

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

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[Website](#), [GitHub](#), [LinkedIn](#), [Twitter](#), [Google Scholar](#), [PubMed](#)

- Research** **Psychiatric Genetics, Therapeutic Target Identification, Machine Learning for Health**
- Current Appointment** **Research Associate, Department of Pharmacology and Toxicology Temerty Faculty of Medicine, Jan 2024–Present**
- Former Appointment** **Postdoctoral Researcher**, University of Manitoba and Université de Montréal
Department of Mathematics, **Mar 2022–Jan 2024**
- Postdoctoral Researcher**, York University
Department of Mathematics and Statistics, **Sep 2020–Feb 2022**
- Postdoctoral Researcher**, Toronto Metropolitan University
Department of Mathematics, **Sep 2018–Aug 2020**
- Education** **Ph.D. in Physics (Evolutionary Graph Theory), Sep 2014– Jun 2018**
University of Zanjan, Zanjan, Iran
Thesis: Evolutionary Dynamics on Complex Networks
Defense Date: June 19, 2018
Summary: Investigated evolutionary dynamics in structured populations under spatial and temporal heterogeneity using evolutionary graph theory. Modelled populations as networks of interacting individuals (e.g., cells), applying Moran processes (birth–death and death–birth) to study mutation fixation under natural selection and drift. Introduced fitness variability to quantify how randomness and network topology influence fixation probabilities and timing. Findings revealed distinct evolutionary effects of spatial vs. temporal heterogeneity, providing insight into mutation spread in complex systems such as tumour microenvironments—laying the groundwork for future modelling of heterogeneity in cancer, immunology, and pharmacology.
Supervisors: [Dr. Amir Hossein Darooneh](#), University of Zanjan;
[Dr. Mohammad Kohandel](#), University of Waterloo
Mentor/Collaborator: [Dr. Natalia L. Komarova](#), University of California San Diego
Visiting Ph.D. Researcher (Exchange Semesters), Fall–Winter 2017–2018
Department of Applied Mathematics, University of Waterloo, Canada
Conducted part of Ph.D. research under the supervision of [Dr. Mohammad Kohandel](#).
- M.Sc. in Physics (High-Energy Particle Physics), Sep 2009– Jan 2012**
Azarbaijan Shahid Madani University, Tabriz, Iran
Thesis: Nambu Structures on Four-Dimensional Real Lie Groups
Defense Date: January 23, 2012
Summary: Investigated Nambu–Poisson structures and their role in integrable systems. Classified triple and quadruple Nambu tensors on Lie groups and proposed novel Nambu–sigma models on non-semisimple manifolds, **Supervisor:** [Dr. Adel Rezaei-Aghdam](#)

B.Sc. in Physics, University of Tabriz, Tabriz, Iran, **2005–2008**

Graduation Date: July 20, 2008

Teaching Experience

Department of Pharmacology and Toxicology, University of Toronto

Guest Lecturer, PCL381H: Molecular Toxicology, March 16, 2026

Toronto, ON, Canada

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, English Language, Applied Science and Technology, Jahad Daneshgahi (University of Zanjan), Nov 2014 – Jun 2017

Instructor, Elementary Physics, Fall 2016

Co-Instructor, Advanced Mathematical Physics, Fall 2015

Zanjan, Iran

Department of Physics, Faculty of Science, Azerbaijan Shahid Madani

University, *Teaching Assistant, Statistical Mechanics*, 2013-2015

Tabriz, East Azarbayjan, Iran

Skills

Statistical Genetics & Bioinformatics: Large-scale genomic data analysis: (GWAS, (MTAG, fine-mapping, colocalization, PRS calculation, TWAS , including joint/conditional TWAS), integrative multi-omic annotation, and advanced computational workflows in psychiatric genetics

Genomic Annotation & Visualization: Use of web-based and programmatic tools including **FUMA** and **FIVEx**; locus-level visualization using LocusZoom (**web** and R), publication-quality Manhattan, Miami, QQ plots, and Venn diagrams

Pharmacometric Modeling:

