

Moein Khajehnejad

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Education and Occupation

Monash University

Postdoctoral Research fellow, Advisor: Prof. Adeel Razi
Monash Data Futures Institute, Turner Institute for Brain and Mental Health, Monash University

Melbourne
2023 - current

Monash University

Ph.D., Department of Data Science and AI

Melbourne
2019 - 2023

Sharif University of Technology

B.Sc., Computer Sciences & Electrical Engineering

Tehran
2011 - 2016

Research Interests

- Graph Neural Networks
- Computational Neuroscience
- Lifelong Learning
- Large Language Models
- Deep Reinforcement Learning
- Neuro-AI

Publications ([Google Scholar](#))

Conferences

1. **M. Khajehnejad et al.** "On Complex Network Dynamics of an In-Vitro Neuronal System during Rest and Gameplay". In Proceedings of the 37th Conference on Neural Information Processing Systems (**NeurIPS 2023: InfoCog, GenBio, RealML, and NeurReps (oral presentation)**).
2. **M. Khajehnejad et al.** "Neural Network Poisson Models for Behavioural and Neural Spike Train Data". **Spotlight paper** at the 39th International Conference on Machine Learning (**ICML 2022**).
3. **M. Khajehnejad et al.** "Biological Neurons vs Deep Reinforcement Learning: Sample efficiency in a simulated game-world". In Proceedings of the 36th Conference on Neural Information Processing Systems (**NeurIPS 2022: DeepRL, MemARI, and LMRL**).
4. **A. Khajehnejad et al.** "CrossWalk: Fairness-enhanced Node Representation Learning". In Proceedings of the AAAI Conference on Artificial Intelligence, (**AAAI-22**).
5. **M. Khajehnejad and Forough Habibollahi** "Hunting for Dual-target Set on a Class of Hierarchical Networks". In Proceedings of the **International Conference on Network Science**, Springer LNCS Vol. 13197.
6. **M. Khajehnejad et al.** "Adversarial Graph Embeddings for Fair Influence Maximization over Social Networks". In Proceedings of the 29th International Joint Conference on Artificial Intelligence (**IJCAI'20**).
7. **M. Khajehnejad et al.** "Optimal Decision Making Under Strategic Behavior". In Proceedings of the 33rd Conference on Neural Information Processing Systems (**NeurIPS 2019: Human-Centric Machine Learning**).

Journals

8. **M. Khajehnejad et al.** "Biological Neurons Compete with Deep Reinforcement Learning in Sample Efficiency in a Simulated Gameworld". Under minor review at **Nature Machine Intelligence**.
9. **M. Khajehnejad et al.** "Explaining workers' inactivity in social colonies from first principles". Published in the **Journal of the Royal Society Interface**.
10. **M. Khajehnejad et al.** "Social Learning versus Individual Learning in the Division of Labour". Published in the **Journal of Biology**.
11. **B. J. Kagan et al.** "Scientific communication and the semantics of sentience". Published in **Neuron**.
12. **B. J. Kagan et al.** "In vitro Neurons Learn and Exhibit Sentience When Embodied In a Simulated Game-world". Published in **Neuron**.
13. **M. Khajehnejad**, "SimNet: Similarity-based Network Embeddings with Mean Commute Time". Published in **Journal**

of PLoS One.

14. **M. Khajehnejad**, "Efficiency of Long-Range Navigation on Treelike Fractals". Published in the journal of **Chaos, Solitons & Fractals**.
15. **M. Khajehnejad et al.** "Alzheimer's Disease Early Diagnosis using Manifold-based Semi-Supervised learning". Published in journal of **Brain Sciences**.
16. **T. Weng et al.** "Navigation by anomalous random walks on complex networks". Published in the journal of **Nature Scientific Reports**.

Work Experience

Cortical Labs pty ltd

Australia

Data Scientist - Part Time

Jan 2022 – Current

- o **Achievement:** Developed deep reinforcement learning algorithms and compared sample efficiency during learning with live biological neurons. Studied the neural correlates of consciousness and intelligence in vitro.
- o **Research Areas:** Deep reinforcement learning, Computational Neuroscience, Cognition, Consciousness.

Max Planck Institute for Software Systems (MPI-SWS)

Germany

Machine Learning Researcher

Jan 2019 – May 2019

- o **Achievement:** Mathematically solved problem of optimal decision-making under strategic behaviour using synthetic/real credit card data.
- o **Research Areas:** Fairness, Optimal Decision-Making, Machine Teaching

statNLP @ SUTD-MIT

Singapore

Machine Learning Intern

Jul 2016 – Oct 2016

- o **Achievement:** Developed a novel approach for low-dimensional network embedding.
- o **Research Areas:** Network Embedding, Graph Representation Learning

LSIR @ EPFL

Switzerland

Information Systems Research Intern

Jan 2016 – May 2016

- o **Achievement:** Significantly modified the accuracy of several state-of-the-art deep learning algorithms in word embedding.
- o **Research Areas:** Convex Optimization, Natural Language Processing, Word Embedding

