

Christopher Heggerud

University of Alberta - Department of Mathematical and Statistical Sciences

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Education

University of Alberta [Edmonton, Alberta]

September 2015 - Present

Ph.D candidate in Applied Mathematics, transferred directly from the Master of Science program in September 2016.
Supervised by Dr. Mark Lewis & Dr. Hao Wang.

Ryerson University [Toronto, Ontario]

September 2011 – April 2015

Bachelor of Science with honors in Applied Mathematics with a minor in Medical Physics. Supervised by Dr. Kunquan Lan

University of Alberta- Augustana Campus [Camrose, Alberta]

September 2010 – April 2011

Studied one year of Math and Physics.

Awards

Alberta Graduate Excellence Scholarship

2020

University of Alberta

Society of Mathematical Biology - Travel Grant

2019

University of Alberta

Faculty of Graduate Studies and Research - Travel Award

2019

University of Alberta

Alberta Innovates - Graduate Student Scholarship

2017/2018

Held at the University of Alberta.

NSERC [Canadian Graduate Scholarship - Masters]

2015/2016

Held at the University of Alberta.

Walter H. Johns Graduate Fellowship

2015

University of Alberta

Dennis Mock Student Leadership Award

2015

Ryerson University

C.Roy Horney Award

2014

Ryerson University

Paul and Anna Maria Bonato Scholarship

2014

Ryerson University

NSERC [Undergraduate Student Research Award]

2013 & 2014

Held at Ryerson University.

Howard Kerr Memorial Scholarship

2013

Ryerson University

Math Faculty Scholarship

2012

Ryerson University

Research Experience

University of Alberta [Research Assistant]

September 2015 – Present

NSERC [Undergraduate Student Research Award]

Summer 2014

Supervised by Dr. Kunquan Lan a Ryerson University Math Department researching new methods of analyzing predator-prey models and disease models. This project was extended to be part of my Undergraduate Thesis.

NSERC [Undergraduate Student Research Award]

Summer 2013

Supervised by Prof. Dejan Delic of the Ryerson University Math Department in research areas related to graph theory.

Supervising

Co-supervisor [BIOL 498]

Winter 2019

Co-supervised Daniel Jin for their biology undergraduate research project (BIOL498) at the University of Alberta.

Co-supervisor [MITACS internship]

Fall 2019

Co-supervised Julian Pavón García from Eberhard Karls University of Tübingen who was visiting with a MITACS Globalink Research Internship.

Publications

C. M. Heggerud, H. Wang, M. A. Lewis, Transient dynamics of a stoichiometric cyanobacteria model via multiple-scale analysis.

SIAM Journal of Applied Mathematics 80 (3), 1223–1246 (2020).

C. M. Heggerud, K.Q. Lan, Local stability analysis of ratio-dependent predator-prey models with predator harvesting rates.

Applied Mathematics and Computation 270: 349-357 (2015)

A. Peace, P. C. Frost, N. D. Wagner, M. Danger, C. Accolla, P. Antczak, B. W. Brooks, D. M. Costello, R. A. Everett, K. B. Flores, **C. M. Heggerud**, R. Karimi, Y. Kang, Y. Kuang, J. H. Larson, T. Mathews, G. D. Mayer, J. N. Murdock, C. A. Murphy, R. M. Nisbet, L. Pecquerie, N. Pollesch, E. M. Rutter, K. L. Schulz, J. T. Scott, L. Stevenson, H. Wang, Stoichiometric Ecotoxicology for a Multisubstance World.

BioScience: biaa160, <https://doi.org/10.1093/biosci/biaa160> (2021).

C. M. Heggerud, K.-Y. Lam, H. Wang, Coexistence of phytoplankton species based on niche differentiation in absorption spectrum.

In preparation.

H. Wang, P. V. Garcia, S. Ahmed, **C. M. Heggerud**, A mathematical comparison of the Monod and Droop forms for resource based population dynamics.

In preparation.

C. M. Heggerud, H. Wang, M. A. Lewis, Coupling the socio-economic and ecological dynamics of cyanobacteria

In preparation.

J. Xu, P. Ramazi, **C. M. Heggerud**, M. A. Lewis, R. Zurawell, C. Loewen, R. Vinebrooke, H. Wang, A Bayesian network approach to understanding and predicting cyanobacteria blooms.

In preparation.