Phoenix NLME 8.5.2.4 (nonlinear mixed-effects modeling, compartmental analysis)

Phoenix WinNonlin 8.5.2.4 (noncompartmental analysis, NCA)

Machine Learning: Supervised and unsupervised learning

(classification, regression, principal component analysis (PCA), clustering)

Deep Learning: Biology-Informed Neural Networks (BINNs) for parameter estimation

Languages: **Python** (*NumPy, Pandas, SciPy, Scikit-learn, TensorFlow, matplotlib*);

Julia (*DifferentialEquations.jl, Plots.jl, DataFrames.jl, GLM.jl, LsqFit.jl*);

C++ (Linux-based stochastic simulations, OpenMP parallelization);

MATLAB (ODE solvers, data visualization); **Mathematica** (ODEs, stochastic simulations, visualization)

Other Tools: \LaTeX , Microsoft Office, CorelDRAW (scientific illustration)

Awards Scholarships

[HQP Travel Support Award](#), 2024

Letter of support provided by Dr. Morgan Craig for funding application
([PDF link](#))

[GSK Pharmaceutical Industry Fellowship](#), 2024–2026

Landahl Travel Grant, Society of Mathematical Biology (SMB) Annual Meeting
The Ohio State University, Columbus, Ohio, July 16–21, 2023
Supported by: Prof. Laura S. Kubatko (Statistics and Evolutionary Biology)

Travel Award, [Moffitt Cancer Center](#),
[IMO Workshop: Cancer Communities](#), Oct 29 – Nov 5, 2022

Postdoctoral Fellowship, [Khiabanian Lab](#),
Rutgers Biomedical and Health Sciences (RBHS), 2020

Postdoctoral Fellowship, [Prof. Lennaert Van Veen](#), Ontario Tech University
Department of Mathematics, Faculty of Science, 2020

FOS Dean's Research Fund Travel Award, 2019
Supported by: Prof. Kathleen Wilkie, Toronto Metropolitan University

Research Grant, University of Waterloo (Exchange Semester), Fall–Winter 2017
Supported by: Prof. Mohammad Kohandel

International Mobility Grant, Iran's Ministry of Science, Research and Technology
(Exchange Semester), Fall–Winter 2017
Supported by: Prof. Esmail KaramiDehkordi, University of Zanjan

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

Virtual Talk (Upcoming), *Population Pharmacokinetic Modelling of Nicotine in the African Green Monkey*, CAMH Addiction Research Rounds, Feb 12, 2026,
Centre for Addiction and Mental Health (CAMH), Toronto, ON, Canada

[Poster Presentation](#), *Genome-Wide Multi-Trait Genomic and Transcriptomic Analyses of Smoking Behaviours and Schizophrenia*,
[World Congress of Psychiatric Genetics \(WCPG\)](#),
Oct 19–23, 2025, Cancún, Mexico

Poster Presentation, *Neurosciences and Clinical Translation*,
[Department of Psychiatry, University of Toronto](#), June 19, 2025, Chelsea Hotel, Toronto

Poster Presentation, *Genome-Wide Multi-Trait Analysis of Smoking Behaviours and Schizophrenia: New Insights and Drug Repurposing Opportunities*,
[Society of Biological Psychiatry \(SOBP 2025\)](#),
Apr 24–26, 2025, Sheraton Toronto

Virtual Talk, *Genome-Wide Multi-Trait Analysis of Smoking Behaviours and Schizophrenia Identifies Novel Loci and Therapeutic Targets*,
CAMH Addiction Research Rounds, Apr 17, 2025
[Watch Recording](#) (Passcode: **jShxx3mJ**)

Virtual Seminar, *Center for Computational Oncology*,
[University of Texas at Austin](#), Feb 26, 2025

Virtual Seminar, *Department of Biology, faculty of Science*
[Memorial University of Newfoundland](#), (Nov22, 2024)

Workshop Mathematical oncology: at the crossroads of computational fluids, mechanics, and biology, Fields Institute, Toronto, Ontario, Canada, (Nov18-19, 2024)

