

## EDUCATION

**M.Sc., Applied Mathematics – Simon Fraser University**

Sep 2020-Mar 2023

- Thesis title: *Unrolled NESTA: constructing stable, accurate and efficient neural networks for gradient-sparse imaging problems*
- Committee: Ben Adcock, Nilima Nigam, Ozgur Yilmaz, Nadish de Silva

**B.Sc., Mathematics Honours – Simon Fraser University**

Sep 2014-Apr 2020

- Minor in *Computing Science*
- Thesis title: *Diversities, cluster analysis, and ultrametric embeddings*
- Committee: Paul Tupper, Jonathan Jedwab

## TECHNICAL SKILLS

- Linux, Windows
- Python, MATLAB, SQL, C, Git, Bash, LaTeX
- Tensorflow, Torch, Numpy, Pandas, Spark, Scikit-learn, NetworkX, Jupyter
- Machine learning and statistics
- Data analysis, visualization and cleaning
- Optimization theory and algorithms
- Technical writing, presentations and research

## WORK EXPERIENCE

**Data scientist – Statistics Canada**

Oct 2019-Aug 2020

- Designed and implemented OpenTabulate, a data tabulation Python program
- Assembled and published open datasets for Canadian health and education facilities on Statistics Canada's website
- Collaborated with co-workers and supervisors to write, edit, and submit documentation of several projects

Jan-Apr 2019

May-Aug 2018

## PUBLICATIONS

**Journal papers**

- M. Neyra-Nesterenko & B. Adcock, *NESTANets: stable, accurate and efficient neural networks for analysis-sparse inverse problems*. *Sampl. Theory Signal Process. Data Anal.* **21**, 4 (2023)

**Conference abstracts**

- B. Adcock & M. Neyra-Nesterenko. Provably accurate, stable and efficient deep neural networks for compressive imaging. In *International Conference on Computational Harmonic Analysis*, volume 48. 13-17 Sep 2021.

**Preprints**

- B. Adcock, M. Colbrook & M. Neyra-Nesterenko, *Restarts subject to approximate sharpness: a parameter-free and optimal scheme for first-order methods*. arXiv:2301.02268.

## PRESENTATIONS

### Contributed talks

- *Unrolled NESTA: constructing stable, accurate and efficient neural networks for gradient-sparse imaging problems* – Math Grad Social Seminar (Feb 7, 2023)
- *Restart schemes: a powerful parameter-free acceleration scheme for first-order methods*  
SFU Applied Math Seminar (Nov 23, 2022)
- *Stable, accurate and efficient deep neural networks for reconstruction of gradient-sparse images*  
SIAM Pacific Northwest Conference (May 21, 2022)
- *Stable, accurate and efficient deep neural networks for gradient sparse imaging*  
SIAM Conference on Imaging Science (Mar 22, 2022)
- *Stable, accurate and efficient deep neural networks for inverse problems with analysis sparse models*  
SFU Operations Research Seminars (Feb 14, 2022)
- *Provably accurate, stable and efficient deep neural networks for compressive imaging*  
International Conference on Computational Harmonic Analysis (Sep 17, 2021)
- *Provably accurate and stable deep neural networks for imaging*  
CAIMS Annual Meeting (Jun 23, 2021)

## RESEARCH INTERNSHIPS

### Undergraduate Research Assistant – Simon Fraser University

- Supervised by Paul Tupper and funded by NSERC May-Aug 2017
- Supervised by Karen Yeats and funded by SFU May-Aug 2016

## AWARDS

### NSERC Canada Graduate Scholarships Master's

May 2021-Apr 2022

Value: \$17500, received from NSERC by application

### Peter Borwein Memorial Graduate Scholarship

Jan-Apr 2022

Value: \$1500, received from SFU by nomination

### BC Graduate Scholarship

Sep 2020-Aug 2021

Value: \$15000, received from SFU by nomination

### NSERC Undergraduate Student Research Award

May-Aug 2017

Value: \$4500, received from NSERC by application

### VPR Undergraduate Student Research Award

May-Aug 2016

Value: \$4500, received from SFU by application

## RECOGNITION

- AISTATS 2023 top reviewer (top-10% of reviewers) Feb 2023

## REFEREE ACTIVITY

- SIAM Journal on Scientific Computing (SISC) Spring 2023
- International Conference on Artificial Intelligence and Statistics (AISTATS) Fall 2022

## WORKSHOPS and DEVELOPMENT

**PIMS-IFDS-NSF Summer School on Optimal Transport – University of WA** Jun 20-Jul 1, 2022

- Workshop and lectures on optimal transport, with numerous researchers presenting their work in the area

**PIMS Math to power Industry workshop – University of Calgary** Aug 3-27, 2021

- Completed MITACS professional industry training and development courses
- Presented and reported for Serious Labs project on developing real-time simulation for hydraulic systems

## TEACHING and MENTORSHIP

**Teaching assistant – Simon Fraser University**

- Advised and guided students in math workshop and tutorials
- Performed marking, invigilation, and management duties
- Past courses and workshops:
  - Continuous optimization, algebra workshop Fall 2022
  - Ordinary differential equations Summer 2022
  - Algebra workshop, mathematics of data science Spring 2022
  - Vector calculus, applied calculus workshop Spring 2021
  - Algebra workshop Fall 2020
  - Applied calculus workshop Fall & Spring 2018

## PERSONAL PROJECTS

**Address parsing with recurrent neural networks** Jun 26, 2023

- Mockup character-level Canadian address parser built with machine learning
- Procedural generation used to tackle the issue of imbalanced data
- Improved robustness by augmenting training data with typos

**San Francisco fire service analysis** May 23, 2023

- Independent exploration of San Francisco's fire department with open data
- Collected descriptive statistics on service calls, safety complaints and incidents
- Examined trends and answered questions using inferential statistics

**Strongly solving Quantik** Mar 22, 2023

- Independently solved the 2-player abstract strategy game Quantik
- Search written in C for high performance with cache-friendly data structures

## MEMBERSHIPS

**Canadian Applied and Industrial Mathematics Society (CAIMS)**

Jan 2021-Dec 2022

**Society for Industrial and Applied Mathematics (SIAM)**

Jan 2021-Dec 2022

## LICENSES and CERTIFICATIONS

**First aid and CPR/AED level C – Canadian Red Cross**

Jul 2023-Jul 2026

- Credential ID: 104291530