

## Module 3: Activator-Inhibitor

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Aim:

- Introduce self-organized pattern formation (Turing patterns)
- Show the potential of qualitative/theoretical modeling

Description:

- Activator-Inhibitor models
- Theoretical introduction on Turing patterns (1951)
- Self-organized organizer
- large system size = periodic pattern
- change inhibitor diffusion and observe changing pattern wavelength
- half-wavelength system size and no flux bc. = spontaneous symmetry break of homogeneous init.cond. with max and min at opposite boundaries
- Fish coat pattern:
  - Miyazawa et al.
- Trigger discussion:
  - Parameters and variables do no longer correspond to molecules anymore
  - What is the explanatory power of 'blending model'?
  - Bottom-up, top-down, middle-out

Paper:

- Miyazawa, Okamoto and Kondo, Blending of animal colour patterns by hybridization, Nature Communications, 2010. [link](#)

Morpheus models:

[Activator-Inhibitor: reaction-diffusion in one dimension](#)

[Turing patterns: spatial parameter exploration](#)

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