Dr. Yurij Salmaniw

Mathematical Institute
University of Oxford
Oxford, England
OX2 6GG

Academic email: yurij.salmaniw@maths.ox.ac.uk
Personal email: yurij_salmaniw@hotmail.com
Website: salmaniw.com
Office: S4.23

EDUCATION

Doctor of Philosophy, 2018 – 2023
University of Alberta, *Edmonton, Alberta*   Major: Applied Mathematics

Thesis: "*Global dynamics of diffusive animal movement models*   Advisors: Dr. Hao Wang, Dr. Zhongwei Shen
under habitat degradation, destruction, and fragmentation:
eigenvalue problems and geometry at the landscape scale"

Master of Science, Thesis stream, 2016 –2018   Major: Applied Mathematics
McMaster University, Hamilton, Ontario   Advisors: Dr. Lia Bronsard, Dr. Stanley Alama

Thesis: "*Existence and Regularity of Solutions to Some*
Singular Parabolic Systems"

Bachelor of Science with Honours, 2012 – 2016   Major: Mathematics
Cape Breton University, Sydney, Nova Scotia   Advisor: Dr. Shaohua Chen

Thesis: "*Global Existence for a Singular General Activator-Inhibitor Model*"

PUBLICATIONS

Published & accepted

- *Fundamental principles on the effect of habitat fragmentation on species with different movement rates.* (Accepted 2024 – Conservation Biology). (With J. Jacobs, K.-Y. Lam, L. Zhai, H. Wang & B. Zhang)
- *Steady-state bifurcations of a diffusive–advective predator–prey system with hostile boundary conditions and spatial heterogeneity.* Z. Angew. Math. Phys. 75 (2024), no. 4, Paper No. 124. (With D. Liu, H. Wang & W. Jiang)
- *Threshold dynamics of a reaction-advection-diffusion schistosomiasis epidemic model with seasonality and spatial heterogeneity.* J. Math. Biol. 88 (2024), no. 6, Paper No. 76, 36 pp. (With P. Wu & X. Wang)
- *Open problems in PDE models for knowledge-based animal movement via nonlocal perception and cognitive mapping.* J. Math. Biol. 86, 71 (2023). (With H. Wang)
- *Global dynamics of a diffusive competition model with habitat degradation.* J. of Math. Biol., 84 (2022), No. 18. (With Z. Shen & H. Wang)
- *Persistence and propagation of a discrete-time map and PDE hybrid model with strong Allee Effect.* Nonlinear Anal. Real World Appl. 61(2021). (With Z. Wang & H. Wang)
- *Global Boundedness of Weak and Classical Solutions to a Singular Parabolic Equation and Applications.* J. Math. Anal. Appl. (2020), No 1.
- *Bounded Solutions to a Singular Parabolic System.* J. Math. Anal. Appl. 455 (2017), No. 2, 963-978. (With S. Chen & R. Xu)
- *Global Existence for a Singular Gierer-Meinhardt System.* J. Diff. Eqs. 262 (2017), No. 3, 2940-2960. (With S. Chen & R. Xu)

Submitted & under review

- *Structural identifiability for linear-in-parameters partial differential equations* (Submitted 2024). (With A. P. Browning)
- *Neither single large nor several small: patch-size variation, corridors, and the essential role of movement* (Submitted 2024). (With G. Hessler, R. J. Fletcher Jr., S. Ma, H. Wang & B. Zhang)
- *Well-posedness of aggregation-diffusion systems with irregular kernels* (Under review). (With J. Carrillo & J. Skrzeczkowski)
- *From habitat decline to collapse: a spatially explicit approach connecting habitat degradation to destruction* (Under review). (With Z. Shen & H. Wang)
- *Biological Aggregations from Spatial Memory and Nonlocal Advection*, (Under Review). (With D. Liu, H. Wang, J. Shi & J. Potts)

