

Yijun Dong

Curriculum Vitae

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Research Interests

Randomized Numerical Linear Algebra, Theoretical Machine Learning.

I am interested in the computational and sample efficiency of algorithms in machine learning and scientific computing. From the computational efficiency perspective, my work is centered on matrix sketching and randomized low-rank decompositions like SVD and CUR. From the sample efficiency perspective, my work focuses on the generalization and distributional robustness of learning algorithms in data-limited settings.

Employment

2023-Present **Assistant Professor/Courant Instructor (Postdoc)**, *Courant Institute of Mathematical Sciences*, New York University, New York, NY, US.

Education

2018-2023 **Ph.D. in Computational Science, Engineering, and Mathematics**, *Oden Institute*, University of Texas at Austin, Austin, TX, US.

- Advisors: Prof. Per-Gunnar Martinsson, Prof. Rachel Ward
- Thesis: Randomized Dimension Reduction with Statistical Guarantees

2014-2018 **B.S. in Applied Mathematics & Engineering Science**, *Magna Cum Laude*, Emory University, Atlanta, GA, US.

- Advisors: Prof. Effrosyni Seitaridou, Prof. Eric Weeks
- Thesis: Crystals and Liquids in Gravitationally Confined Quasi-2D Colloidal Systems

Awards/Honors/Fellowships

2023	Graduate School Summer Fellowship	UT Austin
2023	Rising Stars in Computational and Data Sciences	UT Austin
2019-2020	NIMS Graduate Fellowship	UT Austin
2018-2019	Peter O'Donnell Graduate Fellowship	UT Austin
2018	Trevor Evans Award	Emory University
	Awarded to top graduate of Emory Department of Mathematics	

Preprints (* for equal contribution)

1. **Yijun Dong**, Chao Chen, Per-Gunnar Martinsson, Katherine Pearce. “Robust Blockwise Random Pivoting: Fast and Accurate Adaptive Interpolative Decomposition”. *arXiv preprint arXiv:2309.16002*, 2023.
2. **Yijun Dong**, Per-Gunnar Martinsson, Yuji Nakatsukasa. “Efficient Bounds and Estimates for Canonical Angles in Randomized Subspace Approximations”. *arXiv preprint arXiv:2211.04676*, 2022.

Publications (* for equal contribution)

1. **Yijun Dong***, Kevin Miller*, Qi Lei, Rachel Ward. “Cluster-aware Semi-supervised Learning: Relational Knowledge Distillation Provably Learns Clustering”. *Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS)*, 2023.
2. **Yijun Dong***, Yuege Xie*, Rachel Ward. “Adaptively Weighted Data Augmentation Consistency Regularization for Robust Optimization under Concept Shift”. *International Conference on Machine Learning (ICML)*, 2023.
3. Shuo Yang*, **Yijun Dong***, Rachel Ward, Inderjit S Dhillon, Sujay Sanghavi, Qi Lei. “Sample Efficiency of Data Augmentation Consistency Regularization”. *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2023.
4. **Yijun Dong**, Per-Gunnar Martinsson. “Simpler is better: A comparative study of randomized algorithms for computing the CUR decomposition”. *Advances in Computational Mathematics*, 2023.
5. Chen Cheng*, **Yijun Dong***, Matthew Dorian*, Farhan Kamili*, Effrosyni Seitaridou. “Quantifying Biofilm Formation of *Sinorhizobium meliloti* Bacterial Strains in Microfluidic Platforms by Measuring the Diffusion Coefficient of Polystyrene Beads”. *Open Journal of Biophysics*, 7, no. 3 (2017): 157-173.

