Theoretical physics and mathematics of the brains:
Bridges across disciplines and applications

4-5 December 2019, Moscow

PROGRAM
(For abstract of talks, please visit https://www.poncelet.ru)

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4 December 2019

On December 4, 2019 the conference is hosted by Institute for Advanced Brain Studies at the Lomonosov building (Ломоносовский корпус) of the Moscow State University, Room **D1** (Lomonosovskiy Prospekt, 27 building 1, Moscow, 119192).

В связи с тем, что проход в МГУ ограничен и осуществляется по предварительной записи, для прохода, пожалуйста, отправьте письмо с Вашими ФИО на русском языке на адрес **ncc.msu@gmail.com** до 2 декабря и возьмите с собой паспорт. В заголовке письма, пожалуйста, укажите "Конференция 4 декабря". Проход также возможен без предварительной записи для всех сотрудников и студентов МГУ, а также для бывших студентов МГУ по предъявлении диплома об окончании МГУ и паспорта.

The "Lomonosov building" of MSU is located in 10 min walking distance from the metro station "**Universitet**" along the Lomonosovskii prospect.

9-30 – 10-00:	*Arrival and coffee*
10-00 – 10-45:	Konstantin Anokhin, Fundamental brain theory: the main challenge to theoretical physics and mathematics of the brain
10-45 – 11-30:	Alexander Gorsky, The brain: a homework for a theoretical physics
11-30 – 12-00:	*Coffee break*
12-00 – 12-45:	Vladimir Itskov, Topological analysis and inferring the sensory stimulus space from neural responses
12-45 – 13-30:	Yakov Kazanovitch, Modeling brain cognitive functions by oscillatory neural networks
13-30 – 15-00:	*Lunch*
15-00 – 15-45:	Vadim Ushakov, Approaches to Learning and Creating Brain Models
15-45 – 16-30:	Alexander Bernstein*, В. Бухштабер, Е. Бурнаев, М. Шараев, О. Качан, Е. Стрельцова, Topological Data Analysis of Connectivity Matrices in Medical Diagnostic Tasks
16-30 – 17-00:	*Coffee break*
17-00 – 17-30:	Anton Ayzenberg*, Vsevolod Chernyshev, Topological formal contexts
17-30 – 18-30:	*Round table discussion*

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5 December 2019

On December 5, 2019 the conference is hosted by the Center for Neurobiology and Brain Restoration of Skolkovo Institute of Science and Technology (Skolkovo, Bolshoy Boulevard 30, bld. 1 Moscow, Russia 121205), Room **E-B4-3006**

To get to the place, please take the bus with the logo **Sk** at the metro station "**Slavyansky boulevard**" (last car from the center) till the stop "**Technopark**" (inside the Skoltech campus). Then take the local cab **No.5** at the same stop till the "University" (big round building). The total trip from the metro takes about 35 min (20 min Sk bus + 5 min local cab + 5 min waiting time).

Room **E-B4-3006**, Skolkovo Institute of Science and Technology (Bolshoy Boulevard 30, bld. 1 Moscow, Russia 121205)

9-30 – 10-00:	*Arrival and coffee*
10-00 – 10-45:	Vladimir Nekorkin, Transient sequences in adaptive spiking networks: hepernetworks and spatiotemporal processing
10-45 – 11-30:	Roman Borisyuk, Structural and functional properties of a nervous system: Modelling tadpole locomotor behaviour in response to sensory signals
11-30 – 12-00:	*Coffee break*
12-00 – 12-45:	Alexey Koulakov, Formation of neural connectivity: nature versus nurture
12-45 – 13-30:	Alexey Ossadtchi, Mapping normal and pathological brain function with magnetoencephalography
13-30 – 15-00:	*Lunch*
15-00 – 15-45:	Elena Popova*, A. Bugay, and E. Dushanov, Computer simulation of radiation-induced dysfunction of the neural networks of the prefrontal cortex
15-45 – 16-15:	Nikita Pospelov*, Konstantin Anokhin, Vladik Avetisov, Alexander Gorsky, Sergei Nechaev, and Olga Valba, Spectral peculiarity and criticality of the human connectome
16-15 – 16-45:	*Coffee break* / Sergey Lobov, Demonstration of an operating robot controlled by a spiking neural network
16-45 – 17-15:	Viktor Kazantsev, Mathematical and computational models of plasticity and learning in spiking neuronal networks (SNN)
17-15 – 18-30:	*Round table discussion*