RESEARCH INTERESTS

Analysis of Nonlinear Partial Differential Equations
- Interested in the qualitative and quantitative properties of solutions to nonlinear parabolic and elliptic equations and systems
- Study problems that feature low-regularity in one of its components, including existence & uniqueness of solutions, long-time behaviour of solutions, and characterizations of steady-states
- Maximum principle arguments, theory of monotone flows, energy/entropy methods, Crandall-Rabinowitz bifurcation theory, spectral theory and other abstract techniques from functional analysis are primary technical tools used

Modelling of Ecological Systems
- Deep investment in the application of linear and nonlinear partial differential equations to phenomena observed in the natural world
- Primary interests lie in modelling of habitat loss (degradation/destruction/fragmentation), animal movement models featuring cognitive influences (perception, memory, learning)

WORK & TEACHING EXPERIENCE

Mathematical Institute Lecturer, *University of Oxford*   *September 2024 – Present*
- Course lecturer for graduate-level course C4.1 *Further Functional Analysis*
- Delivering lectures twice per week for 8 weeks; deliver tutorial sessions every third week
- Responsible for exam creation, delivery, and grading

Affiliate Researcher, *University of Oxford*   *September 2023 – Present*
- Working in collaboration with Dr. Jose Carrillo and colleagues at the University of Oxford Mathematical Institute studying various aspects of nonlocal reaction-diffusion-aggregation equations with applications to ecology and animal movement behaviour
- Cross-listed with OxPDE group and the Wolfson Centre for Mathematical Biology (WCMB)
- Funded by the Natural Sciences and Engineering Research Council of Canada (NSERC) PDF Award

Instructor, *University of Alberta*   *September 2022 – December 2022*
- Full instructor for MATH100 (entry level calculus)
- Lecture three times a week, providing enthusiastic and animated teaching for first year students
- Responsible for preparing lectures, providing regular office hours, responding to student emails, and answering course related questions

Teaching Assistant, *University of Alberta*   *September 2018 – December 2021*
- Teaching assistant for introductory calculus, linear algebra, and differential equations
- During the COVID-19 pandemic, responsible for delivering engaging and accessible lectures virtually, along with providing lecture recordings and personal notes for students in distant time zones
- Responsible for creating lab notes, worked examples and quiz questions for differential equations and multivariable calculus courses
- Responsible for grading assignments/quizzes in a timely manner using the Assign2 grading system

Tutorial Instructor, *McMaster University*   *January 2018 – April 2018*
- Responsible for conducting tutorials for a differential equations course three times a week
- Responsible for creating an interactive and encouraging learning environment while also providing a clear and understandable presentation of the relevant material
- Responsible for holding regular office hours to help students in a more personal environment
- Responsible for marking midterms in a timely manner

Teaching Assistant, *McMaster University*   *September 2016 – December 2017*
- Teaching assistant for introductory calculus and differential equations courses
- Responsible for assisting students with the MATLAB components of the courses
- Responsible for grading assignments and exams in a timely manner
- Responsible for providing interactive review sessions before midterms and final exams

SUPERVISION & MENTORSHIP EXPERIENCE

MSc Supervision

MFoCS, University of Oxford   *May 2024 – September 2024*
- Primary supervisor for A. L. Villares, to complete a MSc in Mathematics and Foundations of Computer Science (co-supervised with Dr. José Carrillo)
- Provided guidance and critical feedback for thesis progress, writing, and depth of results
- Met at least weekly to discuss progress due to the accelerated nature of the program
- Final thesis received a classification of *distinction*, indicative of the quality and depth of the final work

Research Subgroup Leader - *Memory-based Movement and PDE/DDE Analysis*
ILMEE Lab Group, University of Alberta   *September 2022 – Present*
- Primary organizational role for one of three distinct ILMEE research subgroups, meeting weekly
- First half comprised of moderating reading/writing activities, such as reading through the entirety of William Strunk's *The Elements of Style* and critical assessment of other members' academic writing style
- Second half comprised of supervising research presentations, student-led discussions, explorations of different theoretical approaches, discussions of model validity, and model development

