

Zachary Frangella
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zfrangella.github.io

Education

Stanford University Ph.D., Management Science & Engineering	2022–25
Cornell University, M.Sc., Applied Mathematics	2019–2022
Rensselaer Polytechnic Institute, B.Sc., Mathematics, <i>Magna Cum Laude</i>	2015–2018

Awards & Honors

Dean’s Honors List , Rensselaer Polytechnic Institute	2015–2018
Max Hirsch Prize , Rensselaer Polytechnic Institute <i>This Prize is awarded to a Senior in the Department of Mathematical Sciences who has demonstrated outstanding ability in his or her academic work and also gives promise of outstanding success in a career in mathematical sciences.</i>	2019

Publications [\(Google Scholar\)](#)

† → Equal contribution

Journal Articles

- J1. **Frangella, Zachary**, Tropp, J. A. & Udell, M. Randomized Nyström Preconditioning. *SIAM Journal on Matrix Analysis and Applications* **44**, 718–752 (2023).
- J2. **Frangella, Zachary**, Rathore, P., Zhao, S. & Udell, M. Promise: Preconditioned Stochastic Optimization Methods by Incorporating Scalable Curvature Estimates. *Journal of Machine Learning Research* **25**, 1–57 (2024).
- J3. **Frangella, Zachary**, Rathore, P., Zhao, S. & Udell, M. SketchySGD: Reliable Stochastic Optimization via Randomized Curvature Estimates. *SIAM Journal on Mathematics of Data Science* **6**, 1173–1204 (2024).

Peer-reviewed Conference Proceedings

- C1. Stephenson, W., **Frangella, Zachary**, Udell, M. & Broderick, T. *Can We Globally Optimize Cross-Validation Loss? Quasiconvexity in Ridge Regression* in *Advances in Neural Information Processing Systems* (2021), 24352–24364.
- C2. Zhao[†], S., **Frangella, Zachary**[†] & Udell, M. *NysADMM: faster composite convex optimization via low-rank approximation* in *International Conference on Machine Learning* (2022), 26824–26840.

*Expected.

- C3. Rathore, P., Lei, W., **Frangella, Zachary**, Lu, L. & Udell, M. *Challenges in Training PINNs: A Loss Landscape Perspective in International Conference on Machine Learning* (2024), 42159–42191. **Oral, Top 1.5% of submissions.**
- C4. Feng, M., **Frangella, Zachary** & Pilanci, M. *CRONOS: Enhancing Deep Learning with Scalable GPU Accelerated Convex Neural Networks in Advances in Neural Information Processing Systems* (2024).

In the pipeline

- P1. Diamandis, T., **Frangella, Zachary**, Zhao, S., Stellato, B. & Udell, M. GeNIOS: an (almost) second-order operator-splitting solver for large-scale convex optimization. *Submitted* (2023).
- P2. **Frangella, Zachary**, Diamandis, T., Stellato, B. & Udell, M. On the (linear) convergence of Generalized Newton Inexact ADMM. *Submitted* (2023).
- P3. Díaz[†], M., Epperly[†], E.N., **Frangella, Zachary**[†], Tropp, J. A. & Webber[†], R.J.. Robust, randomized preconditioning for kernel ridge regression. *Submitted* (2024).
- P4. Fazliani, S., Frangella, Z. & Udell, M. Enhancing Physics-Informed Neural Networks Through Feature Engineering. *Submitted* (2025).
- P5. Rathore, P., **Frangella, Zachary**, Yang, J., Dereziński, M. & Udell, M. Have ASkotch: A Neat Solution for Large-scale Kernel Ridge Regression. *Submitted* (2025).
- P6. Rathore, P. *et al.* Turbocharging Gaussian Process Inference with Approximate Sketch-and-Project. *Submitted* (2025).
- P7. Sun, J., **Frangella, Zachary** & Udell, M. SAPPHERE: Preconditioned Stochastic Variance Reduction for Faster Large-Scale Statistical Learning. *Submitted* (2025).

Talks and Posters

ICME Seminar on Linear Algebra and Optimization , Stanford <i>Faster Convex Optimization via Randomized Numerical Linear Algebra</i>	2024
MILA Tensor Network Reading Group , Montreal <i>SketchySGD: Reliable Stochastic Optimization via Randomized Curvature Estimates</i>	2024
International Congress of Industrial and Applied Mathematics , Tokyo <i>Faster Convex Optimization via Randomized Numerical Linear Algebra</i>	2023
ICME Xpo , Stanford <i>SketchySGD: Reliable Stochastic Optimization via Randomized Curvature Estimates</i>	2023
SIAM Conference on Optimization , Seattle <i>Low-rank Approximation for Faster Optimization</i>	2023
International Conference on Machine Learning , Baltimore <i>NysADMM: Faster Composite Convex Optimization via Low-Rank Approximation</i>	2022
SciMLCon , Virtual <i>Speeding up $A \setminus b$ with Randomized Preconditioners</i>	2022

Technical Skills

Programming Languages & Frameworks :

- *Proficient:* Python, Jax, PyTorch, NumPy, Cython, MATLAB, \LaTeX
- *Familiar:* Pandas, C/C++, Julia

Academic Mentoring

Graduate

Jingruo Sun, M.Sc. Stanford MS&E
Stochastic Proximal Preconditioning

Summer 2024 – Spring 2025

Weimu Lei, M.Sc. Stanford ICME
Optimization for PINNs, GPU Accelerated Optimization Software

Fall 2023 – Fall 2024

Undergraduate

Yingxi Li, B.Sc. Cornell ORIE
Faster Sparse Composite Optimization via SAFE coordinate selection

Spring 2022

Teaching

Rensselaer Polytechnic Institute

MATH 2400: Differential Equations
Teaching Assistant

Spring 2019

Cornell University

MATH 1910: Calculus for Engineers
Teaching Assistant

Fall 2019, 2020

MATH 1920: Multivariable Calculus for Engineers
Teaching Assistant

Spring 2021

MATH 2930: Differential Equations for Engineers
Teaching Assistant

Spring 2020, 2022

Stanford University

CME 306/MS&E 311: Optimization
Teaching Assistant, Guest Lecturer

Spring 2023, Winter 2024, Fall 2024

Academic Service

Organized Sessions

ICME Seminar on Linear Algebra and Optimization, Stanford <i>with Michael Saunders</i>	Winter 2024
INFORMS: Advances in Optimization for Machine Learning, Seattle <i>with Pratik Rathore and Madeleine Udell</i>	2024

Conference Reviewer

International Conference on Artificial Intelligence and Statistics (AISTATS)	2022, 2024
Advances in Neural Information Processing Systems (NeurIPS)	2024, 2025
International Conference on Learning Representations (ICLR)	2024

Journal Reviewer

Journal of Machine Learning Research	2021, 2022
SIAM Journal on Mathematics of Data Science	2022
SIAM Journal on Matrix Analysis	2023, 2025
Automatica	2024
Optimization and Engineering	2025
Statistics & Computing	2024

Relevant Courses

Numerical Computing, Numerical Ordinary Differential Equations, Numerical Partial Differential Equations, Matrix Computations, Data-sparse Matrix Computations, Numerical Methods for Data Science, Reinforcement Learning, Probability Theory, Quantum Physics I-II

Last updated: September 11, 2025