

## Title: **Shifting paradigms: Emerging ideas from freshwater research in Latin America**

The three papers featured in this BRIDGES cluster address some of the challenges and limitations surrounding the application of models and conceptual frameworks developed for watersheds in the Global North to river systems in Latin America, where ecological and socioeconomic conditions differ significantly. In each paper, the authors consider ideas that were developed in the Global North and how they have been applied to understanding the structure and function of lotic systems in Latin America. The authors offer recommendations for enhancing freshwater research in Latin America by promoting greater coordination with water management efforts. Key points include:

- Many of the models and conceptual frameworks (MCFs) developed for and used in freshwater research were originally proposed, developed, tested, and validated in the Global North (i.e., Western Europe, the United States, and Canada). While these MCFs can be a useful starting point for evaluating freshwater systems in other regions, it is important to evaluate them critically before applying them to regions with different ecological and socioeconomic contexts than where they were originally developed (Gutiérrez-Fonseca and Tagliaferro, 2023).
- One of the major limitations in monitoring freshwater ecosystems using bioindicators in Latin America is the need for accurate recognition of local biota and the development of open databases. There is a need to enhance biomonitoring standards in Latin America by advancing knowledge of the aquatic biodiversity in the region. To protect the ecological quality of freshwater systems in Latin America, researchers must engage with decision-makers to develop region-specific and innovative management tools (Cortelezzi and Paz, 2023).
- The urban stream syndrome is a MCF developed using evidence from high-income countries in the Global North. However, it remains unclear to what extent this MCF applies to low and middle-income countries in Latin America, which often lack sufficient sanitation infrastructure. Future urban stream research in Latin America could fill important knowledge gaps by prioritizing studies on the effects of untreated wastewater and stormwater on urban hydrological regimes, identifying critical loads of wastewater-derived resources and pollutants, and evaluating the impact of these constituents on the ecology and evolution of biota (Marques and Cunico, 2023).

### *About the Authors*

**Pablo E. Gutiérrez-Fonseca** is a Lecturer at the University of Vermont. Pablo studies how tropical freshwater ecosystems respond to natural extreme events and how anthropogenic activities are affecting aquatic ecosystem function and structure in the tropics. **Marina Tagliaferro** is an Assistant Researcher at the Institute of Diversity and Animal Ecology (IDEA) - National Scientific and Technical Research Council (CONICET- Argentina). Marina studies structural and ecotoxicological responses to anthropogenic disturbances in aquatic organisms.

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**Piatã Marques** is an Assistant Professor at the State University of New York at Buffalo. Piatã studies urban disturbances and the intersection between ecology, evolution, and people in aquatic systems. **Almir Cunico** is an Associate Professor at the Federal University of Paraná (Brazil). Almir's research focuses on the ecology of freshwater fish in aquatic habitats affected by human activities.