MITACS Summer Student Mentor
ILMEE Lab Group, University of Alberta   *Spring/Summer 2022, 2023, 2024*
- Senior mentorship role of 4 summer students (N. Ames, J. Price, R. C. Monroy, J. Moylan) over 3 years across three countries (USA, UK, Chile), sponsored through the MITACS Research Internship program
- Provided challenging yet accessible research problems for strong undergraduate students, along with guidance and resources to tackle these problems
- Met at least weekly to discuss technical skills developed, project accessibility and feasibility

SCHOLARSHIPS & AWARDS

2023	Anton Alexander Cseuz Gold Medal in Mathematics	($15,000)
2023	University of Alberta Faculty of Science Doctoral Dissertation Award	
2023	NSERC PDF Award (currently held at the University of Oxford)	($90,000 over 2 years)
2022	Alberta Graduate Excellence Scholarship	($12,000)
2021	Alberta Graduate Excellence Scholarship	($12,000)
2021	President's Doctoral Prize of Distinction	($5800)
2021	Josephine Mitchell Research Prize	($7500)
2020	President's Doctoral Prize of Distinction	($5800)
2020	University of Alberta Graduate Student Teaching Award	
2020	Alberta Graduate Excellence Scholarship	($12,000)
2019	Eoin L Whitney Scholarship	($2200)
2019	President's Doctoral Prize of Distinction	($10,000)
2019	NSERC PGS-D Graduate Scholarship	($63,000 over 3 years)
2019	Pundit RD Sharma Memorial Award	($5000)
2018	University of Alberta Entry Scholarship	($10,000)
2017	Ontario Graduate Scholarship	($15,000)
2016	McMaster Research Scholarship	($6000)
2016	Milos Novotny Fellowship	($4000)
2016	McMaster Graduate Scholarship	($6000)
2016	NSERC Undergraduate Student Research Award	($6800)
2016	NSERC Undergraduate Student Research Award	($6800)
2012-2016	Cape Breton University Incourse Scholarship	($500 per semester)

RECENT PRESENTATIONS, WORKSHOPS & TALKS (* denotes invited talk given)

December 2024	AIMS Conference on Dynamical Systems, Differential Equations and Applications*
	Global and Blowup Solutions for Nonlinear Evolution Equations
October 2024	Oxford Maths Conference
	Discontinuities and Singularities in Nonlinear Evolution PDEs
April 2024	CIRM Conference
	Aggregation-Diffusion Equations & Collective Behavior: Analysis, Numerics and Applications
June 2024	CIRM Research School
	Frontiers in Interacting Particle Systems, Aggregation-Diffusion Equations & Collective Behavior
March 2024	OxPDE Lunchtime Seminar*
July 2023	Sheffield Spatial Ecology Workshop*

	From animal movement processes to spatial distributions	
July 2023	Oxford Maths Conference	
	Topics on Neuroscience, Collective Migration and Parameter Estimation	
June 2023	Cape Breton University Summer Research Speaker Series*	
June 2023	AIMS Conference on Dynamical Systems, Differential Equations and Applications*	
	Global and/or Blowup Solutions for Nonlinear Evolution Equations and Their Applications	
June 2023	AIMS Conference on Dynamical Systems, Differential Equations and Applications*	
	Recent Advances on Population Models in Ecology and Epidemiology	
May 2023	Alberta Mathematics Dialogue*	
	Mathematical Modelling	
March 2023	University of Alberta MathBio Seminar*	
January 2023	AMS Special Session*	
	Impulsive Models in Ecology and Socio-Economic Systems	
August 2022	Fields Institute Workshop*	
	Modeling Population Dynamics in Ecology, Environment and Epidemiology	
June 2022	Canadian Mathematical Society (CMS) Summer Meeting*	
	Harmonic Analysis and PDEs	
June 2022	Canadian Mathematical Society (CMS) Summer Meeting*	
	Global Dynamics and Propagation Phenomena of Biological Systems	
December 2021	Canadian Mathematical Society (CMS) Winter Meeting*	
	Recent Advancement in Nonlinear PDEs	
June 2021	Society for Mathematical Biology (SMB) Annual Meeting*	
March 2021	Wisconsin Analysis/Applied Mathematics Seminar*	

