# Andrew D. McRae

École Polytechnique Fédérale de Lausanne
Institute of Mathematics

andrew.mcrae@epfl.ch
admcrae.github.io


**Research Interests**

Exploiting structure in high-dimensional statistics and machine learning
Convex relaxations and optimization for high-dimensional inference
Regression and classification with linear/kernel methods

**Education**

**Ph.D. in Electrical and Computer Engineering** 2017–2022
Georgia Institute of Technology
Thesis: *Structured Statistical Estimation via Optimization*
Advisor: Mark Davenport

**M.S. in Mathematics** 2021
Georgia Institute of Technology

**M.S. in Electrical and Computer Engineering** 2016
Georgia Institute of Technology

**B.S. in Applied Mathematics** 2012–2015
**B.S. in Electrical Engineering**
Georgia Institute of Technology
Highest Honor

**Employment**

**École Polytechnique Fédérale de Lausanne** 2022–Present
Institute of Mathematics (Postdoctoral researcher)

**Georgia Tech** 2017–2022
School of Electrical and Computer Engineering (GRA/GTA)
School of Interactive Computing (GTA)

**Georgia Tech Research Institute** 2016–2017
Robotics and Autonomous Systems Division

**Raytheon Missile Systems** Summer 2015
Systems Test Division

**Honors**

Georgia Tech ECE Cleaver Award (best Ph.D. proposal) 2020
Georgia Tech ARC-TRIAD fellowship 2020
SPARS workshop finalist for Best Student Paper Award 2019
Georgia Tech President's Fellowship 2017–2021
Georgia Tech ECE Cleaver Award (highest preliminary exam score) 2016
Georgia Tech Faculty Honors (perfect GPA), eight semesters 2012–2015

**Preprints**

**Andrew D. McRae**, Justin Romberg, and Mark A. Davenport, "Optimal convex lifted sparse phase retrieval and PCA with an atomic matrix norm regularizer," 2021, arXiv: 2111.04652 [math.ST]

**Journal Publications**

**Andrew D. McRae** and Mark A. Davenport, "Low-rank Matrix Completion and Denoising Under Poisson Noise," *Inform. Inference.* 10, no. 2 (2021): 697–720

**Conference Publications**

**Andrew D. McRae**, Austin Xu, Jihui Jin, Namrata Nadagouda, Nauman Ahad, Peimeng Guan, Santhosh Karnik, and Mark A. Davenport, "Delta Distancing: A Lifting Approach to Localizing Items from User Comparisons," in *Proc. IEEE Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP)* (Singapore, May 2022)

**Andrew D. McRae**, Santhosh Karnik, Mark A. Davenport, and Vidya Muthukumar, "Harmless interpolation in regression and classification with structured features," in *Proc. Int. Conf. Artif. Intell. Statist. (AISTATS)* (Virtual conference, March 2022)

**Andrew D. McRae**, Justin Romberg, and Mark A. Davenport, "Sample Complexity and Effective Dimension for Regression on Manifolds," in *Proc. Conf. Neural Inf. Process. Syst. (NeurIPS)* (Virtual conference, December 2020)

## Workshop Publications

**Andrew D. McRae** and Mark A. Davenport, "Low-rank Matrix Completion and Denoising Under Poisson Noise," in *Work. on Signal Processing with Adaptive Sparse Structured Representations (SPARS)* (Toulouse, France, July 2019)
**(Finalist for Best Student Paper Award)**

## Presentations

"Delta Distancing: A Lifting Approach to Localizing Items From User Comparisons," in *IEEE Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP)* (Singapore, May 2022)

"Harmless interpolation in regression and classification with structured features," in *Int. Conf. Artif. Intell. Statist. (AISTATS)* (Virtual conference, March 2022)

"An Atomic Matrix Norm Regularizer for Sparse Phase Retrieval and PCA," in *Georgia Tech ACO Student Seminar* (Atlanta, Georgia, September 2021)

"Risk bounds for regression and classification with structured feature maps," in *IFDS-MADLab Work. on Statistical Approaches to Understanding Modern ML Methods* (Madison, Wisconsin, August 2021)

"Sample complexity and effective dimension for regression on manifolds," in *Conf. Neural Inf. Process. Syst. (NeurIPS)* (Virtual conference, December 2020)

"Low-rank Matrix Completion and Denoising Under Poisson Noise," in *IAS Work. on Missing Data Challenges in Computation, Statistics and Applications* (Virtual conference, September 2020)

"Sample Complexity and Effective Dimension for Regression on Manifolds," in *Bernoulli-IMS One World Symp.* (Virtual conference, August 2020)

"Effective Dimension in Sample-complexity Bounds for Hilbert Space Regression," in *Int. Conf. High-Dimensional Probability* (Virtual conference, June 2020)

"Low-rank Matrix Completion and Denoising Under Poisson Noise," in *Rice University DSP Seminar* (Houston, Texas, October 2019)

"Low-rank Matrix Completion and Denoising Under Poisson Noise," in *Work. on Signal Processing with Adaptive Sparse Structured Representations (SPARS)* (Toulouse, France, July 2019)

## Teaching Experience

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|---|---|
| Introduction to Artificial Intelligence (CS 3600) | Spring 2022 |
| Introduction to Signal Processing (ECE 2026) | Fall 2020, Spring 2021 |
| *As a teaching assistant:* | |
| Convex Optimization (ECE graduate special topics) | Spring 2019 |
| Statistical Machine Learning (ECE 6254) | Spring 2018 |
| Advanced Digital Signal Processing (ECE 6250) | Fall 2017 |
| Introduction to Signal Processing (ECE 2026) | Spring 2016 |
| Calculus III (Math 2401) | Spring 2015 |
| Calculus II (Math 1502) | Fall 2014 |

**Service**

Reviewer for *IEEE Trans. Signal Processing*
Reviewer for *IEEE Trans. Information Theory*
Reviewer for *IEEE Trans. Pattern Analysis and Machine Intelligence*
Reviewer for *EURASIP J. Advances in Signal Processing*
Reviewer for *Int. Conf. Artificial Intelligence and Statistics (AISTATS)*
Reviewer of Ph.D. program applications for Georgia Tech ECE 2022
Officer, Eta Kappa Nu (Beta Mu Chapter) 2015–2017