Selected Talks

1. SIAM Conference on Parallel Processing for Scientific Computing (PP24), Minisymposium on Randomized Methods in Linear Solvers and Matrix Factorizations (Baltimore, Maryland, Mar 2024): “Robust Blockwise Random Pivoting: Fast and Accurate Interpolation Decomposition with Adaptiveness and Randomness”.
2. Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS) (New Orleans, LA, Dec 2023): “Cluster-aware Semi-supervised Learning: Relational Knowledge Distillation Provably Learns Clustering”. (poster)
3. 6th SIAM Texas-Louisiana Sectional Meeting (SIAM TX-LA 2023), Minisymposium on Nonlinear Algebra in Applications (Lafayette, Louisiana, Nov 2023): “Efficient Bounds and Estimates for Canonical Angles in Randomized Subspace Approximations”.
4. 10th ICIAM Conference, Minisymposium on Randomized Numerical Linear Algebra (Tokyo, Japan, Aug 2023): “Efficient Bounds and Estimates for Canonical Angles in Randomized Subspace Approximations”.
5. International Conference on Machine Learning (ICML) 2023 (Honolulu, HI, Jul 2023): “Adaptively Weighted Data Augmentation Consistency Regularization for Robust Optimization under Concept Shift”. (poster)
6. 2023 Rising Stars in Computational and Data Sciences (Austin, TX, Apr 2023): “Adaptively Weighted Data Augmentation Consistency Regularization”.
7. IPAM Workshop IV: Multi-Modal Imaging with Deep Learning and Modeling (CMSWS4) (Los Angeles, CA, Nov 2022): “AdaWAC: Adaptively Weighted Augmentation Consistency Regularization for Volumetric Medical Image Segmentation”. (poster)
8. SIAM Conference on Mathematics of Data Science (MDS22) (San Diego, CA, Sep 2022): “Sample Efficiency of Data Augmentation Consistency Regularization”. (poster)
9. Jane Street Symposium 2022 (New York, NY, Jan 2022): “Revitalize Classical Algorithms with Randomization: Efficient Low-rank Approximations with

Statistical Guarantees”.

10. SIAM Conference on Applied Linear Algebra (LA21) (Virtual, May 2021): “A Randomized CUR Decomposition via Partially Pivoted LU Factorization”. (poster)
11. American Physical Society March Meeting (Los Angeles, CA, March 2018): “Forming 2D colloidal crystals with sedimented colloids”.

Service

Journal reviewer: SIAM Journal on Matrix Analysis and Applications (20’), IMA Journal of Numerical Analysis (22’), BIT Numerical Mathematics (22’), Calcolo (23’), Annals of Applied Probability (23’)

Conference reviewer: AISTATS (23’)

Teaching Experience

2023-Present **Instructor**, Courant Institute of Mathematical Sciences, New York University, New York, NY.

- Fall 2023: Discrete Mathematics

Jul 2023 **Teaching Assistant**, Simons Laufer Mathematical Sciences Institute (SLMath) Summer Graduate School, IBM Almaden, San Jose, CA.

- Mathematics of Big Data: Sketching and (Multi-) Linear Algebra (TA for Drs. Kenneth Clarkson, Lior Horesh, Misha Kilmer, Tamara Kolda, and Shashanka Ubaru)

2020-2022 **Teaching Assistant**, Department of Mathematics & Oden Institute, UT Austin, Austin, TX.

- Fall 2022: Differential Equations with Linear Algebra (TA for Dr. Michael Novack)
- Fall 2021: Numerical Analysis: Linear Algebra (TA for Prof. Per-Gunnar Martinsson)
- Fall 2020: Differential Equations with Linear Algebra (TA for Prof. Sam Raskin)

2015-2016 **Student Tutor**, Department of Physics, Oxford College of Emory University, Oxford, GA.

- Introduction to Physics, Modern Physics

Industrial Experience

Jun-Aug 2022 **Research Intern**, Dell Technologies, Austin, TX.

- Semi-supervised tabular learning with data augmentation and consistency regularization

May-Aug 2021 **Research Intern**, Dell Technologies, Austin, TX.

- Streaming telemetry time series compression on edge devices

Skills

Programming ◦ Proficient: Bash, Git, MATLAB, Python
◦ Prior knowledge: C++, IDL, Java, Julia, Mathematica, etc.

Language ◦ Chinese (native), English (proficient), Japanese

References

Per-Gunnar Martinsson,
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Rachel Ward,
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The University of Texas at Austin,
rward@math.utexas.edu.

Yuji Nakatsukasa,
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