

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.

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	

Skills

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

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

Preprints (* for equal contribution)

1. **Yijun Dong***, Kevin Miller*, Qi Lei, Rachel Ward. “Cluster-aware Semi-supervised Learning: Relational Knowledge Distillation Provably Learns Clustering”. *arXiv preprint arXiv:2307.11030*, 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***, Yuege Xie*, Rachel Ward. “Adaptively Weighted Data Augmentation Consistency Regularization for Robust Optimization under Concept Shift”. *International Conference on Machine Learning (ICML)*, 2023.
2. 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.
3. **Yijun Dong**, Per-Gunnar Martinsson. “Simpler is better: A comparative study of randomized algorithms for computing the CUR decomposition”. *Advances in Computational Mathematics*, 2023.
4. 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 Presentations

1. 10th ICIAM Conference, Minisymposium on Randomized Numerical Linear Algebra (Tokyo, Japan, Aug 2023): “Efficient Bounds and Estimates for Canonical Angles in Randomized Subspace Approximations”.
2. IFML Workshop 2023, Voluntary Spotlight Session (Seattle, WA, Apr 2023): “Sample Efficiency of Data Augmentation Consistency Regularization”.
3. 2023 Rising Stars in Computational and Data Sciences (Austin, TX, Apr 2023): “Adaptively Weighted Data Augmentation Consistency Regularization”.
4. Texas Women in Math Symposium (TWIMS2023) (Austin, TX, Mar 2023): “Efficient Bounds and Estimates for Canonical Angles in Randomized Subspace Approximations”.
5. 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)
6. CSEM Student Forum (Austin, TX, Oct 2022): “Sample Efficiency of Data Augmentation Consistency Regularization”.
7. SIAM Conference on Mathematics of Data Science (MDS22) (San Diego, CA, Sep 2022): “Sample Efficiency of Data Augmentation Consistency Regularization”. (poster)
8. Jane Street Symposium 2022 (New York, NY, Jan 2022): “Revitalize Classical Algorithms with Randomization: Efficient Low-rank Approximations with Statistical Guarantees”.
9. SIAM Conference on Applied Linear Algebra (LA21) (Virtual, May 2021): “A Randomized CUR Decomposition via Partially Pivoted LU Factorization”. (poster)
10. 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

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

References

Per-Gunnar Martinsson,
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Rachel Ward,
Department of Mathematics & Oden Institute,
The University of Texas at Austin,
rward@math.utexas.edu.

Yuji Nakatsukasa,
Mathematical Institute,
University of Oxford,
nakatsukasa@maths.ox.ac.uk.