Martin Fixman

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Statement

PhD student in Computer Science at the University of Cambridge with a background in computer science, machine learning, and mathematics. I develop learning-guided proof search for first-order theorem provers: learned axiom selection that orders a prover's choices without affecting soundness, integrated into SATCoP, Prover9, and Vampire. I am particularly interested in automated reasoning, formal verification, and learning-guided symbolic systems, with prior experience deploying adversarial machine-learning models at Meta.

Publications

All Axioms are Equal, but Some are More Equal Than Others: Neural Guidance for Axiom Selection on First-Order Provers (in preparation)
M. Fixman, F. Rømming, S. B. Holden
A graph network ranking axioms to guide SATCoP, Prover9, and Vampire; planned for CADE 2027.

Reset Early, Reset Often, Eliminate Models (2026)
M. Fixman, F. Rømming, S. B. Holden
Presented at the Vampire Workshop, FLoC 2026; proceedings forthcoming.
SATResetCoP 1.0 competed in CASC-J13 (2026): `https://github.com/mfixman/satresetcop`

PALMS: A Computational Implementation for Pavlovian Associative Learning Models' Simulation (2026)
M. Fixman, A. Abati, J. Jiménez Nimmo, S. Lim, E. Mondragón
Preprint; in preparation for submission to *Behaviour Research Methods*.
`https://arxiv.org/abs/2602.07519`

Comparison of Feature Extraction Methods and Predictors for Income Inference (2017)
M. Fixman, M. Minnoni, C. Sarraute
3er Simposio Argentino de Grandes Datos (AGRANDA), 46as JAIIO, Córdoba, Argentina.
`https://arxiv.org/abs/1811.05375`

A Bayesian approach to income inference in a communication network (2016)
M. Fixman, A. Berenstein, J. Brea, M. Minnoni, M. Travizano, C. Sarraute
2016 International Conference on Advances in Social Networks Analysis and Mining, San Francisco.
`http://ieeexplore.ieee.org/document/7752294/`

Education

University of Cambridge 2025 – *2029*
PhD in Computer Science, researching Automated Theorem Proving under Dr. Sean Holden.
Thesis topic: **Adaptive Automated Theorem Proving using Hierarchical Reinforcement Learning and Curriculum Learning**.

City, University of London 2023 – 2024
MSc in Artificial Intelligence, with Distinction (82.51% grade average).
Thesis: Knowledge Grounding in Large Language Models.

University of Buenos Aires 2011 – 2018
Licenciatura en Ciencias de la Computación (Integrated Master's Degree in Computer Science).
Elective subjects focused on artificial intelligence and formal logic.
Thesis: Methods for Inference of Socioeconomic Status in a Communications Graph.

Work Experience

Staff Researcher at CitAI, City, University of London 2024 – 2025

Created PALMS for research in computational cognitive science and contributed to work on improving retrieval-augmented language models.

Backend Engineer at Monzo 2021 – 2023

Built and maintained onboarding risk models for *Financial Crime Decisioning*, combining rules and machine learning to assess new-customer risk. Adapted models to changing operational requirements and adversarial attacks.

Software Engineer at Meta/Facebook 2017 – 2021

Developed and deployed machine-learning classifiers for Facebook and Instagram's *Abusive Accounts Detection* team, working against adaptive attackers while reducing false positives.

Highlights include:

- Automating the detection and deployment of hidden signals from attackers to use as ground truth to detect over 13M fake accounts every day.
- Finding new possible attack surfaces to collect data and add new classifiers, including one at account confirmation time that detects over 120K fake accounts every day.
- Leading a small team to develop a generalised linear least squares algorithm that predicts live metrics by combining accurate delayed metrics with recent less accurate ones.

Research Engineer at Grandata 2013 – 2017

Worked in the research "Labs" division, predicting user attributes such as age, home address, and income level from large phone-call and banking datasets. Collaborated on research projects on human mobility with MIT Human Dynamics Lab and the French Institute for Research in Computer Science and Automation.

Awards & Achievements

ACM International Collegiate Programming Contest

World Finalist in the 37th ACM ICPC — St. Petersburg, Russia (2013)

International Olympiad in Informatics (IOI)

Part of the Host Scientific Committee and Problem Writer — Pattaya, Thailand (2011)

Silver Medal on the 22nd International Olympiad in Informatics — Waterloo, Canada (2010)

Participation on the 21st International Olympiad in Informatics — Plovdiv, Bulgaria (2009)

Bronze Medal on the 20th International Olympiad in Informatics — Cairo, Egypt (2008)

Skills & Research Interests

Automated Reasoning and Logic

First-order theorem proving, connection tableaux, formal verification, and proof assistants.

Machine Learning for Reasoning

Reinforcement learning, imitation learning, curriculum learning, and neuro-symbolic methods.

Adversarial Machine Learning

Large-scale abuse detection and financial-crime risk modelling under adaptive attack.

Software Development

Research software in Python and Lean; broader experience with Haskell, C++, Go, SQL, and LaTeX, including model development with PyTorch and scikit-learn.