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Personal Profile

I am currently a Ph.D. candidate in the Department of Mathematical and Statistical Sciences at the University of Alberta, with a focus on mathematical biology. My current research is developing a mathematical model of tumor invasion in the brain using a continuum mechanics approach which incorporates real patient data.

I obtained a B.Sc. in biology with a minor in mathematics from the University of Victoria, focusing my studies on molecular biology and differential equations, finding an intriguing connection between the two subjects. As math has always been a passion, I continued my education with an M.Sc. and Ph.D. in mathematics to further explore mathematical biology. My biological background provides a broad knowledge base, while mathematics strengthens my analytical intelligence and provides a toolbox to tackle complex problems.

Education

2016- Ph.D. Mathematical and Statistical Sciences – University of Alberta, Edmonton, AB, CAN

Thesis: A DTI-based continuum mechanics computational model of glioma.
Co-supervised by Dr. Thomas Hillen and Dr. Vakhtang Putkaradze
Expected 2021

2013-2016 M.Sc. Mathematics and Statistics – University of Victoria, Victoria, BC, CAN

Thesis: Mathematical Model of Growth and Neuronal Differentiation of Human Induced Pluripotent Stem Cells Seeded on Melt Electrospun Biomaterial Scaffolds.
Co-supervised by Dr. Roderick Edwards and Dr. Stephanie Willerth

2008-2013 B.Sc. Biology – University of Victoria, Victoria, BC, CAN

Peer-reviewed Publications

Rhodes, M., Putkaradze, V., Hillen, T. Comparing the effects of linear and one-term Ogden elasticity in a model of glioblastoma invasion. In preparation.

Rhodes, M., Putkaradze, V. The Chaplygin figure skate: Understanding dynamics and control in figure skating. In preparation.

Hall, M., Khadem Mohtaram, N., Willerth, S., Edwards, R. (2017). Modeling the behavior of human induced pluripotent stem cells seeded on melt electrospun scaffolds. *Journal of Biological Engineering*, 11 (38).

Other Publications and Media

Rhodes, M., Gzenda, V., Putkaradze, V. (2021). Control and integrability in figure skating. *SIAM News*, 54 (3).

University of Alberta write-up on figure skating research (2020). Math on ice: The science behind figure skating. <https://www.ualberta.ca/science/news/2020/may/ice-skating-math.html>

Hall, M. (2016). Mathematical model of growth and neuronal differentiation of human induced pluripotent stem cells seeded on melt electrospun biomaterial scaffolds (Master's Thesis). University of Victoria, Victoria, BC, CAN.

Awards

- 2021** University of Alberta Images of Research Competition – Semi-finalist
- 2020** Marathon of Hope Graduate Studentship in Breast Cancer or Glioblastoma Research
- 2019** Graduate Students' Association Academic Travel Grant
- 2019** Pacific Institute for the Mathematical Sciences (PIMS) Mathbio Accelerator Award
- 2018** Graduate Students' Association Academic Travel Grant
- 2016** Queen Elizabeth II Graduate Scholarship
- 2016** International Collaboration On Repair Discoveries Trainee Travel Award
- 2015** International Collaboration On Repair Discoveries Trainee Travel Award
- 2015** Faculty of Graduate Studies Travel Grant
- 2008-2012** Lisa Huus Bursary
- 2008** UVic Undergraduate Entrance Scholarship

Presentations

- 06/2021** *Speaker (Contributed, Virtual) and Session Chair* – Society for Mathematical Biology (SMB) 2021 Annual Meeting
- 05/2021** *Speaker (Contributed, Virtual)* – Cancer Research Institute of Northern Alberta (CRINA) Research Days 2021, Edmonton, AB, CAN
- 05/2021** *Speaker (Virtual)* – Mathematical Biology Journal Club, University of Alberta, Edmonton, AB, CAN
- 03/2021** *Speaker (Virtual)* – Math Attack Society Pi Day Afternoon of Talks
- 03/2021** *Speaker (Virtual)* – Mathematical Biology Journal Club, University of Alberta, Edmonton, AB, CAN
- 10/2020** *Speaker (Virtual)* – Mathematical Biology Journal Club, University of Alberta, Edmonton, AB, CAN
- 03/2020** *Speaker (Virtual)* – Mathematical Biology Journal Club, University of Alberta, Edmonton, AB, CAN
- 11/2019** *Speaker* – Mathematical Biology Journal Club, University of Alberta, Edmonton, AB, CAN

