

Mateo Díaz

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Research Interests

I am interested in the interplay between continuous optimization, high-dimensional statistics and probability and its applications to data science.

Education

Cornell University

Ph.D. Applied Mathematics (2016–Present)

Center for Applied Mathematics,

Committee: Damek Davis (Advisor), Robert Kleinberg, Adrian Lewis, and James Renegar;

M.S. Computer Science (2016–2018)

Computer Science Department.

Universidad de los Andes

M.S. Mathematics (2014–2016)

B.S. Mathematics (2010–2013)

Department of Mathematics;

B.S. Systems and Computing Engineering (2010–2015)

Systems and Computing Engineering Department.

Publications

Journal papers

Low-rank matrix recovery with composite optimization: good conditioning and rapid convergence

(with V. Charisopoulos, Y. Chen, D. Davis, L. Ding, D. Drusvyatskiy)

Foundations of Computational Mathematics (Accepted with minor revisions), 2019.

Composite optimization for robust blind deconvolution

(with V. Charisopoulos, D. Davis, D. Drusvyatskiy)

Information and Inference (To appear), 2019.

Local angles and dimension estimation from data on manifold

(with A. Quiroz, M. Velasco)

Journal of Multivariate Analysis, 2019.

Compressed sensing of data with known distribution

(with M. Junca, F. Rincón, M. Velasco)

Applied and Computational Harmonic Analysis, 2018.

Conference papers

Efficient Clustering for Stretched Mixtures: Landscape and Optimality

(with K. Wang and Y. Yan), *NeurIPS*, 2020.

The nonsmooth landscape of blind deconvolution

Workshop on Optimization for Machine Learning, 2019.

In search of balance: The challenge of generating balanced Latin rectangles

(with C. Gomes, R. Le Bras)

CPAIOR, 2017.

Presentations

SIAM Conference on Mathematics of Data Science, Hong Kong, China May 2020. Speaker. **(Cancelled)**

SIAM Conference on Mathematics of Data Science, Cincinnati, OH May 2020. Speaker. **(Cancelled)**

INFORMS Optimization Society Conference, Greenville, SC. Speaker March 2020. **(Postponed)**

RPI Applied Math days, Troy NY, April 2019. Speaker.

Composite optimization for robust blind deconvolution.

Young Researchers Workshop (ORIE Cornell), Ithaca NY October 2017. Poster presenter.

A Randomized Algorithm for Quadratic inclusions.

Foundations of Computational Mathematics conference, Barcelona Spain June 2017. Poster Presenter.

Angles and Intrinsic Dimension.

Octava Escuela de Física Matemática, Bogotá Colombia May 2016. Speaker. *A geometrical introduction to origami*.

The 22nd International Symposium on Mathematical Programming, Pittsburgh PA June 2015. Speaker at Contributed Sessions.

Compressed Sensing with an a priori distribution.

Foundations of Computational Mathematics conference, Montevideo Uruguay December 2014. Poster Presenter.

Compressed Sensing with an a priori distribution.

Employment history

Google Research

Research Intern (Fall 2020). I am currently working with the Algorithms and Optimization team. We are building a Google-scale linear programming solver based on first order methods.

Hosts: Miles Lubin, David Applegate.

Rappi

Visiting Research Scientist (Summer 2020). I led a team that developed graph-based learning models to solve an array of financial tasks, including fraud detection and credit risk estimation.

Manager: Alejandro Correa.

Google Maps

Software Intern (Summer 2019). I worked on machine learning pipelines to improve Google's guidance system.

wOzy

Co-founder and developer (2010-2015). I co-founded a video game startup during my undergraduate years.

Grants and Awards

Universidad de los Andes: Proyecto Semilla 1-semester Grant, "*Adquisición comprensiva (compressive sensing) de datos con distribución conocida*", Fall 2015.

Universidad de los Andes: Full-tuition fellowship for Master's Degree, 2014-2016.

Ecopetrol: "Bachilleres por Colombia" Scholarship, 2010-2014. Full-tuition scholarship for undergraduate studies, given to the best ICFES score (equivalent to SAT in Colombia) in each State.

Service

Reviewer for: IEEE ISIT, IEEE Transactions on Signal Processing, IEEE Transactions on Information Theory, Mathematical Programming, SIAM Journal on Optimization, and STOC.

Teaching Experience

At Cornell:

ORIE 5270 Big Data Technologies, Spring 2020 (Instructor),

ORIE 6125 Computational Methods in Operations Research, Spring 2020 (Instructor),

ORIE 3300 Optimization I, Summer 2017 (Lecturer).

At Universidad de los Andes as a Lecturer:

MATE-1105 Linear Algebra, Fall 2012, Spring 2013, Fall 2014,

MATE-1201 Precalculus, Spring 2015,

MATE-2604 Numerical Analysis, Spring 2015.

Programming Skills

C++, Python, Julia, Java, Objective-C, Matlab, \LaTeX .

Languages

Fluent: English, Portuguese, and Spanish (native).