Analysis of non-autonomous systems of reaction-diffusion equations on growing domains: The effects of domain growth and linear cross-diffusion

Anotida Madzvamuse

Abstract: In many biological applications, domain growth plays a crucial role during pattern development and pattern formation is normally described by a system of reaction-diffusion equations. Modelling domain growth during development within the reaction-diffusion paradigm for pattern formation generally results in non-autonomous systems of semi-linear parabolic partial differential equations whose analysis is not trivial. Furthermore, cross-diffusion has been shown experimentally to enhance the generality of reaction-diffusion theory. In this talk, I will present recent advances on the analysis of non-autonomous systems of reaction-diffusion equations with linear cross-diffusion posed on domains that evolve or change in time. The analytical results demonstrate that domain growth enhances the robustness of pattern formation, while cross-diffusion allows you to consider non-standard pattern formation models, thereby offering biologists alternative experimental models to study pattern formation during growth development.

Affiliation: University of British Columbia, Mathematics Department, Vancouver, Canada

e-mail : am823@math.ubc.ca