



Ομιλητής: Prof. Metin Akay

Τίτλος ομιλίας: Advanced Technologies for Human Brain Initiatives

Περίληψη ομιλίας:

Neural Engineering is a new discipline which unites engineering, computer science, physics, chemistry, and mathematics with cellular, molecular, cognitive and behavioral neurosciences, to understand the organizational principles and underlying mechanisms of the biology of neural systems, and to study the behavior dynamics and complexities of neural systems in nature. Therefore, it deals with many aspects of basic and clinical problems associated with neural dysfunction including the representation of sensory and motor information, the electrical stimulation of the neuromuscular system to control the muscle activation and movement, the analysis and visualization of complex neural systems at multi-scale from the single-cell and to the system levels to understand the underlying mechanisms, the development of novel electronic and photonic devices and techniques for experimental probing, the neural simulation studies, and the design and development of human-machine interface systems and artificial vision sensors and neural prosthesis to restore and enhance the impaired sensory and motor systems and functions from gene to system.

Furthermore, the neuroscience has become more quantitative and information-driven science since emerging implantable and wearable sensors from macro to nano and computational tools facilitate collection and analysis of vast amounts of neural data. Complexity analysis of neural systems provides physiological knowledge for the organization, management and mining of neural data by using advanced computational tools since the neurological data are inherently complex and non-uniform and collected at multiple temporal and spatial scales. The investigations of complex neural systems and processes require an extensive collaboration between biologists, mathematicians, physicists, computer scientists and engineering to improve our understanding of complex neurological process from system to gene.

To highlight this emerging discipline, we devote this talk to the recent advances in neural engineering research and education.