

Vasileios Charisopoulos

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Research Interests

I am broadly interested in the mathematics of data science, with an emphasis on the interplay of optimization, high-dimensional statistical estimation, and numerical linear algebra.

Education

Cornell University

PhD candidate, Operations Research & Information Engineering

GPA: 4.083/4.0

Committee: Damek Davis (chair), Anil Damle (co-chair), Austin R. Benson, Adrian Lewis

Ithaca, NY, USA

2017 – present

National Technical University of Athens

BSc & MEng, Electrical and Computer Engineering

GPA: 9.06/10 (top 5%)

Thesis advisor: Petros Maragos

Athens, GR

2010–2017

Professional Experience

Google GCloud Infra

Student Researcher (*part-time*), Hosts: Carlos Villavieja & Milad Hashemi

Seattle (remote)

September 2022 – present

Google GCloud Infra

Research Intern, Hosts: Carlos Villavieja & Milad Hashemi

Forecasting and anomaly detection for large-scale time series.

Seattle (remote)

May – August 2022

Google Research NYC

Research Intern, Hosts: Miles Lubin & David Applegate

Code & theory for Google's experimental LP solver (open sourced [here](#)).

New York City (remote)

June – August 2021

INRIA Paris-Saclay - team TROPICAL

Researcher, Hosts: Stephane Gaubert & Xavier Allamigeon

Formalization of convex polyhedra in the Coq proof assistant.

Paris, FR

May 2017 – August 2017

NCSR Demokritos

Research intern, Host: George Giannakopoulos

Subsequence indexing and similarity search using graph-based models.

Athens, GR

September – December 2015

Honors and Awards

Cornelia Ye Outstanding Teaching Assistant Award

Cornell Center for Teaching Innovation

University-wide teaching award, given to one domestic and one international teaching assistant per year.

2021

Andreas G. Leventis Scholarship

Andreas G. Leventis Foundation

Research scholarship awarded to PhD students & postdocs of Greek descent.

2020

Schloss-Dagstuhl Support Grant for Junior Researchers

National Science Foundation Award #1257011

2018

Cornell University Fellowship

School of Operations Research & Information Engineering

Fellowship covering 1 year of PhD studies.

2017

Publications

Preprints in Review

- [2] V. Charisopoulos, A. R. Benson, and A. Damle. *Incrementally Updated Spectral Embeddings*. 2019. arXiv: 1909.01188 [math.NA].
- [3] D. Davis, D. Drusvyatskiy, and V. Charisopoulos. *Stochastic algorithms with geometric step decay converge linearly on sharp functions*. 2019. arXiv: 1907.09547 [math.OC].
- [4] V. Charisopoulos and P. Maragos. *A Tropical Approach to Neural Networks with Piecewise Linear Activations*. 2018. arXiv: 1805.08749 [stat.ML].

Journal publications

- [1] V. Charisopoulos and D. Davis. "A superlinearly convergent subgradient method for sharp semismooth problems". In: *Mathematics of Operations Research (accepted)* (2022). arXiv: 2201.04611 [math.OC].
- [5] V. Charisopoulos, A. R. Benson, and A. Damle. "Communication-Efficient Distributed Eigenspace Estimation". In: *SIAM Journal on Mathematics of Data Science* 3.4 (2021), pp. 1067–1092. doi: 10.1137/20M1364862.
- [6] P. Maragos, V. Charisopoulos, and E. Theodosis. "Tropical Geometry and Machine Learning". In: *Proceedings of the IEEE* 109.5 (2021), pp. 728–755. doi: 10.1109/JPROC.2021.3065238.
- [7] V. Charisopoulos et al. "Low-Rank Matrix Recovery with Composite Optimization: Good Conditioning and Rapid Convergence". In: *Foundations of Computational Mathematics* 21.6 (2021), pp. 1505–1593. doi: 10.1007/s10208-020-09490-9.
- [8] V. Charisopoulos, D. Davis, M. Díaz, and D. Drusvyatskiy. "Composite optimization for robust rank one bilinear sensing". In: *Information and Inference: A Journal of the IMA* 10.2 (2021), pp. 333–396. doi: 10.1093/imaiai/iaaa027.
- [9] A. Nikas et al. "Managing stakeholder knowledge for the evaluation of innovation systems in the face of climate change". In: *Journal of Knowledge Management* 21.5 (2017), pp. 1013–1034.

