Suzan Farhang-Sardroodi, M.Sc. Ph.D.

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Website, GitHub, ResearchGate, LinkedIn, Twitter, Google Scholar, PubMed

Research Interest

Quantitative Immunology, Clinical Pharmacology
Pharmacometrics (PK/PD), Quantitative System Pharmacology (QSP)
Machine Learning and Artificial Intelligence (ML/AI)

Current Academic Appointment

Research Associate, Department of Pharmacology and Toxicology
Temerty Faculty of Medicine, **Jan 2024-Present**
Supervisors: Dr. Rachel Tyndale *(Professor)*
Departments of Psychiatry, and Pharmacology and Toxicology, University of Toronto
Canada Research Chair in Pharmacogenomics (CAMH)
Toronto, Ontario, Canada

Dr. Meghan Chenoweth *(Assistant Professor)*
Department of Psychiatry, University of Toronto
Scientist in Molecular Science at the Centre for Addiction and Mental Health (CAMH)
Toronto, ON, Canada

Former Academic Appointments

Postdoctoral Researcher, University of Manitoba, (Université de Montréal)
Department of Mathematics, **Mar 2022-Jan 2024**
Supervisors: Prof. Stephanie Portet *(Associate Professor)*
Prof. Julien Arino *(Professor)*, Prof. Kang-Ling Liao *(Assistant Professor)*
Faculty of Science, Department of Mathematics, University of Manitoba
Winnipeg, MB, Canada
Prof. Morgan Craig, *(Associate professor)*, Sainte-Justine University Hospital Research Centre and Department of Mathematics and Statistics, Université de Montréal
Montréal, Québec, Canada

Postdoctoral Researcher, York University
Department of Mathematics and Statistics, **Sep 2020-Feb 2022**
Supervisor: Prof. Jane Heffernan , Professor, Faculty of Science
Department of Mathematics and Statistics, York University, Toronto, ON, Canada

Postdoctoral Researcher, Toronto Metropolitan University (Ryerson University)
Department of Mathematics, **Sep 2018-Aug 2020**
Supervisor: Prof. Kathleen Wilkie , Associate Professor
Department of Mathematics, Toronto Metropolitan University, Toronto, ON, Canada

Education

Exchange Semesters, Department of Applied mathematics
Fall-Winter 2017-2018, University of Waterloo, Waterloo, ON, Canada

University of Zanjan, Zanjan, Iran
Ph.D., Solid State Physics (*Evolutionary Graph Theory*) **2014-2018**
(defended on **June** 19^{th}). *Thesis:* **Evolutionary Dynamics on Complex Networks**

Summary: We studied the evolutionary properties of mutant and wild type individuals in spatial and temporal fluctuating environments on geographically structured populations. The presence of temporal or spatial variability significantly affects the competition dynamics in populations, and gives rise to some counterintuitive observations.
we considered both birth-death (BD) or death–birth (DB) Moran processes on a circular or a complete graph and investigated spatial and temporal variability affecting division and/or death parameters. Assuming that mutant and wild-type fitness parameters are drawn from an identical bimodal distribution, we studied mutant fixation probability and timing. Our results demonstrated that temporal and spatial types of variability possess fundamentally different properties.
Supervisor: Prof. Amir Hossein Darooneh, Professor, Faculty of Sciences
Department of Physics, University of Zanjan
Co-Supervisor: Prof. Mohammad Kohandel , Associate Professor, Faculty of Sciences,
Department of Applied Mathematics, University of Waterloo
*Ph.D degree was evaluated by World Education Service, WES, (**Reference**#4446208/SAA)*

Azarbaijan Shahid Madani University, Tabriz, Iran
M.Sc., Particle Physics (High-Energy Physics), 2009-2012, (defended on January 23^{rd})
Thesis: **Nambu Structures on Four Dimensional Real Lie Groups**
Supervisor: Prof. Adel Rezaei-Aghdam, Professor, Department of Physics
Azarbaijan Shahid Madani University

University of Tabriz, Tabriz, Iran
B.Sc., Solid State Physics, 2005-2008, (July, 20^{th})

Teaching Experience

Department of Mathematics and Statistics, York University
Instructor, **Calculus I**, May-August, 2020-2021 (summer term)
Toronto,ON, Canada

