



The Ioffe Institute is one of Russia's largest institutions for research in physics and technology with a wide variety of operating projects. It was founded in **1918** and run for several decades by **Abram F. Ioffe**. The Institute is affiliated with the **Russian Academy of Sciences**.

Structure

- Centre of Nanoheterostructure Physics
- Division of Solid State Electronics
- Division of Solid State Physics
- Division of Plasma Physics, Atomic Physics and Astrophysics
- Division of Physics of Dielectric and Semiconductors

Publishing

The Ioffe Institute is a founder of the four physical journals:

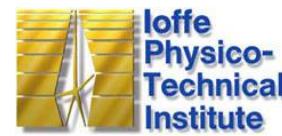
"Fizika Tverdogo Tela",

"Fizika i Tekhnika Poluprovodnikov",

"Zhurnal Tekhnicheskoi Fiziki",

"Pis'ma v Zhurnal Tekhnicheskoi Fiziki".

Neurophysics in Ioffe Institute



Collaborators:

- *Lab. of Neurophysics and Physiology, University Paris Descartes*
- *Dpt. of Neurodynamics and Neurobiology, University of Nizhny Novgorod*

Research directions:

• **Single neuron models**

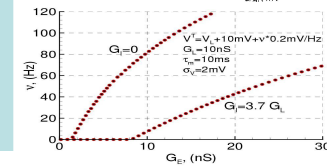
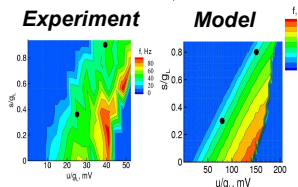
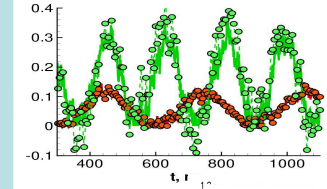
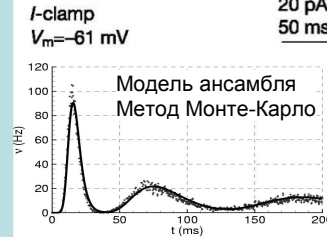
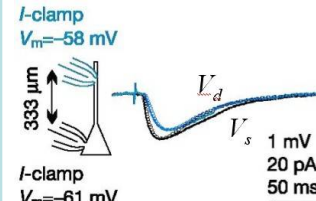
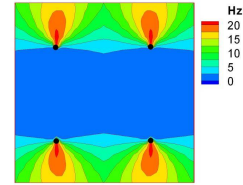
- Two-compartmental neuron
- Rate-current-conductance function
- Divisive effect
- Electrically coupled neurons

