

## SESIONES CIENTÍFICAS DEL CTB VIERNES 24 DE JULIO DE 2015

### **SPEAKER: Prof. Vyacheslav Fedorov**

**Vyacheslav Fedorov** is Full Professor at the Novosibirsk Technical University, Doctor in Biological Science and Director of the Laboratory of Biophysics at the Institute of Laser Physics, Russia. He is a well-known specialist on a system approach to physiology, the author of more than 100 papers and academic monographs on physiological cybernetics. Prof. Fedorov was born in 1941 in Saratov. He received two high educations, first from the Saratov Medical University and then from the Novosibirsk State University, where he studied human and animal physiology. Since 1967 he has been working in the Novosibirsk Academic City. His main research interests are robustness of biological systems, control of organism systems, and biological effects of THz radiation.

### **"Main principles of neural system organization"**

Prof. V. I. Fedorov

The first part of the presentation deals with a hierarchical division of complex physiological processes to elementary. The hierarchy of a control system is presented as: the elementary control unit - functional ensemble - functional system. We consider the fundamental organization of a neuron as an elementary control unit, and partial contributions of individual input elements to a change in the neuron state. We describe the role of stereochemical matching neurotransmitter and receptor in signal transduction, and the neuron dynamics under the influence of control signals. We emphasize the importance of the convergence of inputs for a space-time analysis of incoming information. Finally, a neural network is considered as a functional dynamical system.

The second part deals with the general structure of the neural control of complex physiological processes and features of the motor and autonomic regulators.