

RONDELEZ LAB.

[*in vitro* reaction network using DNA]

Center for International Research on MicroNano Mechatronics

<http://www.cirmm.iis.u-tokyo.ac.jp>

Biomolecular Microengineering

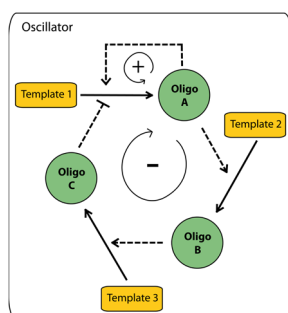
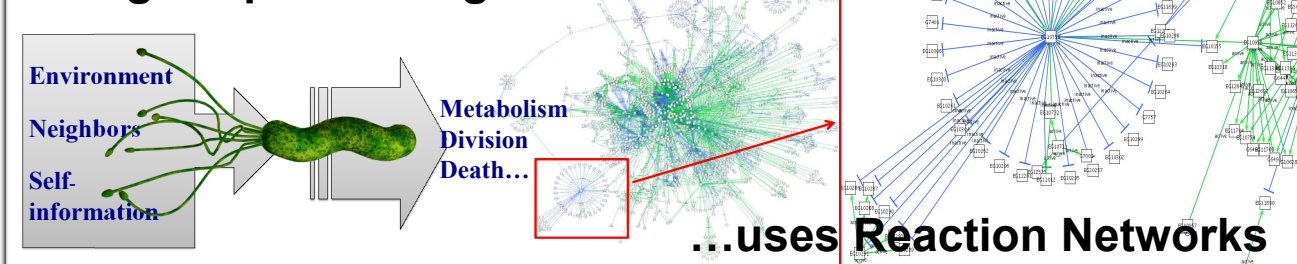
Complex *in vitro* behaviors

Construction of Dynamic and Complex Functions by *in vitro* reaction network using biomolecules

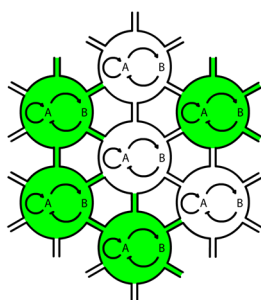
Networks of interacting chemical reactions can lead to very complex behaviors, the ultimate example being life itself. For example, inside live cell Gene Networks can be arranged into switches, gates, memory element or oscillators. We want to build such dynamic systems, but in a artificial (*in vitro*) settings. To do this, we explore both homogeneous systems and more complex setups where diffusion and transport become key factors.

DNA isothermal amplification reaction
Molecular programming
Chemical oscillations and multistability
Molecular ecosystems
Spatially distributed systems

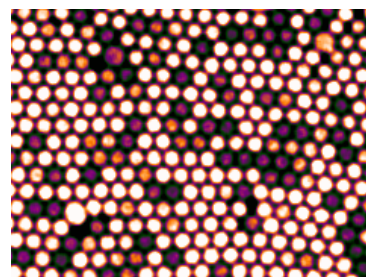
Biological processing of information...



Topology of a biochemical oscillator



Microfluidic network of reaction networks



Array of oscillating droplets