Biomathematics and Fluids Group, Toronto Metropolitan University
Covered some sessions, **Calculus I and Calculus III**, Mathematical Biology, 2018-2019
Toronto,ON, Canada

Department of Physics, Faculty of Science, University of Zanjan
Instructor, **Elementary Physics**, 2016
Instructor, **English Language, Jahad Institute**, 2014-18
Co-Instructor, **Advanced Mathematical Physics**, 2015
Zanja, Zanjan, Iran

Department of Physics, Faculty of Science, Azerbaijan Shahid Madani University, *Teaching Assistant*, **Statistical Mechanics**, 2013-2015
Tabriz, East Azarbayjan, Iran

Skills

Machine Learning [Including: **Regression** (*Linear, Multiple, Polynomial, SVR, Decision Tree, Random Forest*), **Classification** (*Logistic Regression, K-NN, SVM, Kernal SVM, Naive Bayes, Decision Tree, Random Forest*), **Clustering** (*K-Means, Hierarchical*),**Deep Learning** (*ANN, CNN*), **Dimensionality Reduction** (*PCA, LDA, Kernal PCA*)]

Languages: C++, parallelizing with OpenMP
Python (*Libraries: NumPy, Pandas, Scikit-learn, TensorFlow, SciPy, matplotlib.pyplot*)
Julia (*DifferentialEquations.jl, Plots.jl, advanced statistical analysis and modelling* packages), Matlab, Software: Mathematica, Designe: Coreldraw. Others: LaTeX, Microsoft Office

Awards & Scholarships

GSK Pharmaceutical Industry Fellowship, 2024-2026

Landahl Travel Grant from "Society of Mathematical Biology (SMB)"
Annual Meeting, The Ohio State University (Columbus, Ohio), (July 16-21, 2023)
Supported by: Prof. Laura S. Kubatko Professor of Statistics and of Evolution, Ecology and Organismal Biology

Travel award from the Moffitt Cancer Center and the Center of Excellence for Evolutionary Therapy, Integrated Mathematical Oncology (IMO) workshop
Cancer Communities (Oct29-Nov5, 2022)

Postdoctoral Fellowship, Khiabanian Lab, Rutgers Biomedical and Health Sciences (RBHS), The State University of New Jersy, 2020

Postdoctoral Fellowship, Awarded by Prof. Lennaert Van Veen, OnTechU North Oshawa Campus, Department of Mathematics, Faculty of Science, 2020

Grants from University of Waterloo
Fall-winter, 2017,(Exchange Semester)
Supported by: Prof. Mohammad Kohandel
Associate Professor at the University of Waterloo

Grants from Iran's Ministry of Science, Research and Technology,
Fall-winter, 2017,(Exchange Semester)
Supported by: Prof. Esmail KaramiDehkordi, Director of
International Scientific Cooperation Office, University of Zanjan 2013-2020

Ph.D. Education Scholarship, Iran's Ministry of Science, Research and Technology, 2014-2018

M.Sc., Education Scholarship, Iran's Ministry of Science, Research and Technology, 2009-2011

Conference Presentations

Mechanistic Modeling: From Oncology to Anti-SARS-CoV-2 Immunity
Department of Pharmacology & Toxicology, the University of Toronto
Toronto, Ontario, Canada, November 10^{th}, 2023

Virtual presentation, Physics Colloquium, Topic: *Modeling humoral immune response to SARS-CoV2 and machine learning for discriminating COVID-19 and influenza infection: an application approach*, Institute for Research in Fundamental Sciences
School of Physics (IPM). Tehran, Iran, September 4^{th}
https://physics.ipm.ac.ir/seminars/2023/4sep23/poster.pdf, 2023

The VI AMMCS International Conference, Topic: *Mathematical modelling of the adaptive immune response: B-lymphocytes and SARS-CoV-2 neutralizing antibodies* Waterloo, Ontario, Canada, August 14-18, 2023

Online Video Flash talk, SMB annual meeting, Society for Mathematical Biology, Topic: *Mathematical modelling of the humoral and B cell response to SARS-CoV-2* hosted by Ohio State University, Columbus, Ohio, USA, July 17, 2023

