MSc project

Synchrony and persistence of populations in river networks

We are looking for an enthusiastic MSc student who will be working on the development and testing of metapopulation models in river networks. The project involves extensive computational tasks and is part of a larger research program (based in the Altermatt lab at Eawag/UZH).

Background
River ecosystems promote the persistence of species by favoring spatial dynamics among branches, in which synchrony plays a major role. Yet, our understanding of how network topology influences population synchrony in these ecosystems remains limited. This project builds on a model of virtual constructs reproducing the topology of river networks (so-called Optimal Channel Networks - OCNs), and aims to identify the drivers of species persistence in river networks.

Aim
Development of a mechanistic model for a riverine population in an OCN, and assessment of synchrony/persistence dynamics as a function of habitat and species dispersal characteristics. This is a fully simulation-based study.

Requirements
Interest in ecological modelling, programming skills (R language), robust mathematical background.

Starting date
Any time.

Contact/Supervision
Prof. Dr. Florian Altermatt (florian.altermatt@ieu.uzh.ch), University of Zürich and Eawag Dübendorf;
Dr. Luca Carraro (luca.carraro@eawag.ch, day-to-day supervisor)

References
Carraro, L., Bertuzzo, E., Fronhofer, E. A., Furrer, R., Gounand, I., Rinaldo, A., & Altermatt, F. (2020). Generation and application of river network analogues for use in ecology and evolution. *Ecology and Evolution*, 10(14), 7537-7550. https://doi.org/10.1002/ece3.6479
Jacquet, C., Carraro, L., & Altermatt, F. (2021). Meta-ecosystem dynamics drive the spatial distribution of functional groups in river networks. *bioRxiv*. https://doi.org/10.1101/2021.06.04.447105