

Tyler Chen

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<https://chen.pw>

Academic/Industry Positions

University of Washington 2017 - Present
Ph.D. in Applied Mathematics

- My research is focused on the design and analysis of conjugate gradient and Lanczos type algorithms in exact and finite precision arithmetic.

Baidu Research 2021 - Present
Research Intern at Cognitive Computing Laboratory

Education

University of Washington 2017 - 2019
M.Sc.

Tufts University 2013 - 2017
B.S. Summa Cum Laude in Mathematics and Physics; Minor in Studio Art

Publications

- [4] Anne Greenbaum, Hexuan Liu, and Tyler Chen. *On the Convergence Rate of Variants of the Conjugate Gradient Algorithm in Finite Precision Arithmetic*. 2019. arXiv: 1905.05874 [cs.NA]. [intro]
- [3] Tyler Chen, Thomas Trogdon, and Shashanka Ubaru. “Analysis of stochastic Lanczos quadrature for spectrum approximation”. In: *Proceedings of the 37th International Conference on Machine Learning*. Proceedings of Machine Learning Research. PMLR, 2021. arXiv: 2105.06595 [cs.DS]. [intro]
 - selected for long presentation
- [2] Tyler Chen. “Non-asymptotic moment bounds for random variables rounded to non-uniformly spaced sets”. In: *Stat* (June 2021), e395. DOI: 10.1002/STA4.395. arXiv: 2007.11041 [math.ST]. [intro]
- [1] Tyler Chen and Erin C. Carson. “Predict-and-recompute conjugate gradient variants”. In: *SIAM Journal on Scientific Computing* 42.5 (Jan. 2020), A3084–A3108. DOI: 10.1137/19m1276856. arXiv: 1905.01549 [cs.NA]. [intro]
 - abridged version was Student Paper Competition winner at 16th Copper Mountain Conference on Iterative Methods

In progress/submission

- [2] Tyler Chen, Thomas Trogdon, and Shashanka Ubaru. *Randomized matrix free quadrature for spectrum approximation*. 2021.
- [1] Tyler Chen, Anne Greenbaum, Cameron Musco, and Christopher Musco. *Error bounds for Lanczos-based matrix function approximation*. 2021. arXiv: 2106.09806 [math.NA]. [intro]

Teaching

Instructor, Applied Linear Algebra and Numerical Analysis (UW AMATH 352)	Spring 2021
Instructor, Interdisciplinary Writing/Natural Science (UW ENGL 199)	Winter 2021
Instructor, Interdisciplinary Writing/Natural Science (UW ENGL 199)	Autumn 2020
TA, Probability and Statistics for Computational Finance (UW CFRM 410)	Winter 2019
TA, Calculus with Analytic Geometry I (UW MATH 124)	Autumn 2018
TA, Calculus with Analytic Geometry II (UW MATH 12)	Winter 2018
TA, Calculus with Analytic Geometry II (UW MATH 125)	Autumn 2017
Lab TA, Electronics (Tufts PHY 41)	Spring 2017
Lab TA, Electronics (Tufts PHY 41)	Spring 2016
Grader, Discrete Mathematics (Tufts MATH 61)	Spring 2016
Grader, Calculus III (Tufts MATH 42)	Fall 2015
Grader, Differential Equations (Tufts MATH 51)	Spring 2015
Grader, Calculus III (Tufts MATH 42)	Fall 2014

Awards & Honors

Boeing Research Award (UW Department of Applied Mathematics)	2020
Student Paper Competition winner (Copper Mountain Conference on Iterative Methods)	2020
Graduate Research Fellowship (NSF)	2019
Top Scholars Fellowship (UW)	2017
The Audrey Butvay Gruss Science Award (Tufts)	2017
The Howard Sample Prize Scholarship in Physics (Tufts)	2015

Talks and Posters

- [7] *Analysis of stochastic Lanczos quadrature for spectrum approximation*. July 2021.
- [6] *Concentration in the Lanczos Algorithm*. Presentation at SIAM Linear Algebra 21. May 2021. [\[pdf\]](#)
- [5] *Analysis of stochastic Lanczos quadrature for spectrum approximation*. Presentation at Baidu Research. Mar. 2021.
- [4] *Analyzing the Effects of Local Roundoff Error on Predict-and-Recompute Conjugate Gradient Variants*. Poster at Householder Symposium (Cancelled). June 2020.
- [3] *Predict-and-recompute conjugate gradient variants*. Presentation at Copper Mountain Student Paper Award Session (Cancelled). Mar. 2020.
- [2] *Predict-and-recompute conjugate gradient variants*. Presentation at SIAM Parallel Processing. Feb. 2020. [\[pdf\]](#)
- [1] *Symmetric Preconditioner Refinement Using Low Rank Approximations*. Presentation at Baidu Research. Feb. 2019.

Service and Outreach

Minisymposium Organizer	May 2021
Random matrices and numerical linear algebra (at SIAM Linear Algebra 21, co-organized with Thomas Trogon) [program]	
Graduate Student Representative	2019 - 2020
Represent interests of graduate students to the department	
Minisymposium Organizer	Feb. 2020

High performance Krylov subspace methods: Theory, Implementation, and Application (at SIAM Parallel Processing 20)[[program](#)]

Diversity Committee Departmental Climate Orientation *Oct. 2019*
Pannelist for event focused on building an inclusive department culture

Washington Directed Reading Program *Autumn 2019*
Mentor undergraduate student in independent reading project

Numerical Analysis Research Club *2019-2020*
Organize and plan weekly meetings for NARC

SIAM UW Mental Health Conversation and Resources *Oct. 2018*
Organize and facilitate a discussion about mental health in grad school

Software

PETSc (<https://www.mcs.anl.gov/petsc/>)

Contribute [PIPEPRCG](#). This method can be used by with the flag `-ksp_type pipeprcg`.

Professional

Tufts Conference and Events Services *2014 - 2017*
Reservations Manager, Registrar, Facilitator

Oversee all housing reservations at Tufts University during the summer conference season; Coordinate and assist clients with logistical details relating to conferences; perform supervisory role overseeing and training new staff; schedule employee shifts (implemented a VBA/excel system to automate much of this process); prepare individualized printed materials for upcoming conferences.

Tisch Library Digital Design Studio *2014 - 2017*
Student Supervisor

Provide supervision to student workers; staff front desk at the Digital Design Studio; assist patrons with large format printing, recording, digitization equipment, and software.