Conference publications

- [10] V. Charisopoulos and A. Damle. "Communication-efficient distributed eigenspace estimation with arbitrary node failures". In: *Advances in Neural Information Processing Systems (accepted)*. 2022. arXiv: 2206.00127 [stat.ML].
- [11] V. Charisopoulos, A. R. Benson, and A. Damle. "Entrywise convergence of iterative methods for eigenproblems". In: *Advances in Neural Information Processing Systems*. Ed. by H. Larochelle et al. Vol. 33. Curran Associates, Inc., 2020, pp. 5644–5655.
- [12] V. Charisopoulos and P. Maragos. "Morphological perceptrons: geometry and training algorithms". In: *International Symposium on Mathematical Morphology and Its Applications to Signal and Image Processing*. Springer. 2017, pp. 3–15.

Talks and Presentations

A superlinearly convergent subgradient method for sharp semismooth problems

- INFORMS Optimization Society Conference March 2022
- Cornell Scientific Computing & Numerics Seminar April 2022
- NYC Operations Day April 2022
- International Conference on Continuous Optimization July 2022
- INFORMS Annual Meeting October 2022

Communication-efficient distributed eigenspace estimation

- Cornell ORIE Young Researchers Workshop October 2021
- SIAM Annual Meeting July 2022
- Cornell Scientific Computing & Numerics Seminar November 2022
- NeurIPS 2022 November 2022

Entrywise convergence of iterative methods for eigenproblems

- Cornell Scientific Computing & Numerics Seminar
- NeurIPS 2020

February 2020
December 2020

Incrementally Updated Spectral Embeddings

- ATD - AMPS NSF meeting

October 2019

A Tropical Approach to Neural Networks with Piecewise Linear Activations.

- SIAM Conference on Applied Algebraic Geometry

July 2019

- Shape Analysis: Euclidean, Discrete and Algebraic Geometric Methods (Dagstuhl seminar #18422)

October 2018

Morphological Perceptrons: Geometry and Training Algorithms

- International Symposium on Mathematical Morphology

May 2017

Service

Reviewing

Mathematical Programming

SIAM Journal on Optimization

IEEE Transactions on Neural Networks and Learning Systems

Diversity & Outreach

Catalyst Program (Cornell Diversity Programs in Engineering)

2022

Cornell ORIE PhD Diversity Ambassador

2021 – 22

Cornell Graduate School STEM Preview day

2020, 2021

Cornell ORIE PhD application support for underrepresented students

2020, 2021

Cornell Prison Education Program

2019 – 20

Teaching Experience

ORIE 6300 - Mathematical Programming

PhD level, Instructors: Katya Scheinberg (2021, 2022), Jim Renegar (2018) - Size: 35

Fall 2022, 2021, 2018

Teaching assistant

ORIE 5270/6125 - Big Data Technologies

MEng & PhD level, Size: 120

Spring 2022, 2021

Instructor

ORIE 4740 - Introduction to Statistical Data Mining

Senior level, Instructor: Damek Davis - Size: 140

Spring 2020

Lead teaching assistant

ORIE 3310 - Optimization II

Junior level, Instructor: David Williamson - Section Size: 40

Spring 2019

Teaching assistant

ORIE 3300 - Optimization I

Junior level, Instructor: Damek Davis - Size: 150

Fall 2020

Lead teaching assistant

MATH 112 - Contemporary Mathematics

Intro level, Cornell Prison Education Program

Fall 2019

Instructor