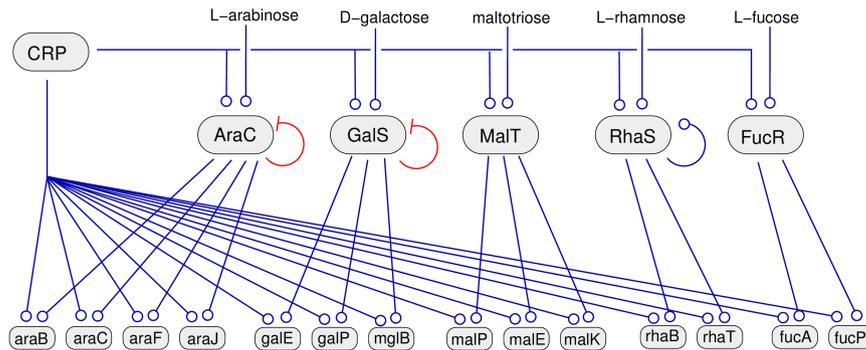# Outlook: What has been left out?
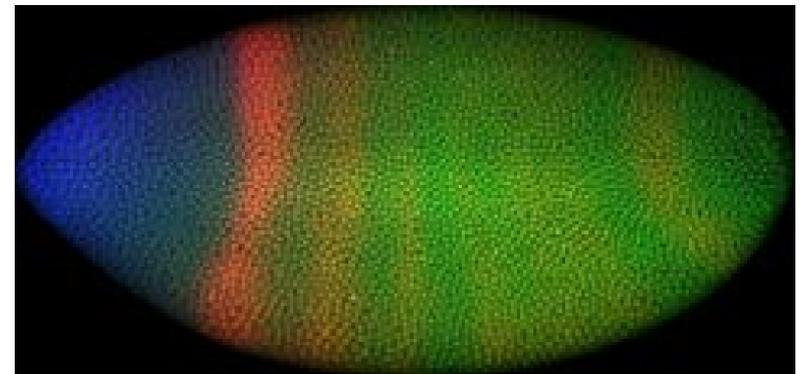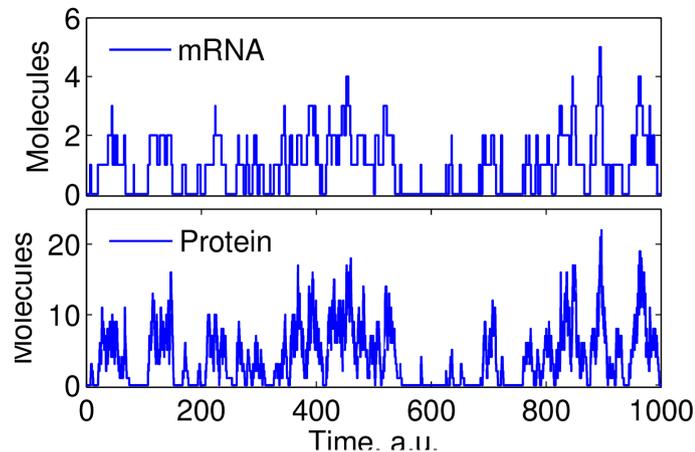
What is missing in our picture of cells?

General concerns with our models

- Shortcomings of the models described
- Other types of models (Boolean, stochastic, spatial, ..)

What other aspects of cells
have been left unconsidered?

What is missing in our picture of cells?

