

Andrew D. McRae

EPFL
Institute of Mathematics

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Research Interests	Exploiting structure in high-dimensional statistics and machine learning (Non-)convex relaxation and optimization for high-dimensional inference	
Education	Ph.D. in Electrical and Computer Engineering	2017–2022
	Georgia Institute of Technology	
	Thesis: <i>Structured Statistical Estimation via Optimization</i>	
	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 (EPFL)	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 (Intern and GRA)	
	Raytheon Missile Systems	Summer 2015
	Systems Test Division (Intern)	
Honors	Georgia Tech CSIP Outstanding Research Award	2022
	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 prelim score)	2016
	Georgia Tech Faculty Honors (perfect GPA), eight semesters	2012–2015
Preprints	Austin Xu, Andrew D. McRae , Jingyan Wang, Mark A. Davenport, and Ashwin Pananjady, “Perceptual adjustment queries and an inverted measurement paradigm for low-rank metric learning,” 2023, arXiv: 2309.04626 [stat.ML]. To appear in NeurIPS 2023.	
	Andrew D. McRae and Nicolas Boumal, “Benign landscapes of low-dimensional relaxations for orthogonal synchronization on general graphs,” 2023, arXiv: 2307.02941 [math.OC]	
	Chiraag Kaushik, Andrew D. McRae , Mark A. Davenport, and Vidya Muthukumar, “New Equivalences Between Interpolation and SVMs: Kernels and Structured Features,” 2023, arXiv: 2305.02304 [stat.ML]	

Journal Publications

Andrew D. McRae, Justin Romberg, and Mark A. Davenport, “Optimal convex lifted sparse phase retrieval and PCA with an atomic matrix norm regularizer,” *IEEE Trans. Inf. Theory* 69, no. 3 (2023): 1866–1882

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)

Presentations

“The rank-relaxed optimization landscape for orthogonal group synchronization on a general graph,” in *Found. Comput. Math. Conference* (Paris, June 2023)

“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) (**finalist for Best Student Paper Award** for extended abstract)

Teaching Experience	Intro. Artificial Intelligence (CS 3600, Georgia Tech)	Spring 2022
	Intro. Signal Processing (ECE 2026, Georgia Tech)	Fall 2020, Spring 2021
	<i>As a teaching assistant:</i>	
	Theory of Stochastic Calculus (MATH 431, EPFL)	Fall 2022
	Convex Optimization (ECE special topics, Georgia Tech)	Spring 2019
	Statistical Machine Learning (ECE 6254, Georgia Tech)	Spring 2018
	Adv. Digital Signal Processing (ECE 6250, Georgia Tech)	Fall 2017
	Intro. Signal Processing (ECE 2026, Georgia Tech)	Spring 2016
	Calculus III (Math 2401, Georgia Tech)	Spring 2015
	Calculus II (Math 1502, Georgia Tech)	Fall 2014
Journal Reviewing	<i>IEEE Trans. Signal Processing</i>	
	<i>IEEE Trans. Information Theory</i>	
	<i>IEEE Trans. Pattern Analysis and Machine Intelligence</i>	
	<i>EURASIP J. Advances in Signal Processing</i>	
Conference Reviewing	<i>Int. Conf. Artificial Intelligence and Statistics (AISTATS)</i>	
	<i>IEEE Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP)</i>	
Other Service	Team leader and jury member for Int. Math. Competition (IMC)	2023
	Reviewer of Ph.D. program applications for Georgia Tech ECE	2022
	Officer, Eta Kappa Nu (Beta Mu Chapter)	2015–2017