Andrew D. McRae

Georgia Institute of Technology
School of Electrical and Computer Engineering

admcrae@gatech.edu
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. student in Electrical and Computer Engineering 2017–Present
Georgia Institute of Technology
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

Industry Experience

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

Raytheon Missile Systems Summer 2015
Systems Test Division

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, arXiv: 1907.05325 [stat.ML]

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)* (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), arXiv: 2111.05198 [stat.ML]

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), arXiv: 2006.07642 [stat.ML]

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

"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)

"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

Introduction to Artificial Intelligence
CS 3600, Georgia Tech
Spring 2022

Introduction to Signal Processing
ECE 2026, Georgia Tech
Fall 2020, Spring 2021

Convex Optimization (Teaching assistant)
ECE Special Topics, Georgia Tech
Spring 2019

Statistical Machine Learning (Teaching assistant)
ECE 6254, Georgia Tech
Spring 2018

Advanced Digital Signal Processing (Teaching assistant)
ECE 6250, Georgia Tech
Fall 2017

Introduction to Signal Processing (Teaching assistant)
ECE 2026, Georgia Tech
Spring 2016

Calculus III (Teaching assistant)
Math 2401, Georgia Tech
Spring 2015

Calculus II (Teaching Assistant)
Math 1502, Georgia Tech
Fall 2014

Peer Review Service

IEEE Transactions on Information Theory
EURASIP Journal on Advances in Signal Processing
Int. Conference on Artificial Intelligence and Statistics (AISTATS)

Other Professional Service

Reviewer of Ph.D. program applications for Georgia Tech ECE
Officer, Eta Kappa Nu (Beta Mu Chapter), 2015–2017

Honors

Georgia Tech ECE Cleaver Award (best Ph.D. proposal), 2020
Georgia Tech ARC-TRIAD fellowship, Spring 2020
Finalist for Best Student Paper Award, SPARS 2019
Georgia Tech President's Fellowship, 2017–2021
Georgia Tech ECE Cleaver Award (highest preliminary exam score), 2016
Eta Kappa Nu, 2014
Georgia Tech Faculty Honors, eight semesters, 2012–2015