

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

- [3] 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]
- [2] Tyler Chen, Thomas Trogon, 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].
 - selected for long presentation
- [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, Anne Greenbaum, Cameron Musco, and Christopher Musco. *Error bounds for Lanczos-based matrix function approximation*. 2021.
- [1] Tyler Chen. *Random variables in finite precision*. 2021. arXiv: 2007.11041 [math.ST]. [intro]

Talks and Posters

- [6] Tyler Chen, Thomas Trogon, and Shashanka Ubaru. *Analysis of stochastic Lanczos quadrature for spectrum approximation*. 2021.
- [5] Tyler Chen and Thomas Trogon. *Concentration in the Lanczos Algorithm*. Presentation at SIAM Linear Algebra 21. May 2020.
- [4] Tyler Chen, Erin C. Carson, and Anne Greenbaum. *Analyzing the Effects of Local Roundoff Error on Predict-and-Recompute Conjugate Gradient Variants*. Poster at Householder Symposium (Cancelled). June 2020.

- [3] Tyler Chen. *Predict-and-recompute conjugate gradient variants*. Presentation at Copper Mountain Student Paper Award Session (Cancelled). Mar. 2020.
- [2] Tyler Chen and Erin C. Carson. *Predict-and-recompute conjugate gradient variants*. Presentation at SIAM Parallel Processing. Feb. 2020. [\[pdf\]](#)
- [1] Tyler Chen. *Symmetric Preconditioner Refinement Using Low Rank Approximations*. Presentation at Baidu Research. Feb. 2019. [\[pdf\]](#)

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*

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.