



Seminar/Talk

Mathematical models of organelle size control and scaling

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Host: Carl Goodrich

Why do organelles have their particular sizes, and how does the cell maintain them despite the constant turnover of proteins and biomolecules? To address this fundamental biological question, we formulate and study mathematical models of organelle size control rooted in the physicochemical principles of transport, chemical kinetics, and force balance. By studying the mathematical symmetries of competing models, we arrive at a hypothesis describing general principles of organelle size control. In particular, we consider flagellar length control in the unicellular green algae *Chlamydomonas reinhardtii*, and develop a minimal model in which diffusion gives rise to a length-dependent concentration of depolymerase at the flagellar tip. We show how noise may be used to fit model parameters and explain how similar principles may be applied to other examples of organelle size and scaling such as the ratio of nucleus to cell volume.

Thursday, October 2, 2025 11:00am - 12:00pm

Mondi Seminar Room 2, Central Building



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