Session 4: Dynamical Systems

Date: January 24, 2019

Venue: Knowledge Theater in Grand Front Osaka

"Emerging Interactions Yielding Functional Differentiation"

Ichiro Tsuda (Chubu University)

In conventional studies of self-organization, variational principles have been adopted to yield macroscopic spatio-temporal patterns via molecular interactions at microscopic levels. Such a theory successfully explains how macroscopic ordered motion could appear in far-from equilibrium systems. On the other hand, living organisms have evolved to represent functions via constraints stemming from environments. We have studied how constraints acting on a whole system yield functional differentiations at elementary levels of the system. The study suggests the construction of self-organizing machines that adopt to variable environments via functional differentiation of the elements.

"Building Neurotechnological Complexity from the Ground Up"

Emmanuelle Tognoli (Florida Atlantic University)

Knowledge of the neurobehavioral mechanisms of teamwork is important for the design of human-machine systems that augment each other's capabilities informationally and physically. I will describe efforts to discover the neurophysiological mechanisms supporting social coordination. I will also present converging paths to developing multiscale neuro-computational models for socially coordinating agents.