Higher-level tasks of cells

- Optimal temporal behaviour (e.g., in switches or cycles)
- Optimal anticipation of uncertain events
- Rate vs yield optimality
- Multi-objective optimality ("Pareto" optimality)
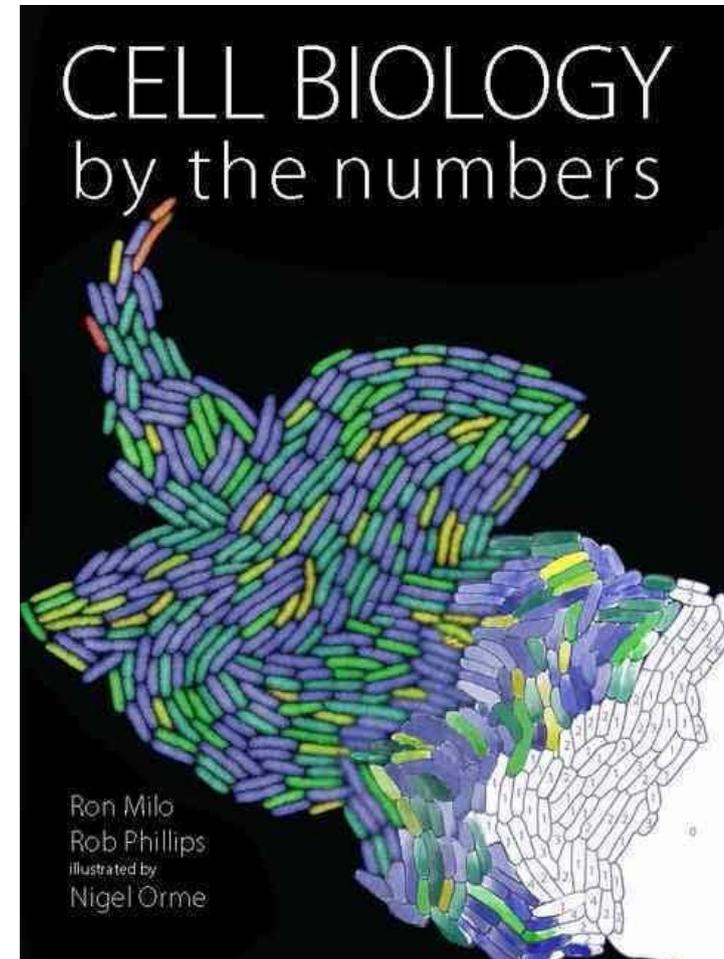- (apparent) non-optimality, reasons for non-optimality

Relation between optimality and evolution

- Evolution defines the objectives!
- Optimal population behaviour (evolution vs switching)
- Fitness objectives and evolution scenarios
- Evolutionary game theory (again, rate-yield trade-off)
- Evolution in the lab

Book recommendations
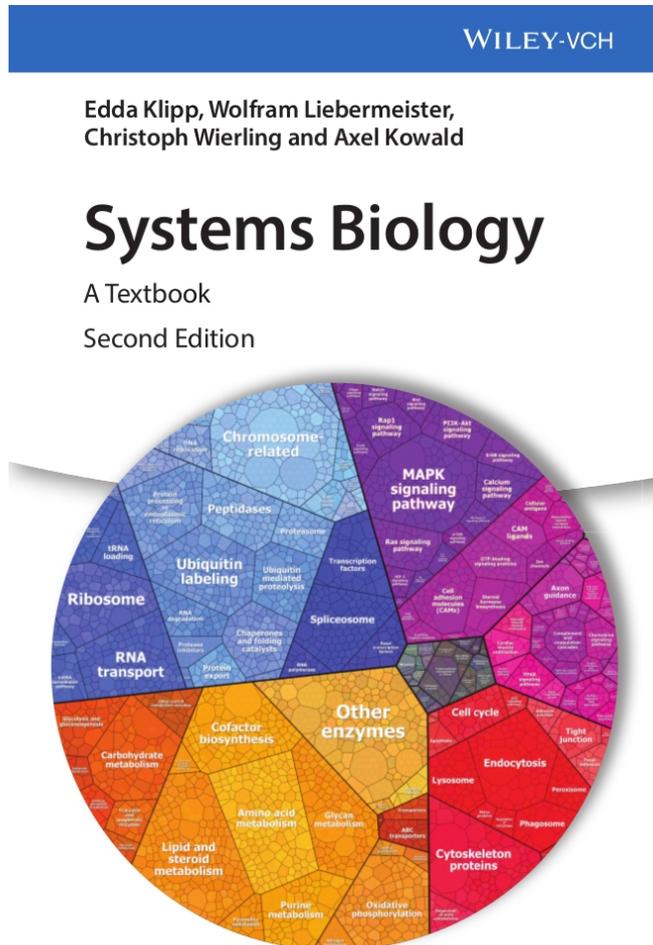
Klipp et al. - Systems biology

Milo and Phillips – Cell biology by the numbers

Thank you !