Virtual presentation, OMNI-RÉUNIS Super-Spreader Seminar Series, Topic: *Mathematical Modeling to Identify Optimal Dosing Schedules: From Chemotherapy to COVID-19 vaccines*, hosted by York University, Toronto, Canada, April: 20, 2023

Virtual presentation, 2022-2023 Centre for Mathematical Medicine Seminar Topic: Mechanistic mathematical modelling of the within-host response: from *chemotherapy to COVID-19*, hosted by Fields Institute, Toronto, Canada April: 10, 2023

Virtual presentation, Symposium on Machine Learning and Data Modelling in the Biomedical Sciences, (MLDMBioMed-2022), Topic: *Pharmaceutical and Non-Pharmaceutical Interventions for Controlling the COVID-19 Pandemic, hosted by York University* Toronto, Ontario, Canada, Sep: 27 - 28, 2022

Virtual Poster Presentation, 12^{th} European Conference on Mathematical and theoretcal Biology (ECMTB), topic: *(1)A Machine Learning Approach to Differentiate Between COVID-19 and Influenza Infection Using Synthetic Data, (2)A Multiscale Immune-Epidemiological Model for Coupling Within-Host and Between-Host Dynamics in COVID-19 Infection*, Heidelberg, 2022

Online Video Flash talk, The Royal Society: Modelling the COVID-19 Pandemic: Achievements and Lessons, topic: *Mathematical Modeling of SARS-CoV-2 Immune Escape* London, UK, Jun13th, 2022

Virtual Poster Presentation, DLSPH Biostatistics Research Day, topic:*A Machine Learning Approach to Differentiate Between COVID-19 and Influenza Infection Using* Synthetic Data, virtually hosted by Dolla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canda, May12th, 2022

Virtual Poster Presentation, topic: *Chemotherapy-induced cachexia and model informed* dosing to preserve lean mass in cancer treatment, ISoP QSP Virtual Student Symposium May11th, 2022.

Virtual Poster Presentation, topic:*Mathematical Modeling of SARS-CoV-2 Immune Escape* 5th Workshop on Virus Dynamics, virtually hosted on behalf of Fred Hutchinson Cancer Research Center & University of Washington, Seattle, WA, USA, October 4-6, 2021

SMB annual meeting, Society for Mathematical Biology, topic: *Analysis of host Immunological Response of Adenovirus-Based COVID-19 Vaccines*,virtually hosted on behalf of the University of California Riverside (UCR), USA, 2021

University of Waterloo, Math Oncology Seminar, Topic:*Evolutionary Dynamics of Wild Types and Mutants on a Geographically Structured Population in a Temporal And Spatial Variable Environments*, Waterloo, Canada, March 6th, 2020.

Ontario Tech University, MCSC Seminar, topic:*Mathematical Model of Muscle Wasting in Cancer Cachexia*, Oshawa, Canada, January 14^{th} http://mcsc.science.uoit.ca/event/tba-3/, 2020.

CMS/SMC, Winter Meeting, topic: *Mathematical Model of Muscle Wasting in Cancer Cachexia*, Canadian Mathematical Society, Toronto, Canada, 2019

Ryerson University, Biomathematics and Fluids Seminar, topic: *Mathematical Model of Muscle Wasting in Cancer Cachexia*, Toronto, Canada, 2019

SMB annual meeting, Society for Mathematical Biology, topic: *Mathematical Model of Muscle Wasting in Cancer Cachexia*, University of Montréal, Quebéc, Canada, 2019

Conferences Organized

Mini-symposium on "Mathematical and computational approaches to modelling immunology" in CMPD6 workshop, Winnipeg, Manitoba Canada, 23-27 May 2023

Workshop on Modelling Immunity, virtually hosted by Fields Institute Canada, November 1^{st}, 2021

Organization

HQP Organizing Committee for "OMNI-RÉUNIS Super Spreader Seminar Series"

Membership of the "Society of Mathematical Biology (SMB)" Since Feb 7, 2016

Membership of the "Canadian Applied and Industrial Mathematics Society" (CAIMS/SCMAI), Since May 20, 2023

Membership of "Cancer Research Network (RRCancer), Quebéc"

Languages

Azeri Turks (Mother Tongue), Persian (Advanced), English (Advanced)

References I

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