

Tiam Heydari

Email: tiam.heydari@ubc.ca
tiam.heydari@gmail.com

Summary

I am currently a transitional postdoctoral fellow in the School of Biomedical Engineering at the University of British Columbia (UBC). I completed my Ph.D. in Biological Engineering at UBC in October 2023 under the supervision of Prof. Peter Zandstra. My research focuses on systems biology, biology-informed AI architectures, and multiscale biology, with an emphasis on predicting, designing, and controlling biological systems' responses.

Education

University of British Columbia (UBC) **2023**

Ph.D, School of Biomedical Engineering, Supervisor: Dr. Peter Zandstra

Sharif University of Technology (SUT) **2016**

M.Sc, Department of Physics and Astronomy, Biophysics program, Co-supervises: Dr. Morteza Mahmoudi (Harvard Medical School) and Dr. Reza Ejtehadi Lab (SUT)

Sharif University of Technology (SUT) **2014**

B.Sc, Department of Physics and Astronomy

Professional experience

Postdoctoral researcher **Oct 2023-Present**

School of Biomedical Engineering, University of British Columbia

Visiting researcher **Sep-Oct 2025**

Research Center for Advanced Science and Technology, University of Tokyo

Instructor **Sep 2024-Jan 2025**

School of Biomedical Engineering, University of British Columbia

Visiting researcher **Jun-Aug 2023**

Living System Institute, University of Exeter, UK

Researcher **Apr-Sep 2019**

Microsoft Research Centre, Cambridge, UK

Visiting researcher **Apr-Aug 2017**

Science Park, University of Amsterdam, Netherlands

Publications

Preprints & Manuscripts Under Review/Revision

1. **Heydari, T.**, Bashth, O., Fernandes, J., Sabbineni, B., Aguilar-Hidalgo, D., Chen, J., ... & Zandstra, P. W. (2025). Predicting and Controlling Collective Fate in Multicellular Systems. *bioRxiv*, 2025-12. DOI: 10.64898/2025.12.11.693804
2. **Heydari, T.**, Sarropoulos, I., Teichmann, S.A., and Zandstra, P.W. "From Gene Regulation to Multicellular Systems with Systems Biology-Informed AI." (Under Revision).
3. Bockaj, M., **Heydari, T.**, et al. "Locally Directed Morphogenesis Enabling Engineered hPSC Embryoids with Robust Symmetry Breaking." *Cell Stem Cell* (Under Revision).
4. **Heydari, T.**, Ali, U., and Zandstra, P.W. "iQcell2.0: A systems biology informed graph neural network model for high-throughput multiscale regulatory network discovery." (*In Preparation*).

Peer-Reviewed Publications

5. **Heydari, T.**, et al. (2022). "IQCELL: A platform for predicting the effect of gene perturbations on developmental trajectories using single-cell RNA-seq data." *PLoS Computational Biology*. DOI: 10.1371/journal.pcbi.1009907
6. Michaels, Y.S., ... **Heydari, T.**, et al. (2024). "Tracking the gene expression programs and clonal relationships that underlie mast, myeloid, and T lineage specification from stem cells." *Cell Systems*. DOI: 10.1016/j.cels.2024.11.001
7. Dattani, A., ... **Heydari, T.**, et al. (2023). "Human naive stem cell models reveal the role of FGF signalling in hypoblast specification in the human embryo." *Cell Stem Cell*. DOI: 10.1016/j.stem.2024.05.003
8. **Heydari, T.**, et al. (2017). "Development of a virtual cell model to predict cell response to substrate topography." *ACS Nano*. DOI: 10.1021/acsnano.7b03732
9. **Heydari, T.** and Zandstra, P. W. (2023). "Inferring gene regulatory networks and predicting the effect of gene perturbations via IQCELL." *Human Embryo Models In Vitro. Methods and Protocols*. DOI: 10.1007/7651_2022_465
10. Abadi, P.P., ... **Heydari, T.**, et al. (2018). "Engineering of Mature Human Induced Pluripotent Stem Cell-Derived Cardiomyocytes Using Substrates with Multiscale Topography." *Advanced Functional Materials*. DOI: 10.1002/adfm.201707378

Patents & Software

11. **Heydari, T.**, et al. (2025). "Methods and Systems for Controlling Collective Cell Fate." U.S. Provisional Patent Application 63/935,586. Filed Dec 10, 2025.
12. Ejtehadi, M.R., Heidari, M., **Heydari, T.**, and Mahmoudi, M. (2018). "Virtual cell simulator." U.S. Patent Application 15/915,044.
13. IQCELL (Software, Available on Gitlab). A Python-based platform for causal inference from scRNA-seq.