- 07/2019** *Speaker (Invited)* – Society for Mathematical Biology (SMB) 2019 Annual Meeting, Montreal, QC, CAN
- 06/2019** *Speaker (Invited)* – Bridging Cellular and Tissue Dynamics from Normal Development to Cancer: Mathematical, Computational, and Experimental Approaches, Evolution and Therapy, Banff International Research Station, Banff, AB, CAN
- 03/2019** *Speaker* – Mathematical Biology Journal Club, University of Alberta, Edmonton, AB, CAN
- 11/2018** *Speaker (Invited)* – Mathematical Challenges in the Analysis of Continuum Models for Cancer Growth, Evolution and Therapy, Casa Matematica Oaxaca, Oaxaca, Mexico
- 10/2018** *Speaker* – Mathematical Biology Journal Club, University of Alberta, Edmonton, AB, CAN
- 09/2018** *Speaker* – Pacific Institute for the Mathematical Sciences (PIMS) Workshop on Stochastic and Deterministic Modeling in Biology, Jasper, AB, CAN
- 04/2018** *Speaker* – Institute for Geophysical Research Graduate Symposium, University of Alberta, Edmonton, AB, CAN
- 03/2018** *Speaker* – Three Minute Thesis University of Alberta Semi-finals, University of Alberta, Edmonton, AB, CAN
- 02/2018** *Speaker* – Mathematical Biology Journal Club, University of Alberta, Edmonton, AB, CAN
- 01/2018** *Speaker* – Mathematical Biology Journal Club, University of Alberta, Edmonton, AB, CAN
- 10/2017** *Speaker* – Mathematical Biology Journal Club, University of Alberta, Edmonton, AB, CAN
- 06/2017** *Speaker* – 14th Annual Pacific Institute for the Mathematical Sciences Young Researchers Conference, University of Saskatchewan, Saskatoon, SK, CAN
- 05/2017** *Poster Presenter* – Graduate Summit in Mathematical Biology and Applied PDE, Jasper, AB, CAN
- 05/2017** *Speaker* – Mathematical Biology Journal Club, University of Alberta, Edmonton, AB, CAN
- 05/2016** *Speaker (Contributed) and Session Chair* – 10th World Biomaterials Congress, Montreal, QC, CAN
- 11/2015** *Speaker (Invited)* – Applied Mathematics Seminar, University of Victoria, Victoria, BC, CAN
- 05/2015** *Speaker (Contributed)* – 32nd Annual Meeting of the Canadian Biomaterials Society, Toronto, ON, CAN
- 03/2015** *Poster Presenter* – Pecha Kucha Biomedica and Poster Social, University of Victoria, Victoria, BC, CAN
- 03/2015** *Poster Presenter* – Frontiers in Biophysics, University of British Columbia, Vancouver, BC, CAN

Conference and Workshop Participation

- 11/2019** *Participant* – Cancer Research Institute of Northern Alberta Research Day, University of Alberta, Edmonton, AB, CAN
- 05/2019** *Participant* – Conference on Multiscale Modeling in Mathematical Biology, Minneapolis, MN, USA
- 04/2019** *Participant* – LMS-CMI Research School PDEs in Mathematical Biology: Modelling and Analysis, Edinburgh, Scotland
- 08/2018** *Participant* – CIME-EMS Summer School in Applied Mathematics: The Mathematics of Mechanobiology, Cetraro, Italy
- 08/2016** *Participant* – 2016 Graduate Mathematical Modeling in Industry Workshop, Fields Institute, Toronto, ON, CAN
- 08/2016** *Participant* – 2016 Industrial Problem Solving Workshop, University of British Columbia, Vancouver, BC, CAN
- 06/2016** *Participant and Session Chair* – 13th Annual Pacific Institute for the Mathematical Sciences Young Researchers Conference, University of Alberta, Edmonton, AB, CAN
- 06/2016** *Participant* – 2016 Seminaire de Mathematiques Superieures: Dynamics of Biological Systems, University of Alberta, Edmonton, AB, CAN
- 07/2015** *Participant* – Multimodal Monitoring of Cell Migration, Forschungszentrum Juelich and RWTH Aachen University, Germany
- 07/2015** *Participant* – Post-grad ASI in Mathematical and Physical Sciences: Modeling, Numerical Analysis and Applications, Isaac Newton Institute, Cambridge, UK
- 06/2015** *Participant* – Joint 2015 CAMBAM-MBI-NIMBioS Summer School on Nonlinear Dynamics in Biological Systems, McGill University, Montreal, QC, CAN

Work Experience

- 2020** *Instructor - Calculus for the Life Sciences I* – Department of Mathematical and Statistical Sciences, University of Alberta, Edmonton, AB, CAN
- 2016-2020** *Teaching Assistant and Lab Instructor* – Department of Mathematical and Statistical Sciences, University of Alberta, Edmonton, AB, CAN
- 2014-2016** *Private Tutor in Math* – Victoria, BC, CAN
- 2013-2016** *Teaching Assistant* – Department of Mathematics and Statistics, University of Victoria, Victoria, BC, CAN
- 2009-2010** *Work Study Employee* – University of Victoria, Victoria, BC, CAN
- 2009** *Field Research Assistant* – University of Victoria, Victoria, BC, CAN

Volunteer Positions

- 2020** *Graduate Student Representative* – Department of Mathematical and Statistical Sciences Equity, Diversity and Inclusion Committee, University of Alberta, Edmonton, AB, CAN
- 2018-** *Volunteer* – Math Outreach Program, University of Alberta, Edmonton, AB, CAN
- 2018-** *Executive Member, Treasurer* – University of Alberta Figure Skating Club, Edmonton, AB, CAN
- 2017-2019** *Coordinator* – Mathematical Biology Journal Club, University of Alberta, Edmonton, AB, CAN
- 2015-2016** *Trainee Executive Member* – Center for Biomedical Research, University of Victoria, Victoria, BC, CAN
- 2009-2011** *Volunteer* – Raincoast Conservation Foundation, Victoria, BC, CAN

Student Supervision

- 2020-** *Co-Supervisor* – Alexandra Shyntar (Undergraduate), University of Alberta, Edmonton, AB, CAN. Project: *Tumor Growth Paradox and the Invasion Speed of Cancer*

Other Service

- 2020** *Reviewer* – Bulletin of Mathematical Biology
- 2019** *Reviewer* – Journal of Theoretical Biology

Programming Languages and Software

Python, MATLAB, FreeFEM, XPPAUT, \LaTeX , Java, ExploreDTI

References

- Name** Dr. Thomas Hillen
Position Professor, Department of Mathematical and Statistical Sciences, University of Alberta
Contact thillen@ualberta.ca
- Name** Dr. Vakhtang Putkaradze
Position Professor, Department of Mathematical and Statistical Sciences, University of Alberta
Contact putkarad@ualberta.ca