-emotional state
15:35- 15:45	V. Khorev	Mean phase coherence modified for piecewise constant phase difference data
<b>14:45- 15:30, Room 308</b>	<b>Section 5 of the Young Scientists</b> <i>Prof. Mikhail Prokhorov</i>	
14:45- 15:00	M.A. Simonyan, A.S. Karavaev, Y.M. Ishbulatov, V.V. Skazkina, V.I. Gridnev, B.P. Bezruchko, A.R. Kiselev	Directional coupling between the low-frequency control of heart rate and vessels tone in myocardial infarction patients

15:00-15:15	S. Salem, V. Tuchin	Theoretical study for a mixture from magnetic microcapsule suspensions and blood under magnetic field effect
15:15-15:30	S. Salem, V. Tuchin	Numerical simulation for blood flow in a tube under magnetic field effect
<b>September 10, Tuesday</b>		
9.00-9.45, <b>Room 107</b>	<b>Prof. Vladimir Nekorkin</b> <i>Inst. Of Appl. Phys., Nizhny Novgorod, Russia</i>	<b>Lecture</b> Dynamics of oscillatory networks: from simple to complex links
9.45-10.30, <b>Room 107</b>	<b>Prof. Alexander Fradkov</b> <i>Inst. for Problems of Mech. Eng., St. Petersburg, Russia</i>	<b>Lecture</b> Cybernetical physics and cyber-physical systems
10:30-11:00	<i>Coffee Break</i>	
11.00-11.45, <b>Room 107</b>	<b>Prof. Ulrike Feudel</b> <i>Carl von Ossietzky Universität Oldenburg, Oldenburg, Germany</i>	<b>Lecture</b> Tipping phenomena and resilience: two sides of the same coin?
11:45-12:45, <b>Room 107</b>	<b>Prof. Eugene Postnikov</b> <i>Kursk State University, Kursk, Russia</i>	<b>Lecture</b> Spectral and wavelet approaches for revealing state transitions from individual trajectories
12.45-14.00	Lunch	
14:00-14:15, <b>Room 107</b>	<b>Dr. Vasiliy Kuznetsov,</b> <i>Goethe-Institut, Moscow, Russia</i>	<b>Lecture</b> Philosophical Aspects of Artificial Intelligence
14.15-14.45, <b>Room 107</b>	<b>Prof. Leonid Savin,</b> <b>Prof. Alexey Kornaev</b> <i>Orel State University, Orel, Russia</i>	<b>Lecture</b> Application of machine learning to modeling of nonlinear hydromechanical systems
14.45-15.15, <b>Room 107</b>	<b>Prof. Alexander Pisarchik</b> <i>Technical University of Madrid, Madrid, Spain</i>	<b>Lecture</b> Brain noise: good or bad?
<b>September 11, Wednesday</b>		
9.00-9.45, <b>Room 107</b>	<b>Prof. Eckehard Schöll</b> <i>Technische Universität, Berlin, Germany</i>	<b>Lecture</b> Partial synchronization patterns in complex networks - interplay of dynamics, time delay, and network topology

