Adam Catto

Email : agocatto@gmail.com
github.com/adamcatto
linkedin.com/in/adamcatto/

Education

- **The Graduate Center, City University of New York** — New York, NY
  Master of Science in Data Science – Department of Computer Science — *2020 – 2022*
  - **GPA**: 3.90/4.00
  - **Relevant Graduate Courses**: Machine Learning, Artificial Intelligence, Computational Biology, Digital Image Processing, Seminar in Machine Learning & AI for Bioinformatics: Deep Learning for Genomics, Big Data Analytics, Capstone Master's Thesis, Data Visualization, Data Mining

- **Stony Brook University** — Stony Brook, NY
  Bachelor of Science in Applied Mathematics & Statistics and Philosophy (Honors) — *2015-2019*
  - **Relevant Courses**: Operations Research, Data Analysis, Linear Algebra, Multivariable Calculus, Differential Equations, Advanced Symbolic Logic, Graph Theory, Combinatorics, Applied Abstract Algebra, Formal Semantics, Introduction to Computational Linguistics & NLP

- **Carnegie Mellon University** — Pittsburgh, PA
  (Non-Degree-Conferring) Summer School in Logic & Formal Epistemology – Department of Philosophy — *2018*
  - **Relevant Courses**: Computational Linguistics, NLP, Topological Epistemic Logic, Bayesian Statistics

Employment

- **Icahn School of Medicine at Mount Sinai** — New York, NY
  Data Scientist, Nash Family Department of Neuroscience, Friedman Brain Institute — *Jun 2022-Present*
  - **Machine Learning Research & Engineering**: Machine learning and artificial intelligence for medical imaging, neurophysiology, and lab animal behavior prediction.
  - **Data Analysis**: Analyzed single-cell and spatial transcriptomics datasets to understand rodent models of neurobehavioral disorders, with an emphasis on substance use disorders.
  - **Adjunct Instructor**: Guest lecturer in the Icahn School of Medicine's Graduate School of Biomedical Sciences for BDS 3002: Machine Learning for Biomedical Data Science. Topics: Cluster Analysis.

- **Janssen R&D, Johnson & Johnson** — Cambridge, MA (Remote)
  Research Data Science Intern, Clinical Insights — *Jun 2021-Oct 2021*
  - **Digital Biomarker Identification**: Identified digital biomarkers of activity and sleep in immune-mediated inflammatory disease populations from the UK Biobank using accelerometer data. Built predictive models of autoimmune disorders from accelerometer time series features.

- **Research Foundation of CUNY** — New York, NY
  Graduate Research Assistant – Distributed Artificial Intelligence Laboratory — *Aug 2020 - Present*
  - **Machine Learning for Clinical Decision-Making**: Worked under the supervision of Professor Anita Raja on prediction of maternal and fetal outcomes and optimizing obstetric test scheduling. Designed and implemented novel machine learning algorithms for making predictions with missing data.

- **Stony Brook University** — Stony Brook, NY
  Teaching Assistant and Undergraduate Researcher — *Aug 2017 - May 2019*
  - **Undergraduate Researcher – Computer Science & Philosophy**: Projects included developing a method for splicing elementary topoi, sketching a formalism for philosophical systems/worldviews, and creating a computational representation of Tegmark's multiverse hierarchy (resulted in a conference paper/presentation at the 2017 Logic, Relativity, and Beyond conference)
  - **Teaching Assistant**: Graded, taught recitation sections, and gave guest lectures for courses CSE 215 (Foundations of Computer Science), CSE 371 (Logic), PHI 108 (Introduction to Logical and Critical Reasoning), and PHI 220 (Symbolic Logic).