SyMLab @ HKUST

Hong Kong

Machine Learning Intern

Jul 2015 – Oct 2015

- o **Achievement:** Introduced a novel measure for mean first traverse distance on complex networks.
- o **Research Areas:** Network Science, Graph Representation Learning

Computer skills

Programming Languages: Python (NumPy, Tensorflow, Keras, PyTorch), Matlab, R

Generative AI Models: VAEs (Variational Autoencoders), GANs (Generative Adversarial Networks)

Large Language Models: GPT, BERT, RoBERTa, T5, CLIP

LLM Frameworks and Libraries: Hugging Face, LangChain

Version Control: Git **Typesetting Envs.:** L^AT_EX, Xepersian

Network Visualization Envs.: Gephi, MuxViz

Honors and Awards

- o Travel award, **CNS* 2024**, Natal, Brazil.
- o Best reviewer award, **Learning on Graphs (LoG) Conference 2022**.
- o Travel award, **39th International Conference on Machine Learning (ICML 2022)**, Baltimore, United States.
- o Among 17 fully-funded electees globally to **NETHIKE 2022** Summer School by **ETH** Zürich, Switzerland.
- o Among 30 fully-funded electees globally to **2022 Complex networks: theory, methods, and apps** Spring School, Italy.
- o Travel award, **NetSci-X 2022**, Porto, Portugal.

- Accepted to **Machine Learning Summer School (MLSS 2020)**, Tübingen, Germany: acceptance rate of 13.8%.
- Travel award, **33rd Conference on Neural Information Processing Systems (NeurIPS 2019)**, Vancouver, Canada.
- Fully-funded fellowship, **Max Planck Institute for Software Systems**, Saarbrücken, Germany, 2019.
- Awarded full fellowship for internship, **Singapore University of Technology and Design (SUTD-MIT)**, Singapore, 2016.
- Awarded full fellowship for internship, **Swiss Federal Institute of Technology Lausanne (EPFL)**, Switzerland, 2016.
- Full attendance scholarship, **National Uni. of Singapore (NUS) Workshop** on Contemporary Research in Computer Science and Information Systems, Singapore, 2016.
- Awarded full fellowship for internship, **Hong Kong University of Science and Technology (HKUST)**, Hong Kong, 2015.
- Ranked among top **0.05%** in the Iranian nation-wide university entrance exam of Maths and Physics, 2011.
- Awarded Essential Advance diploma for research on pointed graphs from the 21st International Summer **Conference of Tournament of Towns**, Moscow, Russia., 2009

Invited Talks

Oral contribution to Computational Neuroscience Meeting (CNS*2024)	Natal, Brazil, Jul 2024
Maths in the Brain Workshop	Melbourne, Australia, Oct 2023
Telluride Neuromorphic Cognition Engineering Workshop (OSN23)	Telluride, USA, July 2023
Pharmacology Department, Oxford University	Oxford, UK, Oct 2022
Wellcome Trust Centre for Neuroimaging, University College London (UCL)	London, UK, Oct 2022
Spotlight at International Conference on Machine Learning (ICML)	Baltimore, USA, July 2022
Complex networks: Theory, Methods, and Applications	Como, Italy, May 2022
Workshop on Socially Responsible Machine Learning - ICML	Virtual, July 2021
International Joint Conference on Artificial Intelligence (IJCAI)	Virtual, Jan 2021
Machine Learning Summer School (MLSS)	Virtual, July 2020
Human-Centric Machine Learning (HCML) Workshop - NeurIPS	Vancouver, Canada, Dec 2019

Graduate Teaching Assistant

Monash University

Head TA for *Multi agent systems and collective behaviour*

Semester 2 – 2022

TA for *Computational Modelling and Simulation*

Semester 1 – 2020 & 2021

University of Melbourne

TA for *Real and Artificial Neural Networks*

Semester 2 – 2020

Professional Experience

Program Organizer/Area Chair:

- ECR committee member at Organization for Human Brain Mapping-Australian chapter & Maths in the Brain Workshop 2024 (**OHBM-OZ & Maths in the brain 2024**)
- Tutorial on “Unraveling Dynamics and Connectivity from Spiking Time Series” (**CNS*2024**)
- Workshop on Responsible AI at the International Conference on Learning Representations (**ICLR-21**)

Journal/Conference Reviewer:

- 38th Conference on Neural Information Processing Systems (**NeurIPS 2024**)
- IEEE Transactions on Neural Networks and Learning Systems 2023 (**IEEE TNNLS**)
- Learning on Graphs Conference (**LoG**) 2022, 2023
- 39th International Conference on Machine Learning (**ICML 2022**)
- 5th annual ACM FAccT conference (**ACM FAccT 2022**)
- 29th International Joint Conference on Artificial Intelligence 2020 (**IJCAI 2020**)
- Journal of Future Generation Computer Systems 2020 (**FGCS**)