9.45-10.30, <b>Room 107</b>	<b>Dr. Annika Lüttjohann</b> <i>University of Münster, Münster, Germany</i>	<b>Lecture</b> Development of brain computer interfaces for the interruption and prevention of epileptic seizures
10:30-10:45	Coffee Break	
10:45-11:30 <b>Room 107</b>	<b>Prof. Mikhail Lebedev</b> <i>Duke University, Durham, USA</i>	<b>Lecture</b> Expansion of brain functions and neurorehabilitation using neurocomputer interfaces
<b>11:30-13:15, Room 421</b>	<b>Section 6 of the Young Scientists</b> <i>Dr. Annika Lüttjohann</i>	
11:30-11:45	P. Chholak, A.N. Pisarchik, S.A. Kurkin, V.A. Maksimenko, A.E. Hramov	Phase-amplitude coupling between mu- and gamma-waves to carry motor commands
11:45-12:00	V. Maksimenko, V. Grubov	Cognitive interaction during a collaborative attentional task
12:00-12:15	V. Grubov, V. Maksimenko, V. Makarov	Features of brain activity in children during cognitive tasks of different types
12:15-12:30	V. Grubov, N. Frolov, E. Pitsik, A. Badarin	Features of real and imaginary motor activity on EEG and fNIRS signals for neurorehabilitation
12:30-12:45	E. Pitsik, N. Frolov, A. Hramov	Network analysis of brain activity during real motor actions execution using recurrence-based measure of dependence
12:45-13:00	A. Hramov, A. Kiselev, N. Schykovskii	Post-stroke rehabilitation with the help of brain-computer interface
13:00-13:15	A. Hramov, A. Pisarchik	Kinesthetic and visual modes of imaginary movement: MEG studies for BCI development
<b>11:00-13:40, Room 107</b>	<b>Section 7 of the Young Scientists</b> <i>Prof. Vladimir Ponomarenko</i>	
11:00-11:10	A. Kornaev, R. Zaretsky, S. Egorov	Simulation of deep learning control systems to reduce energy losses due to vibration and friction in rotor bearings
11:10-11:20	M.V. Bobyr, A.S. Yakushev, N.A. Milostnaya	Three-coordinate definition of color mark and distance to objects according to stereo image
11:20-11:30	N. Fadeeva, A. Gulai, S. Astakhov	Amplitude-phase dynamics of the three-mode cross-coupled generator
11:30-11:40	D. Artyukhov, I. Artyukhov, V. Alekseev, I. Burmistrov	Using thermoelectrics for power supplying of wireless sensors network

11:40-11:50	A. Makashov	The network layer model of the wireless sensor network acting under the influence of interferences
11:50-12:00	A. Kirpichnikov, A. Titovtsev	Practical recommendations on the application of Markov queuing models with a restricted queue
12:00-12:10	V.A.-jr. Krysko, T.V. Yakovleva, V.A. Krysko	Theory of contact interaction of inhomogeneous beam-lamellar nanostructures taking into account the connectivity of the temperature and deformation fields
12:10-12:20	I.V. Papkova, A.V. Krysko, E.Yu. Krylova	Mathematical modeling of NEMS elements in the form of flexible round plates under the Casimir's force action
12:20-12:30	E.Yu. Krylova, I.V. Papkova, O.A. Saltykova, V.A. Krysko	Mathematical modeling of the behavior of flexible micropolar mesh cylindrical panels with two sets of mutually orthogonal rods
12:30-12:40	O.A. Saltykova, V.A. Krysko	Nonlinear dynamics of a flexible closed cylindrical size-dependent shell under the action of a band load
12:40-12:50	M. Bolotov, T. Levanova, L. Smirnov, A. Pikovsky	Dynamics of disordered heterogeneous chains of phase oscillators
12:50-13:00	A.M. Vaskovsky, M.S. Chvanova	Designing the neural network for personalization of food products for persons with genetic president of diabetic sugar
13:00-13:10	A. Kuc, V. Maksimenko	Spatio-temporal cortical activity during a visual task accomplishing
13:10-13:20	S. Kurkin, P. Chholak, V. Maksimenko, A. Pisarchik	Machine learning approaches for classification of imaginary movement type by MEG data for neurorehabilitation
13:20-13:30	A. Badarin	The control of the dynamics of intense electron beams coupled through a common field
13:30-13:40	S. Kurkin, V. Maksimenko, E. Pitsik	Approaches for the improvement of motor-related patterns classification in EEG signals
13:45-14:45	Lunch	
<b>14:45-16:30</b> <b>Room 305</b>	<b>Section 8 of the Young Scientists</b> <i>Prof. Mikhail Ivanchenko</i>	
14:45-15:00	S. Jalan, V. Rathore, A.D. Kachhvah, A. Yadav	Multiplexing with inhibitory layer leading to explosive synchronization in multiplex networks
15:00-15:15	I.P. Mariño, L. Lacasa, J. Míguez, V. Nicosia, É. Roldán, A. Lisica, S.W. Grill, J. Gómez-Gardeñes	Identifying the hidden multiplex architecture of biological processes