Poster Presentation, *Multi-Trait Genome-Wide Association Analysis of Psychiatric Traits Identified New Loci*, [American Society of Human Genetics \(ASHG\) Annual Meeting](#)
Denver, CO, (Nov5-9, 2024)

Poster Presentation, *Genetic Risk Factors for Concurrent Tobacco Use and Schizophrenia Pharmacogenomics Global Research Network (PGRN) Scientific Meeting*
The Ohio State University, (Sep23-25, 2024)

Frontiers in Computational and Mathematical Medicine, Insights into B cell and antibody kinetics against SARS-CoV-2 variants using mathematical modelling
Fields Institute, Toronto, Ontario, Canada, September 23-24, 2024

Leveraging AI for Enhanced Disease Diagnosis: From Viral Infections to Cancer Cachexia
[CAIMS2024 Annual Meeting, Queen's University](#)
Kingston, Ontario, Canada, June 26th, 2023

Mechanistic Modeling: From Oncology to Anti-SARS-CoV-2 Immunity
Department of Pharmacology & Toxicology, the University of Toronto
Toronto, Ontario, Canada, November 10th, 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 4th
<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](#),
Mathematical Modelling 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, 12th European Conference on Mathematical and theoretical 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*

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, June 13th, 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 Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada, May 12th, 2022

Virtual Poster Presentation, topic: *Chemotherapy-induced cachexia and model informed dosing to preserve lean mass in cancer treatment*, ISoP QSP Virtual Student Symposium May 11th, 2022.

Virtual Poster Presentation

Topic: *Mathematical Modeling of SARS-CoV-2 Immune Escape*

5th Workshop on Virus Dynamics, virtually hosted by Fred Hutchinson Cancer Research Center and 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 14th

<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

Conferences Organized

Mini-symposium on “Advancing Health and Medicine through Scientific Computing: Mechanistic Modelling, Machine Learning, and Quantitative Systems Pharmacology” [CAIMS2024](#), Kingston, Ontario, Canada, 24-27 June 2024

Mini-symposium on “AI for Enhancing Public Health and Healthcare in Canada” [CAIMS2024](#), Kingston, Ontario, Canada, 24-27 June 2024

Mini-symposium on “Mathematical and computational approaches to modelling immunology”, [CMPD6 workshop](#), Winnipeg, Manitoba Canada, 23-27 May 2023

[Workshop on Modelling Immunity](#), virtually hosted by Fields Institute Canada, November 1st, 2021

Conference Services

Judge, Posters -[World Congress of Psychiatric Genetics \(WCPG\)](#), Oct 19–23, 2025, Cancún, Mexico

Judge, Posters — *Visions in Pharmacology (VIP) Research Day 2025*, Department of Pharmacology & Toxicology, University of Toronto; June 17, 2025, Great Hall, Hart House, Toronto, ON, Canada
[Assignment Letter](#)

Conference Services

Judge, Posters — *Visions in Pharmacology (VIP) Research Day 2025*, Department of Pharmacology & Toxicology, University of Toronto; June 17, 2025, Great Hall, Hart House, Toronto, ON, Canada
[Assignment Letter](#)

Journal Review Service

Reviewer, [Frontiers in Immunology](#) ([Loop profile](#))
Reviewer, [PLOS Computational Biology](#)
Reviewer, [Mathematical Biosciences](#)

Active Memberships

[Steering Committee Member, Centre for Mathematical Medicine, Fields Institute](#)
Term: April 10, 2025 – June 30, 2028

[Affiliate Member, Acceleration Consortium, University of Toronto](#)

[Member, T-CAIREM \(Temerty Centre for AI Research and Education in Medicine\)](#)

Former Memberships

[Society for Mathematical Biology \(SMB\)](#)
Membership period: February 7, 2016 – January 1, 2024
Member ID: [31509470](#)

[HQP Organizing Committee / OMNI-RÉUNIS Super Spreader Seminar Series](#)

Languages

Turkish (Advanced), Persian (Advanced), English (Advanced)