國家理論科學研究中心數學組（臺北辦公室）

IAMS / NCTS-TPE Applied Math Seminar

Speaker: **Tsung-Ren Huang (Department of Psychology, Neurobiology and Cognitive Science Center, National Taiwan University)**

Title: **Computational cognitive neuroscience: From neurons to behavior**

Abstract:

How does the brain control behavior? What do neural circuits compute? The field of cognitive neuroscience is thriving thanks to advances in neuroanatomy, neurophysiology, neuroimaging, and cognitive psychology. Given the rich set of empirical observations aggregated from these fields, an emerging challenge is to provide a unified theory that relates different levels of analysis, explaining how neural systems in the brain give rise to intelligent human behavior.

Computational cognitive neuroscience addresses the above questions by studying neural representations and mechanisms from a theoretical perspective. It can offer new insights beyond brain-behavior correlations. One example is the application of machine learning/pattern recognition techniques to brain data for understanding neural representations and for developing brain-computer interfaces. Another example is the class of neural models that construct system-level architectures from the first principles, such as local computation and competitive normalization. These computational models can quantitatively simulate cognitive functions using plausible neural mechanisms and explain seemingly conflicting data in a coherent framework.

In this presentation, differences among computational approaches in (cognitive) neuroscience will be contrasted. The past, present, and future of computational cognitive neuroscience will also be discussed.

Time: **Nov. 21 (Fri.) 13:20 – 14:20**

Venue: **R202, Astro-Math Building (NTU Campus)**

Organizer: **Jenn-Nan Wang (NTU)**

For more information, please refer to http://www.cts.ntu.edu.tw/.