

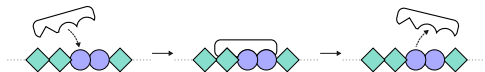
# Functional dynamics in out-of-equilibrium allosteric assemblies

**Molecular complex** made of

- identical subunits
- thermodynamically consistent
- local interactions

futile cycles synchronize into edge currents

## Molecular Automata



enzyme  $E + \cdots i0j \cdots \xrightleftharpoons[r_{E,1 \rightarrow 0,i,j}]{r_{E,0 \rightarrow 1,i,j}}$  changed  $E + \cdots i1j \cdots$

$$r_{E,0 \rightarrow 1,i,j} = K_{E,i,j} \frac{\exp(\beta \mu_E)}{\exp(\beta \mu_E) + 1}$$

$$r_{E,1 \rightarrow 0,i,j} = K_{E,i,j} \frac{1}{\exp(\beta \mu_E) + 1}$$

Memory  
Computation  
Error correction

