# Mandana Samiei

PhD Candidate, Department of Computer Science, McGill University
514-549-9747 | samieima@mila.quebec | linkedin.com/in/mandana | scholar.google/mandana

## Research Interests

**Research Interests**: Reinforcement Learning, Probabilistic Modelling, Modularity, and Reasoning.

## Education

**Ph.D. – Mila and McGill University [GPA: 4.00/4.00]** — Montreal, Canada
*School of Computer Science. Advised by Prof. Blake Richards and Prof. Doina Precup* — *Jan. 2020 – present*

**M.Sc. – Concordia University [GPA: 4.02/4.30]** — Montreal, Canada
*Gina Cody school of engineering and computer science. Advised by Prof. Thomas Fevens* — *2017 – 2019*

**B.Sc. – Shahid Beheshti University [GPA: 17.22/20.00]** — Tehran, Iran
*School of Computer and electrical engineering. Advised by Prof. Mona Ghassemian* — *2012 – 2016*

## Recognition and Awards

| | |
|---|---|
| Awarded Fonds de Recherche du Québec Nature et technologies (FRQNT) | Apr. 2023 |
| Awarded Women in AI Excellence Doctoral Scholarship | Feb. 2022 |
| Invited talk on Memory in Reinforcement Learning at Microsoft Research Summit 2021 | Oct. 2021 |
| Awarded UNIQUE's (Unifying Neuroscience and Artificial Intelligence) PhD Excellence Scholarship | Jan. 2021 |
| Received MITACS Accelerate Research Award | Jan. 2019 |
| Accepted at DLRL Summer School and awarded Travel fund | Sep. 2019 |
| Received Concordia Merit Graduate Scholarship | Sep. 2018 |
| Ranked top 1% in Iranian National University Entrance Exam (Konkour) | Jul. 2012 |

## Research Projects

**Poster at NeurIPS Worksop** | *Causal Hypothesis Testing via Hierarchical Reinforcement Learning.* — Sept. 2024
- How can we generate hypothesis via structural causal models which can be tested using conditional policies?

**In progress** | *Schemas for planning in Reinforcement Learning (RL).* — Sept. 2024
- Learning the Underlying Structure of a task for Goal-Conditioned Planning in RL.

**In progress** | *Learning causal structure via Generative flow Networks.* — Mar. 2023
- Working on Bayesian Structure Learning to learn the underlying structure of a task.

**Poster** | *Episodic memory for deep reinforcement learning.* — Sept. 2021
- Studied **generalization performance** of reinforcement learning (RL) agents using episodic memories incl. neural episodic controller.
- Developed Grid-Cell based agent using LSTM and Actor-Critic models inspired by Banino et al.
- Presented at Microsoft Research Summit 2021 **link**.

**Poster** | *Towards a biologically-inspired navigation with grid-like representations.* — Aug. 2020
- Investigated the **navigation model** of reinforcement learning (RL) agents using grid-like representations.
- The project is accepted for a poster presentation at **BARL 2020** co-located with NeurIPS 2020.
- The **code** and the **poster** are available.

**Master's Thesis** | *Meta-Learning for Cancer Phenotype Prediction from Gene Expression Data* — Jan. 2020
- Designed a meta-learning framework and created a meta-dataset that contains 174 genomics and clinical tasks.
- Implemented meta learning models incl. MAML and Prototypical Networks
- The **full thesis** is available **here**.

**Paper** | *Torchmeta: A meta-learning library for PyTorch* — Sep. 2019
- Investigated few-shot learning datasets and contributed to an open source library for meta-learning algorithms.

- Torchmeta received the Best in Show award at the Global PyTorch Summer Hackathon 2019.
- The code is open-sourced **here** where it has achieved **1.9k stars** and **242 forks**. And here is the **manuscript.**

**Paper** | *The TCGA Meta-Dataset Clinical Benchmark.* Aug. 2019

- Built a clinical meta-dataset derived from The Cancer Genome Atlas Program (TCGA) which includes molecular profiles of more than 11,000 human tumors across 38 different cancers.
- Presented the work at Deep Learning and Reinforcement Learning Summer School - DLRLSS, 2019.
- The **preprint** and **code** are publicly available and have already been cited.

**Bachelor's Thesis** | *Human Activity Recognition using Smart Wireless Sensors* Jul. 2016

- Studied Received Signal Strength Indicator (RSSI) and Link Quality Indicator (LQI) and analyzed the observed patterns among different activities.
- Developed a Human Activity Recognition System to detect Sleeping, Sitting, Standing, Walking, etc.
- An extended abstract on "Activity Recognition using Smart Wireless Sensors" was accepted to the **IEEE Wireless Communications and Networking Conference (WCNC) 2017**. **Manuscript.**

## Professional Experience

**Software Developer Intern** 2018 – 2019

*THINK Surgical Co.* *Montreal, Canada*

- Under supervision of Stefan Seefeld & Sunil Rottoo, developed a python-based software to assess and analyze the **positional accuracy of a robotic surgical tool** that allows surgeons to cut the bones precisely during knee implant surgery. Proposal info.