15:15-15:30	S. Makovkin, M. Ivanchenko, A. Zaikin, S. Jalan	Investigating multiplex models of neuronal systems: small-world topology and inhibitory coupling
15:30-15:45	M. Krivonosov, M. Ivanchenko, S. Jalan, M.G. Bacallini, C. Franceschi	Parentclitic analysis of high-dimensionality DNA methylation data
15:45-16:00	O. Vershinina, S. Denisov, M. Ivanchenko	Quasi-stationary oscillations in game-driven evolutionary dynamics
16:00-16:15	A. Makeeva, A. Dmitrichev, V. Nekorkin	Torus canards in the ensemble synaptically related neurons Fitzhugh-Nagumo
16:15-16:30	T. Nazarenko, M. Krivonosov, A. Zaikin	Analysis of longitudinal high-dimensional medical data with parentclitic networks
<b>14:30-16:40, Room 421</b>	<b>Section 9 of the Young Scientists</b> <i>Dr. Anatoly Karavaev</i>	
14:30-14:40	M. Rassabin, R. Yagfarov, S. Gafurov	Approaches for road lane detection
14:40-14:50	S. Mikhel	State-based velocity profile for manipulator
14:50-15:00	V. Skvortsova, D. Popov	Design of the parallel spherical manipulator for wrist rehabilitation
15:00-15:10	R. Khusainov, S. Mamedov, P. Dmitry	Trajectory planning for biped walk with non-instantaneous double support phase
15:10-15:20	A. Evlampev, M. Ostanin	Obstacle avoidance for robotic manipulator using mixed reality glasses
15:20-15:30	P. Khakimov, S. Savin, A. Klimchik	Trajectory optimization for underactuated systems using reinforcement learning: cart-pole problem
15:30-15:40	I.D. Galushko, G.M. Makaryants, S.A. Gafurov	Mathematical modeling of changes in geometric parameters of pneumatic muscles
15:40-15:50	A. Kurbanov, S. Grebennikov, S. Gafurov, A. Klimchik	Vulnerabilities in the vehicle's electronic network equipped with ADAS system
15:50-16:00	R. Yagfarov, V. Ostankovich, S. Gafurov	Augmentation-based object detection for winter time applications
16:00-16:10	G.Y. Prokudin, N.G. Sharonov, E.S. Briskin	Optimal control of orthogonal-rotary movers of walking robot with an excessive number of drives
16:10-16:20	T.I. Muftakhov, V.M. Giniyatullin, D.V. Shekhovtsov	Interpretation of the results of the neural network after the substitution of continuous activation function on the threshold function
16:20-16:30	N. Stankevich, E. Volkov, E. Hellen	Self-organized quasiperiodicity and multistability in dynamical systems of different nature
16:30-16:40	E. Bagautdinova, S. Kuznetsov, E. Seleznev, N. Stankevich	Circuit simulation of a blue sky catastrophe in the context of bursting dynamics occurrence

16:30- 17:00	Coffee Break	
<b>17:00- 18:00, Room 421</b>	<b>Section 10 of the Young Scientists</b> <i>Dr. Vadim Grubov</i>	
17:00- 17:10	S. Savin	Detecting changes in contact interaction regime with a reaction predictor and a linear contact model
17:10- 17:20	D. Popov, A. Klimchik	Identification stiffness model parameter for bipedal robots
17:20- 17:30	D. Popov, A. Klimchik	Multiple collision detection for a collaborative robot
17:30- 17:40	P. Kozlov, A. Klimchik	Automated robotic assembly of complex workpieces from regular components
17:40- 17:50	E.A. Marchuk, A.P. Fedin, Ya.V. Kalinin	Neuro-fuzzy anti-block braking system of the vehicle
17:50- 18:00	T.A. Tarasova, I.A. Tarasova, A.V. Maloletov, Ya.V. Kalinin	Application of systems of stochastic differential equations for modeling transport processes
18.00- 18.30, Room 107	<b>Closing ceremony</b>	