Vasileios Charisopoulos

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Research Interests

Continuous optimization, high-dimensional statistical estimation, numerical linear algebra.

Education

Cornell University Ithaca, NY, USA
PhD in Operations Research & Information Engineering 2017 – 2023
GPA: 4.083/4.0. **Committee**: Damek Davis (chair), Anil Damle (co-chair), Austin R. Benson, Adrian Lewis
Dissertation: Computationally efficient and robust methods for large-scale optimization and scientific computing

National Technical University of Athens Athens, GR
BSc & MEng, Electrical and Computer Engineering 2010–2017
GPA: 9.06/10 (top 5%). **Thesis advisor**: Petros Maragos

Professional Experience

Electrical & Computer Engineering, University of Washington Seattle
Affiliate Assistant Professor *September 2024 – current*

University of Chicago, Data Science Institute Chicago
Postdoctoral Scholar in AI & Science, *Mentor: Rebecca Willett* *July 2023 – current*

Google GCloud Infra Seattle (remote)
Intern / Student Researcher, *Hosts: Carlos Villavieja & Milad Hashemi* *May 2022 – Feb 2023*

Google Research NYC New York City (remote)
Research Intern, *Hosts: Miles Lubin & David Applegate* *June – August 2021*

INRIA Paris-Saclay - team TROPICAL Paris, FR
Researcher, *Hosts: Stephane Gaubert & Xavier Allamigeon* *May 2017 – August 2017*

NCSR Demokritos Athens, GR
Research intern, *Host: George Giannakopoulos* *September – December 2015*

Honors and Awards

Rising Star in Computational and Data Sciences 2023
University of Texas at Austin, Oden Institute
A workshop for graduate students and postdocs interested in academic and research careers.

Outstanding Teaching Assistant Award 2023
Cornell ORIE
Awarded for the 2022 – 2023 academic year.

Cornelia Ye Outstanding Teaching Assistant Award 2021
Cornell Center for Teaching Innovation
University-wide teaching award, given to one domestic and one international teaching assistant per year.

Andreas G. Leventis Scholarship 2020
Andreas G. Leventis Foundation
Research scholarship awarded to PhD students & postdocs of Greek descent.

Schloss-Dagstuhl Support Grant for Junior Researchers 2018
National Science Foundation Award #1257011

Cornell University Fellowship 2017
School of Operations Research & Information Engineering
Fellowship covering 1 year of PhD studies.

Publications

Preprints

[1] V. Charisopoulos, A. R. Benson, and A. Damle. *Incrementally Updated Spectral Embeddings*. 2019. arXiv: 1909.01188 [math.NA].

[2] V. Charisopoulos and P. Maragos. *A Tropical Approach to Neural Networks with Piecewise Linear Activations*. 2018. arXiv: 1805.08749 [stat.ML].

[3] O. Melia et al. *Multi-Frequency Progressive Refinement for Learned Inverse Scattering*. 2024. arXiv: 2405.13214 [physics.comp-ph].

[4] V. Charisopoulos and R. Willett. *Nonlinear tomographic reconstruction via nonsmooth optimization*. 2024. arXiv: 2407.12984 [math.OC].

Journal publications

[5] D. Davis, D. Drusvyatskiy, and V. Charisopoulos. "Stochastic algorithms with geometric step decay converge linearly on sharp functions". In: *Mathematical Programming* (Sept. 2023). DOI: 10.1007/s10107-023-02003-w.

[6] V. Charisopoulos and D. Davis. "A Superlinearly Convergent Subgradient Method for Sharp Semismooth Problems". In: *Mathematics of Operations Research* (Aug. 2023). DOI: 10.1287/moor.2023.1390.

[7] 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.

[8] 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.

[9] 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.

[10] 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.

[11] 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

[12] P. Alexeenko and V. Charisopoulos. "Reducing Aggregate Electric Vehicle Battery Capacity through Sharing". In: *2023 IEEE 62nd Conference on Decision and Control*. IEEE. 2023. arXiv: 2304.10461 [eess.SY].

[13] V. Charisopoulos, H. Esfandiari, and V. Mirrokni. "Robust and private stochastic linear bandits". In: *Proceedings of the 40th International Conference on Machine Learning*. Ed. by A. Krause et al. Vol. 202. Proceedings of Machine Learning Research. PMLR, 23–29 Jul 2023, pp. 4096–4115. URL: https://proceedings.mlr.press/v202/charisopoulos23a.html.

[14] V. Charisopoulos and A. Damle. "Communication-efficient distributed eigenspace estimation with arbitrary node failures". In: *Advances in Neural Information Processing Systems*. Ed. by S. Koyejo et al. Vol. 35. Curran Associates, Inc., 2022, pp. 18197–18210.

[15] 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.

[16] 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*
- International Conference on Continuous Optimization	*July 2022*
- INFORMS Annual Meeting	*October 2022*
- MIT Sloan (OR & Statistics Seminar)	*January 2023*
- UC Berkeley IEOR Seminar	*February 2023*
- SIAM OP23	*May 2023*
- INFORMS Annual Meeting	*October 2023*
- INFORMS Optimization Society Conference	*March 2024*

Communication-efficient distributed eigenspace estimation

- 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* — *February 2020*
- *NeurIPS 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*

Service

Reviewing
Mathematical Programming, SIAM Journal on Optimization, JMLR, IEEE TNNLS

Diversity & Outreach

Catalyst Program (Cornell Diversity Programs in Engineering)	*2022*
Cornell Graduate School STEM Preview day	*2020, 2021*
Cornell ORIE PhD application support for underrepresented students	*2020 – 2022*
Cornell Prison Education Program	*2019 – 20*

Teaching Experience

Data Science Clinic UChicago — **Fall 2023 & Winter 2024**
Undergrad & Master's level — *Faculty Mentor*

ORIE 6300 - Mathematical Programming — **Fall 2022, 2021, 2018**
PhD level, Instructors: Katya Scheinberg (2021, 2022), Jim Renegar (2018) - Size: 35 — *Teaching assistant*

ORIE 5270/6125 - Big Data Technologies — **Spring 2023**
MEng & PhD level, Size: 120 — *Teaching assistant*

ORIE 5270/6125 - Big Data Technologies — **Spring 2022, 2021**
MEng & PhD level, Size: 120 — *Instructor*

ORIE 4740 - Introduction to Statistical Data Mining — **Spring 2020**
Senior level, Instructor: Damek Davis - Size: 140 — *Lead teaching assistant*

ORIE 3310 - Optimization II — **Spring 2019**
Junior level, Instructor: David Williamson - Section Size: 40 — *Teaching assistant*

ORIE 3300 - Optimization I — **Fall 2020**
Junior level, Instructor: Damek Davis - Size: 150 — *Lead teaching assistant*

MATH 112 - Contemporary Mathematics — **Fall 2019**
Intro level, Cornell Prison Education Program — *Instructor*