CONFERENCE & WORKSHOP ORGANISATION

Nonlocal Aggregation Models in the Life Sciences
Banff International Research Station (BIRS) Workshop, *Alberta*   2026 (tentative)
- Joint workshop organization with Dr. Thomas Hillen (University of Alberta) and Dr. Valeria Giunta (Swansea University)
- Workshop proposed for Spring 2026, bringing together approximately 50 of the leading experts studying nonlocal aggregation models with a particular focus on applications in the life sciences
- Responsible for proposal development, organizational duties, reaching out to prospective speakers and attendees

Alberta Graduate Mathematics and Statistics Conference
Edmonton, Alberta   2022/2023
- Organizational role in the preparation for the second annual AGMSC
- Acted as the primary contact for the University of Alberta mathematics and statistics graduate students in the initial stages of organization
- Aided in securing funding for the mathematics and statistics students specifically attending the University of Alberta through PIMS
- Handed off further organizational efforts to the incoming (now current) SIGMAS President (Curtis Harvey) for the final months of preparation

Introductory LaTeX Workshop
Wilfrid Laurier University, Ontario   November 2018
- Hosted a one-day workshop for the students (undergraduate & graduate) of Dr. Anne Wilson's lab
- Tailored the focus towards psychology students, including initial compilation, required packages, providing a preamble, and an in-depth exploration of BibTeX for efficient referencing

EXTRACURRICULAR ACTIVITIES

President of SIGMAS (Society in Graduate Mathematics and Statistics)
Edmonton, Alberta   July 2021 – March 2023
- Primary organizer of society events, including bimonthly meetings between other executive members and delegation of duties for social networking events (movie nights, pizza nights, trivia nights, etc.)
- Collaborate with outreach coordinators to bring mathematics into the youth community, primarily through hosting events at the University of Alberta for grade school children
- Attend monthly departmental meetings and monthly meetings with other departmental societies within the faculty of science
- Act as a representative for all departmental graduate students and relay important information to the department on behalf of the graduate students

- Coordinate with the undergraduate mathematics and statistics society for events and outreach
- Solicit nominations for the annual departmental mentorship award and support determination of winner

Graduate Student Representative of Departmental EDI (Equity, Diversity & Inclusivity) Committee

Edmonton, Alberta   January 2021 – January 2022
- Act as a liaison between graduate students and the departmental regarding EDI initiatives
- Responsible for helping create a graduate student exit survey to identify key issues amongst undergraduate students as well as graduate students as they relate to EDI
- Responsible for helping organize outreach initiatives related to EDI, such as workshops tailored for undergraduates or grade school children, focusing on the success of women and indigenous students in science and mathematics, and offering tutoring services for indigenous high school students

Academic Coordinator of SIGMAS (Society in Graduate Mathematics and Statistics)

Edmonton, Alberta   September 2019 – July 2021
- Primary role to organize and host the weekly graduate student colloquium (MATH601) course
- Provide students with relevant information regarding the graduation requirements related to completing the MATH601 course
- Act as a student representative for any academic issues faced by my fellow students, forwarded to the president of SIGMAS during our regular executive team meetings

Treasurer of Society for Industrial and Applied Mathematics (SIAM) McMaster Student Chapter

Hamilton, Ontario   April 2017 – May 2018
- Responsible for maintaining the SIAM student chapter bank account, particularly as it relates to using funds for student events
- Report to the President for the creation of the annual expense report

Co-President of Cape Breton University Mathematics Society

Sydney, Nova Scotia   September 2016 – April 2018
- Responsible for the operation of the newly created math society at Cape Breton University
- Organize campus events and activities to encourage collaboration between undergraduate students in mathematics and engineering
- Provide prospective students with information regarding the math program and how they can get involved
- Organize and volunteer for outreach programs, such as visitations to local grade schools and assisting with the WISE (Women in Science and Engineering) outreach event