Michael Gimelfarb

Curriculum vitae

Contact Information

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Research Interests

I have recently completed a Postdoctoral Fellow in the D3M Lab led by Prof. Scott Sanner at the University of Toronto, researching applied sequential planning and decision-making under uncertainty. My research has also focused on improving the reliability of reinforcement learning through knowledge transfer, and by building and leveraging models of epistemic (Bayesian) uncertainty and risk.

Education

University of Toronto, Toronto, ON, Canada
Ph.D., Industrial Engineering Sep. 2017 – Dec. 2022

- **Thesis:** *Who Should I Trust? Using Uncertainty and Risk for Knowledge Transfer from Multiple Sources in Reinforcement Learning Domains*
- **Research Supervisors:** Scott P. Sanner and Chi-Guhn Lee
- **Affiliations:** Data-Driven Decision Making (D3M) Lab, Dynamic Optimization & Operations Management Lab, Center for Maintenance Optimization and Reliability Engineering (C-MORE)
- **GPA:** 3.93/4

University of Toronto, Toronto, ON, Canada
M.A.Sc., Operations Research Sep. 2015 – Sep. 2017

- **Thesis:** *Thompson Sampling for the Control of a Queue with Demand Uncertainty*
- **Research Supervisor:** Michael J. Kim
- **Affiliations:** Center for Maintenance Optimization and Reliability Engineering
- **GPA:** 3.93/4

Schulich School of Business, York University, Toronto, ON, Canada
B.B.A., Spec. Hons. Administrative Studies Sep. 2010 – Jun. 2014

- **Specialization:** finance
- **GPA:** 8.2/9 in major (graduated with distinction)

Experience

RVL Lab, Computer Science, University of Toronto, Toronto, ON, Canada
Postdoctoral Fellow Jan. 2024 – Present

- Developing offline reinforcement learning algorithms for robust evaluation of policies using existing data sets and in simulation.
- Co-supervising an undergraduate student exploring the use of generative diffusion for policy evaluation.
- Working in collaboration with the Toyota Research Institute.

D3M Lab, University of Toronto, Toronto, ON, Canada
Postdoctoral Fellow Jan. 2023 – Sep. 2023

- Coordinated a team of engineers and scientists to build a Python software package for automatic generation of OpenAI gym environments from planning domain language description files.
- Hosted the probabilistic track of the IPPC 2023 planning competition, wrote baselines, evaluation protocols and software documentation, presented software at industrial research labs, and managed continuous integration of bug fixes from user feedback and bug reports.
- Contributed novel deep learning algorithms for automated high-dimensional planning using JAX and TensorFlow.
- Contributed a novel bi-level optimization framework for robust and explainable planning using Gurobi.

Google DeepMind, London, U.K. (Remote)
Research Scientist, Intern, Reinforcement Learning Team Mar. 2022 – July 2022
- Derived a novel algorithmic framework for tackling never-ending reinforcement learning (NERL) more efficiently, by leveraging knowledge representation and transfer learning.
- Prototyped algorithms for internal research use in Python and JAX, submitted code for peer-review, and presented the solution to the research team, with a full-length paper under development.

Vector Institute, Toronto, ON, Canada
Postgraduate Affiliate Apr. 2020 – Apr. 2022
- Participated in internal research discussions and gave presentations about recently-published papers in the area of reinforcement learning.
- Participated in assessment and adjudication of scholarship applications for the Vector Scholarship in Artificial Intelligence.

Russell Investments, Toronto, ON, Canada
Research Analyst, Intern Oct. 2014 – May 2015
- Performed data analysis to summarize trends in clients' institutional asset allocations and competing mutual funds, and prepared reports for the sales and portfolio management teams that assisted in adjusting internal product offerings.
- Developed a robust VBA application from scratch to automate the processing of semi-structured client data, using natural language processing techniques such as fuzzy string matching, to reduce manual work by as much as 90%.

Dept. of Science and Engineering, York University, Toronto, ON, Canada
Research Assistant May 2014 – Oct. 2014
- Collaborated on a research project using multivariate statistical models (copulas) to derive novel pricing formulas for joint life insurance and annuities.
- Developed algorithms for pricing policies using real mortality data from the Canadian government.

Schulich School of Business, York University, Toronto, ON, Canada
Research Assistant Nov. 2013 – Sep. 2014
- Collaborated on a research project by using C#, HTML and RESTful APIs to extract and process large volumes of unstructured data from corporate 13F/13D filings in EDGAR, to determine whether hedge funds and sell-side analysts collude.

Professional Activities

Journal Reviewing

- Machine Learning Journal (MLJ) — 2018, 2019

Conference Reviewing

- International Conference on Machine Learning (ICML) — 2023
- Association for the Advancement of Artificial Intelligence (AAAI) — 2021, 2023
- International Conference on Learning Representations (ICLR) — 2021
- Neural Information Processing Systems (NeurIPS) — 2018, 2021
- Uncertainty in Artificial Intelligence (UAI) — 2018, 2019

International Talks

- Canadian Operations Research Society (CORS) Conference (Virtual) — Jun. 2021
- Institute of Industrial Systems Engineers (IISE) Conference (Virtual) — May 2021

International Competitions

- Technical team for International Planning Competition 2023: Probabilistic & RL Track (ICAPS) — Oct. 2022 – Now

Teaching

Teaching Assistant

- Preparing exercises for a new textbook on MDPs/RL written by Prof. Tim Chan and Prof. Martin Puterman, UofT — Fall 2021 – Now
- Dynamic Distributed Decision Making, UofT — Fall 2018, Winter 2020
- Stochastic Processes, UofT — Fall 2019
- Statistics and Design of Experiments, UofT — Winter 2017

Awards

- University of Toronto — Sep. 2017, 2020
  Ontario Graduate Scholarship ($15,000)
- Didi Chuxing Technology Co — Apr. 2020
  DiDi Graduate Student Award ($10,000)
- Vector Institute — Apr. 2020, 2021
  Postgraduate Affiliate Program ($6,000)
- York University — Nov. 2013, 2014, 2015
  Chair's Honor List
- University of Toronto — Sep. 2015
  Ivara Corporation Bill Shaw Memorial Scholarship ($5,000)
- York University — Oct. 2015
  Golden Key International Honour Society
- York University — Nov. 2014
  George R. and Mary L. Wallace Award for Excellence in Actuarial Mathematics ($1,500)
- York University — Aug. 2014
  York University Continuing Student Scholarship ($720)
- York University — Nov. 2013
  Joshua Tan Memorial Scholarship ($425)
- York University — Sep. 2010
  York University Entrance Scholarship ($2,000)

COMPUTER SKILLS

Languages & Software: Python (including JAX, TensorFlow, Keras, PyTorch), Java, Visual Basic, C#, Basic C++, Docker, Git

GitHub: https://github.com/mike-gimelfarb