

**Field:**

*Medical/Neuroscience*

**Session Topic:**

*Synthetic Biology*

**Introductory Speaker:**

*Daisuke KIGA, Tokyo Institute of Technology*

In various fields of biology, analytical approach has been adopted to accumulate knowledge of life. Recent progress in large-scale efforts such as genome analysis, as well as development in preparation of biomolecules, allows us research by synthetic approaches, where we can realize another combination of biological “parts” found in nature; not only chemically-synthesized DNA fragments, but also artificial clusters of tens of genes can be ordered as a commodity. Such constructions of new combinations are spread among each layer of living-system; new combinations of amino acids, genes, and cells lead construction of a novel protein, a genetic network, and an artificial tissue, respectively, for many applications. Synthetic approach also enables “proof-by-synthesis” of living system. In the construction where a natural function was emulated or expanded, concepts from modern engineering based on mathematical modeling have important roles because of combinatorial explosion of the parts. Such “biology by engineering”, moreover, requires and establishes new modeling concepts where stochastic noise in micro/nano scale reaction has important role. In this session, we will focus on a modeling concept and micro fabrication in recent synthetic biology.