

# Sadegh Marzban, PhD

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## RESEARCH INTERESTS

- Develop agent-based models to enhance understanding of spatial competition effects on dynamics of viral and tumor heterogeneity.
- Conduct data analysis for the classification of biological data using machine learning methodologies.
- Construct clinically-relevant evolutionary mathematical models within the frameworks of artificial life to explore spatial structure and evolutionary dynamics in cancer.

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## EDUCATION & TRAINING

Present **H. Lee Moffitt Cancer Center & Research Institute**, Tampa, FL, United States

*Postdoctoral Fellowship in Integrated Mathematical Oncology*

- *Advisor:* Dr. Jeffrey West

Sep. 2023 **University of Manitoba**, Winnipeg, MB, Canada

*Research Assistant in Riverview Health Centre*

- *Advisor:* Dr. Zahra Moussavi

Mar. 2023 **University of Szeged**, Szeged, Hungary

**Ph.D. Student** in School of Mathematics and Computer Science

*Research:* Hybrid PDE-ABM models: from oncology to virology

- *Advisor:* Dr. Gergely Rost

Feb. 2018 **Amirkabir University of Technology (Tehran Polytechnic)**, Tehran, Iran

**M.Sc. Student** in Biomedical Engineering

*Research:* Modeling the effect of transcranial brain stimulation on motor symptoms in Parkinson's disease.

- *Advisor:* Dr. Farzad Towhidkhal

Sep. 2014 **Ferdowsi University of Mashhad**, Mashhad, Iran

**B.Sc. Student** in Electrical Engineering

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## GRANTS & FUNDING

- **May. 2024** Travel award for winning the Moffitt Postdoctoral Association's first ever Postdocs' Choice Poster Award at the 14th annual Moffitt Scientific Symposium
- **Nov. 2023** Participant on award-winning \$50,000 pilot grant funding IMO Workshop team, Moffitt Cancer Center

- **Sep. 2021** Mitacs Accelerate
- **Sep. 2019** Stipendium Hungaricum scholarship
- **Nov. 2022** Travel award of IMO Workshop V10.0

## PREPRINT

1. Marzban, S., et al., (2024). 'Spatial interactions modulate tumor growth and immune infiltration.' **bioRxiv**. DOI:10.1101/2024.01.10.575036

## PUBLICATIONS

1. Marzban, S., Dastgheib, Z., Lithgow, B., Moussavi, Z., (2024). 'Using principal component analysis to determine which vestibular stimuli provide best biomarkers for separating Alzheimer's from mixed Alzheimer's disease.' **Med Biol Eng Comput**. DOI: 10.1007/s11517-024-03110-2
2. Bartha, FA., Juhász, N. Marzban, S., Han, R., Röst, G., (2022). 'In Silico Evaluation of Paxlovid's Pharmacometrics for SARS-CoV-2: A Multiscale Approach', **Viruses**. DOI: <https://doi.org/10.3390/v14051103>
3. Marzban, S., Han, R., Juhász, N., Röst G., (2021). 'A hybrid PDE-ABM model for viral dynamics with application to SARS-CoV-2 and influenza', **Royal Society Open Science**. DOI: 10.1098/sos.210787
4. Dénes, A., Marzban, S., Röst G., (2021). 'Global analysis of a cancer model with drug resistance due to Lamarckian induction and microvesicle transfer', **Journal of Theoretical Biology**. DOI: 10.1016/j.jtbi.2021.110812
5. Kadkhodaie, M., Sharifnezhad, A., Ebadi, S., Marzban, S., Habibi, S A. H., Ghaffari, A., Forogh, B., (2019). 'Effect of eccentric-based rehabilitation on hand tremor intensity in Parkinson's disease'. **Neurological Sciences**. DOI: 10.1007/10072-019-04106-9
6. Marzban, S., Saviz, M., Towhidkhan, F., (2018). 'Significance of Biological Membranes for Accurate Computational Dosimetry of Low-Frequency Electric Fields'. **Journal of Electrical Bioimpedance**. DOI: 10.2478/joeb-2018-0009
7. Marzban, S., Seifi Ala, T., Towhidkhan, F., Forogh, B., Habibi, S A. H., (2017). 'On the Effects of transcranial Direct Current Stimulation on Hand Movement in Parkinson's disease: A Primary Study'. **24th national and 2nd International Iranian Conference on Biomedical Engineering(ICBME)(indexed in IEEEXplore)**. DOI: 10.1109/ICBME.2017.8430217

## TALKS

### SIAM Conference on the Life Sciences (LS24)

- MS4 Mechanisms of Cell Migration from Intracellular to Extracellular Interactions - Part I of II 2024: 'Modeling the Influence of ECM on Immune Cell Migration by Bridging Artificial Life and Spatial Imaging'

### Biology and Medicine through Mathematics (BAMM) conference

- BAMM 2024: 'Decoding immune cell navigation: integrating artificial life modeling with tumor microenvironment dynamics'

### Integrated Mathematical Oncology (IMO) seminar at MOFFITT

- IMO 2024: 'Spatial interactions modulate tumor growth and immune infiltration'

### 45th Canadian Medical and Biological Engineering Conference

- CMBEC45 2023: 'Selecting the Most Characteristic Vestibular Stimuli to be Used for Alzheimer's Subtype Diagnosis'

### **21st International Symposium on Mathematical and Computational Biology**

- BIOMAT 2021: 'A hybrid PDE-ABM model for viral dynamics with application to SARS-CoV-2 and influenza'

### **19th International Symposium on Mathematical and Computational Biology**

- BIOMAT 2019: 'Mathematical model of the effect of transcranial direct current stimulation in motor function in Parkinson's disease'

## **POSTERS**

### **Cancer Evolution - From Genome to Ecology held in collaboration with the International Society for Evolution, Ecology and Cancer (ISEEC)**

- ISEEC 2024: 'Artificial Life & Cancer Evolution: Integrating artificial life with models of the evolution and ecology of cancer'

### **14th Annual Moffitt Scientific Symposium**

- Moffitt Scientific Symposium 2024: 'Collagen-immune interactions lead to poor immune infiltration in late-stage head and neck squamous cell carcinomas'

### **Meet and greet at Riverview Health Center (RHC)**

- RHC 2023: 'Selecting the most characteristic vestibular stimuli to be used for Alzheimer's subtype diagnosis'

### **10th Integrated Mathematical Oncology (IMO) workshop**

- IMO 2022: 'Hybrid Automata Library: from oncology to virology'

## **TEACHING EXPERIENCES**

Summer 2024	HIP-IMO Java Bootcamp
Winter 2022	Advanced signal processing
Winter 2021	Advanced signal processing
Winter 2018	Biological modeling
Winter 2016	Electromagnetics
Fall 2015	Digital and Non-linear Control Systems
Winter 2014	Introduction to Electrical Engineering
Fall 2014	Linear Systems and Control
Winter 2013	Introduction to Electrical Engineering
Fall 2013	Electromagnetics
Winter 2012	Differential Equations
Winter 2012	General Mathematics I

## **SKILLS**

Programming	Java, MATLAB, R, Wolfram Mathematica
Language	Persian (native), and English

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## MEMBERSHIPS

- Associate Membership of American Association for Cancer Research (AACR)
- Early Career Membership of Society for Industrial and Applied Mathematics (SIAM)

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## REVIEWER

- PLOS Computational Biology (1)
- Scientific Reports (1)
- Royal Society Open Science (1)

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## Non-University Affiliated Professional Activities

June 2013 – June 2014 President of the Electrical Student Scientific Association of Ferdowsi University of Mashhad