• **Neuronal population models**

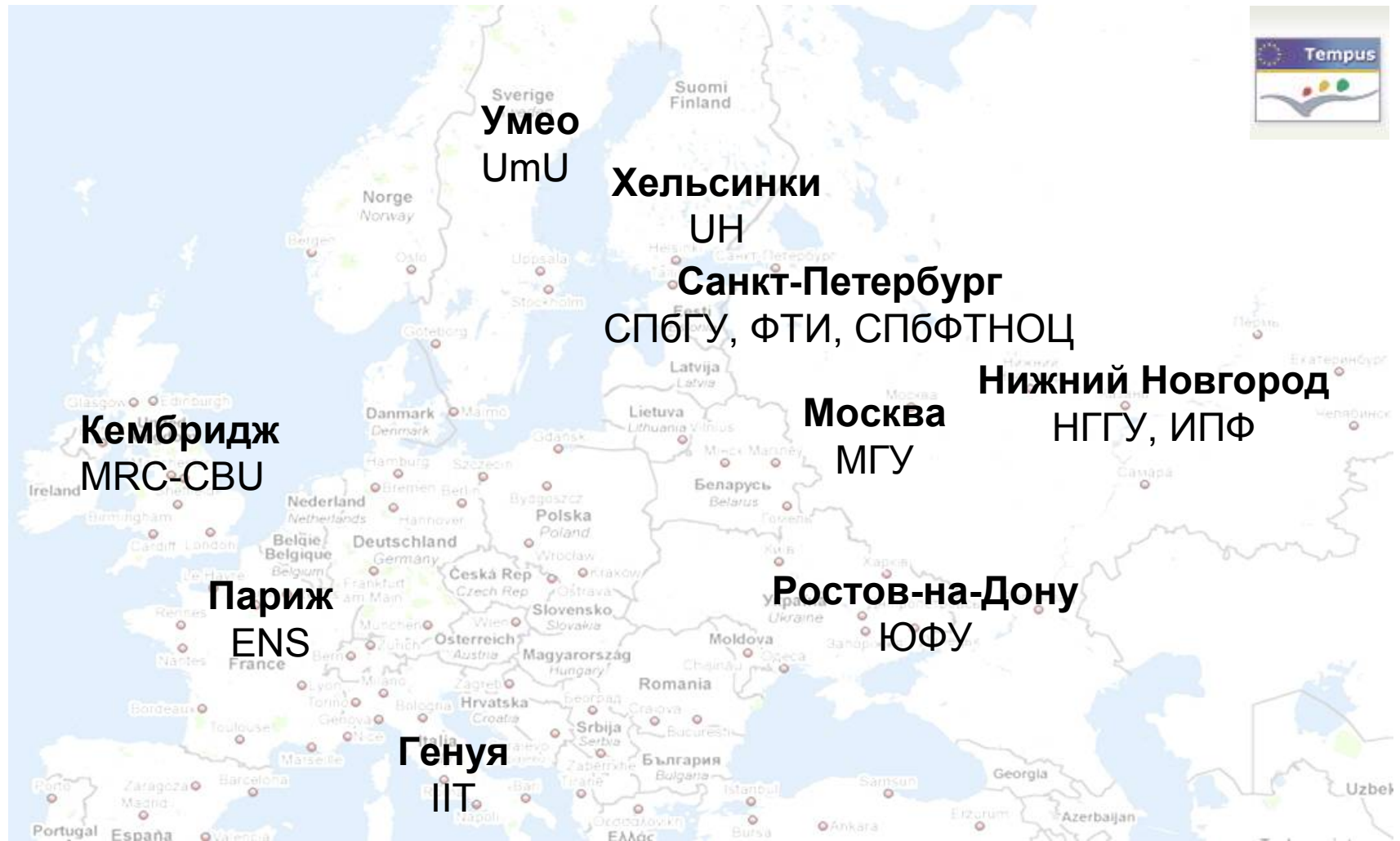
- Theory of single population modeling
- “Artificial slice” simulator
- Visual cortex model

• **Model-based experimental protocols**

- Excitatory and inhibitory conductance estimation in-vivo
- Patch-clamp recordings’ artifacts’ compensation in-vivo
- Spike initiation study in-vivo and in-vitro



“Postgraduate Training Network in Biotechnology of Neurosciences (BioN)”
(Tempus, 2010 - 2012)



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The Institute is affiliated with the **Russian Academy of Sciences**. Traditionally, the Ioffe Physical-Technical Institute of RAS is aimed on both the fundamental studies in physics and implantation of the knowledge in physics to multidisciplinary sciences and technologies, including medicine and biology. For example, the Center of Nanotechnologies for Biology and Medicine has been recently created, which unites a few research institutes in St.Petersburg.

The Ioffe Institute contributes in biotechnologies, and in particular, in neuroscience, carrying out both the fundamental studies in theoretical neuroscience and the design of nanotechnologies providing a technical background for already developing and future brain-computer-interface (BCI) systems. In the light of rapidly growing interest to neurotechnologies in vision, a group of the Computational Physics Laboratory of the Ioffe Institute carries out the research on visual system together with french CNRS laboratory at the University Descartes in Paris.

The Ioffe Institute will contribute to the BioN project by providing teaching, particularly in the nanobiotechnologies and computational neuroscience, and by offering its expertise, supervision, and facilities for carrying out research work by some enrolled students.