Yan Shuo Tan

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Education

2013–2018 (exp.) **Ph.D. in Mathematics**, *University of Michigan*, Ann Arbor.
Advisor: Roman Vershynin

2009–2013 **Bachelor of Science**, *University of Chicago*, Chicago.
Major in Mathematics (Honors)

Research Interests

High-dimensional probability, compressed sensing, mathematical optimization (especially in stochastic or non-convex settings), theoretical machine learning, signal processing, randomized algorithms.

Publications

1. Y.S. TAN, Sparse Phase Retrieval via Sparse PCA Despite Model Misspecification: A Simplified and Extended Analysis. (2017). Preprint available as arXiv:1712.04106.

2. Y.S. TAN AND R. VERSHYNIN, Phase Retrieval via Randomized Kaczmarz: Theoretical Guarantees. *Information and Inference, in revision (positive reviews)* (2017). Preprint available as arXiv:1706.09993.

3. Y.S. TAN AND R. VERSHYNIN, Polynomial Time and Sample Complexity for Non-Gaussian Component Analysis: Spectral Methods. *In revision* (2017). Preprint available as arXiv:1704.01041.

4. Y.S. TAN, Energy optimization for distributions on the sphere and improvement to the Welch bounds. *Electronic Communications in Probability 22*, 43 (2017).

Current Projects

Phase Retrieval via Randomized Kaczmarz with General Measurement Sets, *Joint work with R. Vershynin.*

Theoretical Guarantees for Ensemble K-Subspaces, *Joint work with J. Lipor, D. Hong, D. Zhang, and L. Balzano.*

A Non-Asymptotic Analysis of Free Component Analysis, *Joint work with H. Wu and R. Nadakuditi.*

Honors/Awards

2017 **Juha Heinonen Memorial Graduate Fellowship**, *University of Michigan.*

2016 **Rackham Sokol Graduate Fellowship**, *University of Michigan.*

2014	**Mathematics Department Graduate Fellowship**, *University of Michigan*.
2013	**Paul R. Cohen Prize**, *University of Chicago*.
	Awarded to graduating seniors who have achieved the highest record in mathematics (5 students a year)
2012	**Nomianted to Phi Beta Kappa as a junior**, *University of Chicago*.

Teaching Experience

Fall 2017	**University of Michigan**, *Course Co-coordinator*.
	I was a co-coordinator for Precalculus. My job included training and supervising new instructors, as well as writing homework assignments and examinations.
2013-2016	**University of Michigan**, *Instructor*.
	I was a section instructor for Precalculus (1 semester), Calculus I (3 semesters), Calculus II (2 semesters). My job included lecturing, supervising group work, preparing teaching materials, and grading.
Summer 2016	**PCMI Summer School**, *Teaching Assistant*.
	I was a teaching assistant for Roman Vershynin's mini-course on probabilistic methods for data science.
Summer 2016	**University of Michigan**, *Lecturer*.
	I taught a mini-course (4 lectures) on information theory to graduate students.
Summer 2014	**University of Michigan**, *Teaching Assistant*.
	I was a teaching assistant for Multivariable Calculus. My job included leading lab tutorial sessions and grading.

Invited Talks

2018 (upcoming)	*Provably Efficient Algorithms for Solving Phase Retrieval and Other Single Index Models*, University of Southern California.
2017	*Provably Efficient Algorithms for Solving Phase Retrieval and Other Single Index Models*, SILO Seminar, University of Wisconsin.

Selected Seminar Talks

2017	*Provably Efficient Algorithms for Solving Phase Retrieval and Other Single Index Models*, SPADA Lab Seminar, Michigan.
2017	*SGD, Importance Sampling and Randomized Kaczmarz*, Statistical Machine Learning Reading Group, Michigan.
2017	*Energy optimization on the sphere and application to Welch bounds*, Student Probability Seminar, Michigan.
2016	*The Kadison-Singer Problem: Part 1 of the Marcus-Spielman-Srivastava Proof*, Analysis/Probability Learning Seminar, Michigan.
2016	*Phase Transition in the Ising Model*, course lecture, Michigan.
2016	*Concentration Inequalities*, course lecture, Michigan.
2016	*Reweighted PCA*, Student Probability Seminar, Michigan.
2016	*Uniform Convergence of Empirical Distributions Using VC Dimension*, Student Analysis Seminar, Michigan.

| 2016 | *Clustering for Gaussian Mixture Models Using Isoperimetric Distance Concentration*, Analysis/Probability Learning Seminar, Michigan. |
| 2016 | *Solving Undetermined Linear Systems using Sparsity*, Student Analysis Seminar, Michigan. |

Selected Conferences Attended

May 2017	*CBMS Conference on Sparse Signal Recovery*, Las Cruces, New Mexico.
May 2017	*Simons Intitute Workshop on Computational Challenges in Machine Learning*, Berkeley, California.
Feb 2017	*SAMSI Workshop on the Interface of Statistics and Optimization*, Durham, North Carolina.
July 2016	*PCMI Summer School on the Mathematics of Data*, Park City, Utah.
June 2016	*CBMS Conference on Topological Data Analysis*, Austin, Texas.
May 2016	*Summer School on Random Matrix Theory*, Ann Arbor, Michigan.

Professional Activities

Seminars Organized
○ Student Probability Seminar at the University of Michigan (2016-2017)
○ Student Geometry/Topology Seminar at the University of Michigan (2014-2015)

Reviews for Journals
○ SMAI Journal of Computational Mathematics

Other Skills

| Languages | English (native), Mandarin (advanced), Indonesian (beginner), Spanish (beginner). |
| Computer Skills | MATLAB, R, Python. |

Referees

○ **Roman Vershynin**, Department of Mathematics, University of California, Irvine, rvershyn@uci.edu.
○ **Laura Balzano**, Department of Electrical Engineering and Computer Science, University of Michigan, girasole@umich.edu.
○ **Anna Gilbert**, Department of Mathematics, University of Michigan, annacg@umich.edu.