UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

Department of Mathematics and Statistics

Graduate Student Opportunity – Master in Applied Mathematics

Supervised by:

Dr. Chunyi Gai (Mathematics & Statistics) in collaboration with Prof. Jianbing Li (Environmental Engineering), UNBC

Program Overview

We are seeking one highly motivated Master student in Applied Mathematics to join a dynamic, interdisciplinary research team at the University of Northern British Columbia (UNBC).

This project focuses on the mathematical modeling and analysis of reaction–diffusion systems, with a particular emphasis on emergent patterns in mathematical biology and ecological dynamics. Key applications include modeling plankton and wetland dynamics, incorporating interactions among nutrients, phytoplankton, and zooplankton.

The mathematical frameworks and computational techniques explored in this project are highly versatile and extend well beyond environmental engineering. These methods have broad applicability in fields such as:

- **Public health and epidemiology** – modeling the spread of infectious diseases or tracking the diffusion of contaminants
- **Neuroscience** – simulating signal propagation in neural networks
- **Material science** – understanding phase separation, chemical pattern formation, and diffusion in composite materials
- **Agriculture** – optimizing crop growth patterns under variable environmental conditions
- **Climate science** – modeling heat transfer, pollutant dispersion, and large-scale pattern formation in the atmosphere or oceans

The successful candidate will develop advanced skills in both analytical and numerical methods, including bifurcation analysis and stability theory, with exposure to deterministic and stochastic influences on complex systems. The research has significant real-world applications in industrial wastewater treatment, wetland restoration, and a wide range of other scientific and societal domains.

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Required Background

- Bachelor's degree in applied mathematics or a closely related field
- Strong foundation in differential equations and mathematical modeling
- Enthusiasm for connecting mathematical theory to practical solutions in real-world contexts

Preferred Background

- Experience with MATLAB, Python, or similar scientific computing tools (asset but not required)

Position Details

- **Start Date:** Flexible — January, July, or September 2026
- **Duration:** Typically, 1.5 to 2 years to complete
- **Location:** Prince George, BC (program is delivered in-person at UNBC's Prince George campus)
- **Funding:** Graduate funding may be available and may be supplemented through **Teaching Assistant (TA)** or **Research Assistant (RA)** positions. TA positions are competitive and awarded based on qualifications, availability, and departmental needs.

Why Join Us?

- **Interdisciplinary mentorship:** Work directly with faculty experts in mathematics and environmental engineering.
- **Strong real-world impact:** Your work could inform environmental management, public health strategies, and technological innovation.
- **Skill building:** Gain transferable expertise in computational modeling, data analysis, and problem solving.

- **Professional development:** Opportunities to present at conferences, publish in peer-reviewed journals, and collaborate with government, industry, and research institutions.

About UNBC & Prince George, BC

Located in the spectacular landscape of northern British Columbia, the University of Northern British Columbia (UNBC) is recognized as one of Canada's best small universities, known for excellence in teaching, research, and community engagement. As one of BC's research-intensive institutions, UNBC is especially committed to applied research that addresses local and global challenges.

At the heart of UNBC is a welcoming, inclusive, and supportive learning environment that fosters purpose, adventure, and community connection. Proudly known as Canada's Green University™, UNBC champions sustainability in both research and campus life.

The Prince George campus, located on the unceded traditional territory of the Lheidli T'enneh, sits atop a scenic hill overlooking the city and the foothills of the Rockies. Prince George is a vibrant regional hub — often called the "northern capital" of BC — offering an affordable cost of living, thriving arts and culture, year-round outdoor recreation, and a strong sense of community.

How to Apply

If you are interested in this opportunity, please send the following to Dr. Chunyi Gai at *chunyi.gai@unbc.ca*:

1. A short letter of interest outlining your background, relevant skills, and motivation for joining this project
2. Your CV
3. An unofficial transcript

Review of applications will begin immediately and continue until the position is filled.

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After an initial discussion, applicants with mutual interests will be invited to submit a formal application to the UNBC Office of Graduate Studies: UNBC Graduate Studies Application Portal.

We welcome applicants from diverse backgrounds and perspectives, particularly those from groups traditionally underrepresented in STEM.