Skills, Awards, Honors

- **Programming**: Python, MATLAB, R, Shell Scripting
- **Machine Learning / Data Science**: PyTorch, PyTorch-Lightning, PyTorch-XLA, Scikit-Learn, NumPy, Pandas, SciPy, OpenCV, PyTorch-Geometric, BioPython PDB, ScanPy
- **Misc**: Bash/Zsh, LaTeX, Jupyter, Google Cloud Platform, SLEAP
- **Awards & Honors**:
  - Winner, NICHD Decoding Matenal Morbidity Data Challenge *2021*
  - Stony Brook University URECA Summer Research Grant *2018*
  - IBM Thomas J. Watson Memorial Scholar *2015 - 2019*
  - Stony Brook University Presidential Scholar *2015 - 2019*

Theses

1. Catto, A. (2021). Hierarchical Model Transfer Methods for Ensemble Learning with Large Amounts of Missing Data. **Master's Thesis**, Data Science M.S. Program, CUNY Graduate Center Department of Computer Science.

2. Catto, A. (2019). The Category of Worldviews: Computational Tools for Structuring and Assessing Philosophical and Ideological Systems of Thought. **Undergraduate Honors Thesis**, Stony Brook University Department of Philosophy.

Publications, Preprints, & Technical Reports

1. Catto, A., Jia, N., Raja, A., & Salleb-Aouissi, A. (2023). Extending Dynamic Ensemble Weighting to Handle Missing Values over Imputation-Prediction Pipelines. (Under Review at AAAI 2024)

2. Yun, C. L., MALLIA, D., CLARK-SEVILLA, A. O., CATTO, A., LESHCHENKO, A., WAPNER, R., ... & SALLEB-AOUISSI, A. A. (2022). Preeclampsia Predictor with Machine Learning: A Comprehensive and Bias-Free Machine Learning Pipeline. medRxiv.

3. Goretsky, A., Dmitrienko, A., Tang, I., Lari, N., Kunhardt, O., Khan, R. R., ... & Gyamfi-Bannerman, C. (2021). Data Preparation of the nuMoM2b Dataset. medRxiv.

Papers in Progress

Given that I am starting out in my research career, I have several first-author projects that have mostly concluded; I am in the process of writing up corresponding papers, so I will list those here:

1. Forecasting Animal Behavioral Events in the Laboratory with Computer Vision *(Status: Completed, Editing Manuscript; Target: Nature Communications).* Collaborators: Li Shen, PhD; Paul Kenny, PhD; Richard O'Connor, PhD; Kevin Braunscheidel, PhD (Icahn School of Medicine at Mount Sinai)

2. Improved Detection of Miniature Inhibitory Postsynaptic Currents with Deep Conditional Adversarial Multi-Domain Learning *(Status: Completed; Target: Nature Machine Intelligence / Nature Communications; Submission timing contingent on obtaining commercial software license)* Collaborators: Li Shen, PhD; Paul Kenny, PhD; Junshi Wang, PhD; Masago Ishikawa, PhD (Icahn School of Medicine at Mount Sinai)

3. Predicting Neuronal Subtypes from Whole-Cell Patch Clamp Postsynaptic Current Traces *(Status: Experiments completed.)* Collaborators: Li Shen, PhD; Paul Kenny, PhD; Junshi Wang, PhD; Masago Ishikawa, PhD (Icahn School of Medicine at Mount Sinai)

Posters and Conference Talks

1. Catto, A. (2018). Novel Methods for Splicing Topoi via Semantic Fibering Techniques. Stony Brook University Undergraduate Research & Creative Activities Symposium.

2. Catto, A. (2017). Towards a Formal Theory of Digital Physics: Digital Multiverses. Logic, Relativity, and Beyond 3rd International Conference.

Projects

- **Freezing of Gait Prediction from Wearable Data**: Developed a fully convolutional neural network with wavelet features to predict freezing of gait in Parkinson's patients, via the Kaggle Freezing of Gait competition. Scored in the top 21%.
- **Deep Diffusion Networks on Protein Surfaces**: Implemented a system to learn diffusion models of 3D-surface data extracted from Protein Data Bank files and perform ligand binding site prediction, using PyTorch-Geometric. github.com/adamcatto/prosudi
- **Computer Vision and Image Processing for Intelligent Transportation Systems**: Built an efficient prior- and motion-based image processing architecture for real-time multi-object tracking in noisy tunnel traffic camera video feeds. Also developed an image processing library from scratch in Python. github.com/adamcatto/dippy

Service

Peer Review:

1. Served as a reviewer for the Machine Learning in Computational Biology 2022 & 2023 conferences.