Talks

Coupling the socio-economic and transient ecological dynamics of cyanobacteria.

February 2021

Invited seminar talk at Texas Tech University. (online)

Coupling the socio-economic and ecological dynamics of cyanobacteria.

January 2021

Invited talk at the BIRS workshop: Mathematics of Human Environmental Systems. (online)

Coupling the socio-economic and ecological dynamics of cyanobacteria. August 2020

Invited talk at the Mathematical Biosciences institute meeting: Life on Planet Earth: Above and Below. (online)

Modeling Cyanobacteria: Transient and social-ecological dynamics. January 2020

Invited seminar talk hosted by Dr. Rebecca Tyson at the University of British Columbia Okanagan.

Transient dynamics of a stoichiometric cyanobacteria model October 2019

Contributed talk at the Seventh International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA VII) at Arizona State University

Multiple-scale analysis of a stoichiometric cyanobacteria model with phosphorus impulses July 2019

Presentation in the mini symposium, "Resource explicit population models", during the 2019 annual Society of Mathematical Biology meeting at the Université de Montréal.

Perturbation Theory July 2019

Invited lecture for the International Undergraduate Summer Enrichment Program (IUSEP).

Multiple-scale analysis of a stoichiometric cyanobacteria model with phosphorus impulses June 2019

Contributed talk at Levin Fest (A symposium at the intersection of mathematics and biology to celebrate the conferral of UVic Honorary Doctor of Science to Dr. Simon Levin) at the University of Victoria.

Stoichiometric Modeling and Multi-Scale Dynamics of Cyanobacteria July 2018

Conference presentation at the 6th Butler memorial conference on Differential Equations and Population Dynamics at the University of Alberta.

Stoichiometric Modeling and Multi-Scale Dynamics of Cyanobacteria June 2018

Conference presentation at the 2018 annual CAIMS meeting hosted by Ryerson University.

Ratio-Dependence in Predator Prey Dynamics February 2015

First talk of the Undergraduate Mathematics Seminar series at Ryerson University.

Academic and Professional Activities

Investigative Workshop on Stoichiometric Ecotoxicology [NIMBioS- Knoxville Tennessee] January 2018

BIRS Workshop: Mathematics of Human Environmental Systems. January 2021

Teaching

University of Alberta [Teacher's Assistant] September 2015 – Present

Instructing Labs:

MATH 201 (Differential Equations) - Fall 2015/Winter 2016/Fall 2016/Winter 2017

Math 100 (Calculus I) - Fall 2018

MATH 102 (Applied Linear Algebra) - Winter 2019

Grading:

MATH 201 (Differential Equations) - Spring/Summer 2016

MATH 334 (Introduction to Differential Equations) - Fall 2017

Decimal Robinson Support Centre: Fall 2015 - Winter 2019

Ryerson University [Teacher's Assistant] September 2014 – April 2015

Instructing Labs:

MATH 131 (Modern Mathematics I) - Fall 2014/Winter 2015

The Math Guru [Tutor] January 2014 – April 2015

Tutored students of all levels ranging from grade 8 math to first year university math and statistics.

Other Relevant Activities

Department of Mathematical and Statistical Sciences Math Outreach

Fall 2015 - Present

Volunteer in math outreach at various events, such as "Dark Matters" at the Telus World of Science in Edmonton, Alberta.

Math Fair & Unfair

Fall 2015 - Present

Assisted in the University of Alberta event for elementary and junior high aged students, encouraging interest in mathematics through games and other activities.

Ryerson Undergraduate Mathematics Seminars

2014/2015

Co-founder and organizer for the seminars aimed to give undergraduate students experience in seminar presentation skills, as well as give students the opportunity to engage in Mathematics research.

Ryerson Mathematics Course Union [President]

2014/2015

Elected by a group of my peers as president in May 2014. My role was to create a community for Undergraduate students in the Mathematics program at Ryerson. I ran several successful events that helped students with academic issues and created a positive social atmosphere within the program.

Ryerson Science Society [Director]

2014/2015

Sat on the board of directors as the Ryerson Mathematics representative where we managed, monitored and oversaw affairs within the Ryerson Science Society.

Undergraduate Mathematics Curriculum Advising Committee [Student Representative]

2014

Acted as a Student representative to make sure the students voices are heard at the meetings, and to provide input to the faculty members involved.