

Aram-Alexandre Pooladian

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Education

MSc in Applied Mathematics

Focus: Optimization and Deep learning

Advisors: Tim Hoheisel and Adam Oberman

Funding: Lorne Trottier Fellowship, NSERC CGS-M, FRQNT Scholarship, Mitacs Scholarship

GPA: 4.00/4.00

McGill University

May 2018 – May 2020 (Expected)

BA in Honours Applied Mathematics

CGPA: 3.93/4.00, *Majors GPA:* 4.00/4.00

Awards: NSERC Undergraduate Student Research Award (thrice received), FRQNT supplement funding (twice received), Charlie Peters Scholarship, First Class Honours, Dean's Honour List

McGill University

September 2014 – May 2018

Research Interests

Convex and non-smooth analysis, statistical and computational optimal transport, optimization theory (e.g. algorithm convergence), image processing, and optimization problems in deep learning

Research Experience

Submitted

- o Hoheisel, T., Pablos, B., **Pooladian A-A.**, Schwartz, A., and Steverango, L. (alphabetical) "A survey of one-parameter regularization methods for mathematical programs with vanishing constraints" (Submitted to *Optimization Methods and Software*, 2020)

Conference publications

- o Finlay, C.*, **Pooladian, A-A.***, and Oberman, A. "The LogBarrier attack: making effective use of decision boundary information", IEEE International Conference on Computer Vision (ICCV), 2019
 - Github repo to code and paper: www.github.com/cfinlay/logbarrier [PyTorch]
- o **Pooladian, A-A.***, Finlay, C., Hoheisel, T., and Oberman, A. "A principled approach for generating adversarial images under non-smooth dissimilarity metrics", Proceedings of the 23rd International Conference on Artificial Intelligence and Statistics (AISTATS), 2020.
 - Github repo to code and paper: www.github.com/APooladian/ProxLogBarrierAttack [PyTorch]
- o **Pooladian, A-A.***, Finlay, C., and Oberman, A. "Farkas layers: Don't shift the data, fix the geometry", Pre-print, 2020
 - Github repo to code and paper: www.github.com/APooladian/FarkasLayers [PyTorch]

Projects

- o **Pooladian, A-A.***, Iannantuono, A., Finlay, C., and Oberman, A. "A Langevin dynamics approach to generating sparse adversarial perturbations", Pre-print available (click here), 2019
- o **Pooladian, A-A.** "Numerical methods for the Fermat-Weber problem in polyhedral norms", Master's thesis project, 2019

Asterisk next to author name indicates first or joint-first author contribution

- o **Pooladian A-A.***, and Orfanides, G. "Sparse autoencoder via Scholtes relaxation scheme", Course project, Fall 2018

Honours Thesis: Topics in non-smooth optimization (Summer, Fall 2017)

- o Gained a strong foundation in convex analysis: duality and subdifferential theory, non-smooth analysis, proximal operators, strongly (weakly-) convex functions, infimal convolution, and non-smooth algorithms
- o Supervisor: Professor Tim Hoheisel

Research awards and scholarships

IPAM Research Fellow at UCLA (\$7 000 USD) *March 2020 – June 2020*

Full funding to attend long program at UCLA on high dimensional PDEs and Optimal Transport

Mitacs Scholarship with Desjardins (\$13 000) *September 2019 – December 2019*

Research stipend promoting student and industry collaboration

FRQNT Master's Scholarship (\$35 000) *May 2019 – May 2021*

Highly competitive research stipend (Ranked 2nd amongst all applicants for mathematics)

Lorne Trottier Fellowship (\$5 000) *May 2018 – May 2019*

Fellowship awarded to supplement NSERC CGS-M Scholarship; awardees are nominated by the faculty

NSERC CGS-M Scholarship (\$17 500) *May 2018 – May 2019*

Highly competitive graduate stipend awarded to ~3 of 32 applicants in the department

Charlie Peters Scholarship (\$2 500) *Sept 2017 – May 2018*

Scholarship awarded on the basis of academic merit

NSERC Undergraduate Student Research Award (USRA) (\$5 600 x 3) *Summer 2015, 2016, 2017*

Thrice awarded: Department of Biomedical Engineering, Physiology, and Mathematics

FRQNT Undergraduate Supplemental Funding (\$2 000 x 2) *Summer 2016, 2017*

Supplemental funding for NSERC USRA awardees

Relevant graduate coursework

- o *Probability and Statistics*: Bayesian Statistics, Computational Intensive Statistics, Advanced Probability Theory, Combinatorics, Econometrics I (theory) and II (applications), Concentration Phenomena
- o *Modelling theory*: Models in Financial Economics, Mathematical Modeling in Biology
- o *Optimization*: Continuous Optimization, Convex Analysis and Algorithms, Applied Machine Learning
- o *Analysis*: Partial Differential Equations, Numerical Analysis, Numerical Differential Equations

Professional activities

- o President of the Graduate Students Associations of Mathematics and Statistics (GSAMS) (2019 – 2020)
- o Co-organizer for the Directed Reading Program (DRP) at McGill University (2019 – 2020)
- o Academic reviewer for Winter conference on Applications to Computer Vision (WACV)
- o Teaching assistant for Honours Calculus 1 at McGill University (Fall 2018)

Programming languages

PyTorch (~2 years), Python (~3 years), MATLAB (~5 years), R (~1 year)