## Presentations

**Towards Efficient Generalization in Continual RL using Episodic Memory.** October. 2021

*Microsoft Research Summit 2021* *Virtual*

- Main Audience: Microsoft researchers, profs and graduate students

**Meta-Learning for Cancer Phenotype Prediction using Gene Expression Data.** Jan. 2020

*Concordia University* *Montreal, Canada*

- Main Audience: Concordia graduate students and researchers

**TCGA Benchmark for Supervised Classification.** Aug. 2019

*Deep Learning and Reinforcement Learning Summer School (DLRLSS)* *Montreal, Canada*

- Main Audience: DLRL Summer school attendees

**Meta-Learning for Training Medical Image Analysis Systems.** Jan. 2019

*Medical Reading Group at Mila - Quebec AI Institute* *Montreal, Canada*

- Main Audience: Mila researchers

## Technical Skills

**Programming Languages**: Python, Java, C/C++, JavaScript

**Libraries**: Jax, Pytorch, Tensorflow, OpenAI Gym, Opencv, Pandas, NumPy, Matplotlib

**Developer Tools**: PyCharm, Jupyter Notebook, Git, Google Cloud Platform, VS Code

## Conference Review

**Reviewer** | *Conference on Continual Learning Agents (CoLLAs) 2024*

**Senior Reviewer** | *Reinforcement Learning Conference (RLC) 2024*

**Reviewer** | *Generative Models for Decision Making workshop at ICLR 2024*

**Reviewer** | *Transactions on Machine Learning Research (TMLR) 2023*

**Reviewer** | *Conference on Continual Learning Agents(CoLLAs) 2022*

**Reviewer** | *Decision Awareness in Reinforcement Learning (DARL) at ICML 2022*

**Reviewer** | *The 2nd Biological and Artificial Reinforcement Learning Workshop (BARL) at NeurIPS 2020*

**Reviewer** | *The 15th Machine Learning in Computational Biology Conference (MLCB) 2020*

**Reviewer** | *The AI for Social Good Workshop 2019, ICLR*

## Teaching Experience and Development

**Tutor & marker** | *Reinforcement Learning (COMP 579)* | *McGill University* Jan. 2022–April. 2022
**Tutor & marker** | *Fundamentals of Machine Learning (IFT 6390)* | *University of Montreal* Sept. 2020–Dec. 2020
**Tutor & marker** | *Intro to Robotics & Intelligent Systems (COMP 417)* | *McGill University* Sept. 2020–Dec. 2020
**Tutor & marker** | *Pattern Recognition (COMP 473)* | *Concordia University* Sept. 2019–Dec. 2019
**Lab demonstrator** | *Programming and Problem Solving (COMP 5481)* May. 2019–Aug. 2019
**Tutor & lab leader** | *Principles of Programming Languages (COMP 348)* Jan. 2019–May. 2019
**Tutor & lab leader** | *Computer Networks* | *Shahid Beheshti University* Sep. 2019
**Tutor, marker, lab designer** | *Technical Language in Computer Science* | *Shahid Beheshti University* Jan. 2016

## Community and Volunteer Activities

**Local Chair** | *Conference on Continual Learning Agents(CoLLAs) 2022, 2023* Apr. 2022 - Aug. 2023
**Challenge Organizer** | *ML Reproducibility Challenge (MLRC) 2023* Dec. 2023 - Mar. 2024
**Board Member** | *Women in Machine Learning - WiML* Mar. 2022 - Present
- Lead at WiML Workshop at ICML 2023.

**Workshop Organizer** | *Rethinking ML papers at ICLR 2021* May 2021
**Lab Representative** | *Quebec AI Institute - Mila* Oct 2021 - 2022
- Point of contact between admin, profs, and lab reps.

**Study-group organizer** | *Mila Neural-AI Reading Group* Sep. 2019 – Present
- This reading group is a bi-weekly meeting at Mila - Quebec AI Institute. The goal is to foster collaborations between the Neuroscience and Artificial Intelligence communities.The website can be found **here.**

**Content Creator** | *Neuromatch Academy 2021* Jul 2021 - Aug 2021
- Created hands-on **notebook** for RL for Games Tutorial.

**Workshop organizer** | *Women in Machine Learning (WiML) Un-Workshop at ICML 2020, Workshop* Jul. 2020
- Held Breakout Program and Logistics Chair at WiML 2020. Having this role led me to promote diversity and inclusion in STEM by highlighting the scientific achievements of individuals belonging to underrepresented groups.
- Created internal event materials and guidelines, held training sessions for presenters, led dry-run sessions, and created the post-event impact reports.

**Student volunteer** Sep. 2018 – Present
- *MAIN 2020*: Arranged the Gather.town platform for the social event at MAIN.
- *MAIS 2020*: Organized the poster session at Gather.town virtually, and mentored 5 volunteers.
- *MAIS 2019*: Helped with the posters, stands, and coordinated with the poster presenters.
- *RLDM 2019*: Helped with the registrations.
- *MAIS 2018*: Volunteered at the registration desk and logistics.
- *Robocup Montreal 2018*: Arranged the registration and welcome desk. Also, tested the robots for international competitions.

**Editor** | *International Technical Committee (ITC)* Jun. 2016 – Sep.2017
- As part of ITC association, I was in charge of editing and proofreading scientific papers as well as mentoring undergraduate student on their graduate studies applications.
- This committee was associated with Shahid Beheshti University of Iran. Their main focus was holding workshops regarding effective scientific communications in engineering schools. This association was founded by Mona Ghassemian. Here is the **website.**

## References

**Blake A. Richards** | *Assistant Professor, School of Computer Science at McGill University, blake.richards@mila.quebec*

***Doina Precup*** | Associate Professor, School of Computer Science at McGill University, dprecup@cs.mcgill.ca

**Thomas Fevens** | *Full Professor, Department of Computer Science and Software Engineering at Concordia University, fevens@cs.concordia.ca*