Selected awards

1. Pathway to Independence Award (\$10,000), Michael Smith Laboratories, UBC (2024). Focus: Collective immune behavior.
2. International Mobilization Award (\$15,000), Stem Cell Network (2023).
3. SaP-UBC Course design award for 'Transport Phenomena within Cells and Tissues'

Grants

1. Stem Cell Network (SCN) Impact Award (\$270,000, 2024). Co-Investigator. Project: [Regulatory Network Discovery in Stem Cell Differentiation](#)
2. CIFAR Catalyst Fund (\$60,000, 2024). "AI for Multiscale Biology." (Lead Writer/Co-investigator with Teichmann Lab).
3. Co-led writing the CIHR Grant on developing a multi-scale biological inference pipeline, awarded in 2024 (Zandstra lab, \$1,300,000).

Other activities

Grant Reviewing panel:

- 1- UK Research Council, UK Research and Innovation (UKRI), more than \$2,000,000 of grants reviewed since 2025

Mentorship:

Mentored and supervised 8 students in the past 5 years

- A) Undergraduate Thesis Supervisor: Umar Ali, developing an Graph NN model for gene regulation. Co-op Mentorship: Joelle Fernandes (2021-2023, stem cell culture and differentiation), Bhavya Sabbineni (stem cell differentiation and scRNA-seq experiments), Jessica Chan (2024-present, multiscale GRN-based modeling of tissues).
- B) Graduate student mentorship: Divy Raval.
- C) REX Program Mentor for three first- and second-year students (2022).

Outreach Activities:

- 1- Served at MSL Outreach activities for high under-represented high school students,
- 2- Served as a trainee member of the UBC Faculty Search Committee for SBME.
- 3- Served as a reviewer for journals (Frontiers and Cell Press, Biophysical Journal, PLoS Biology)

Teaching

Instructor for BMEG 371

Fall 2024

Transport Phenomena within Cells and Tissues (developed and taught the course)
School of Biomedical Engineering. University of British Columbia, Canada

Guest lecturer for BMEG524

Winter 2025, Winter 2026

Genome Informatics, two lectures on the basics of Machine Learning and Deep Learning
School of Biomedical Engineering. University of British Columbia, Canada

Guest lecturer for BMEG524**Winter 2024**

Genome Informatics, two lectures on the basics of Machine Learning in Genomic
School of Biomedical Engineering. University of British Columbia, Canada

Guest lecturer for BMEG101**Fall 2020**

School of Biomedical Engineering. University of British Columbia, Canada

Guest lecturer and Teaching assistant for PHYS305**Winter 2018**

Biophysics

Department of Physics and Astronomy. University of British Columbia, Canada

Head TA and guest lecturer for Advanced Computational Physics**Winter 2018**

Department of Physics and Astronomy. University of British Columbia, Canada

Teaching Assistant for Computational Physics**Winter 2016**

Department of Physics and Astronomy. Sharif University of Technology, Iran

Teaching Assistant for Advanced Statistical Physics**Winter 2015**

Department of Physics and Astronomy. Sharif University of Technology, Iran

Selected presentations

"Predicting and Controlling Collective Fate in Multicellular Systems", Young Biophysicist Meetings, 2026

"Engineering collective behavior in stem cell-driven colonies" Biocontrol Workshop 2025

"iQcell2.0: A GNN with Interpretable Message passing for single cell transcriptomics", Cascadia Advanced Genomics Technology Meeting (2025)

"Towards multiscale modeling of human lung", United Therapeutics Multi-scale Lung symposium (2025)

"Engineering collective behavior in stem cell-driven colonies", Synbio6 (2024)

"Engineering collective behavior in stem cell-driven colonies", HFSP (2024)

"The interplay between gene regulatory networks and cell signaling", Living Systems Institute, University of Exeter (2023)

"Stochastic modeling of gene regulatory networks", Mathematical Biology Meeting, UBC (2023)

"Predicting the effect of gene perturbations on developmental trajectories using single-cell RNAseq data", Invited talk at IMAG/MSM (2022)

"Inferring causal GRNs from scRNA-seq data", Medicine by Design Meeting (2022)

" Studying collective behavior in stem cell-driven colonies", BC Cancer Annual meeting (2021)