YIFU ZHANG

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Research Interests

Numerical analysis; approximation theory and applied functional analysis; randomised and numerical linear algebra

Education

- **Imperial College London** *Oct 2026-present*
  First-year PhD in Mathematics London, UK
  ◦ Supervised by *Nicolas Boullé, Greg Pavliotis and Matthew Colbrook (University of Cambridge)*.
- **University of Oxford** *Oct 2022-Jun 2026*
  Master of Mathematics Oxford, UK
  ◦ First Class in all three years.
  ◦ Distinction in Masters, rank 8/85. supervised by *Yuji Nakatsukasa*. Dissertation title: *Fast Approximation of Gram Matrix via CUR*.
- **Keystone Academy** *Graduated Jun 2022*
  International Baccalaureate Diploma Beijing, China
  ◦ Final Grade: 43/45

Publications

C=Conference, J=Journal S=In Submission, T=Thesis

[S.1] Nakatsukasa, Yuji; Zhang, Yifu. 2025. "Efficient Function Approximation Under Heteroskedastic Noise." arXiv:2508.08683 [math.NA].

Research experience

- **Numerical Linear Algebra** *Oct 2025-Jun 2026*
  Master's Dissertation supervised by Prof. Yuji Nakatsukasa, University of Oxford [GitHub]
  ◦ Developed the $CUR(CUR)^T$ approximation for Gram matrix, provided theoretical error bounds using two-sided sketch-and-solve.
  ◦ Conducted numerical experiments, demonstrating substantial computational speedups over Nyström approximation.
- **Efficient Function Approximation Under Heteroskedastic Noise** *Oct 2024-Jul 2025*
  Supervised by Prof. Yuji Nakatsukasa, University of Oxford [GitHub]
  ◦ Developed HeteroChebtrunc, adapting Chebyshev-based approximation to non-uniform noise variance.
  ◦ Proved high-probability sup-norm bounds under heteroskedastic sampling (for subgaussian noise).
  ◦ Consistently lower sup-norm error across noise profiles; $O(N)$ runtime compared with its predecessor's $O(N \log N)$.
  ◦ Open-sourced MATLAB code.
- **Project in Analytic Number Theory** *Jun 2024-Sept 2024*
  Supervised by Dr. Ofir Gorodetsky
  ◦ Studied structural links between permutation groups and integers.
  ◦ Generalised an asymptotic bound of Eberhard–Green–Ford (2016) under Ewens θ measure with $0 < \theta \leq 1$.
  ◦ Extended key parts of the Ford (2016) framework from the uniform to Ewens θ measure.

Honors and Awards

- **Scholar (2025, 2024) and Exhibitioner (2023)**
  University College, University of Oxford
  ◦ For outstanding performance in examinations.
- **Shing-Tung Yau High School Mathematics Award (2021)**
  Tsinghua University
  ◦ Global top 10 among 200+ teams and individual entrants for original research paper in coding theory.
- **Keystone Scholarship (2021, 2022)**
  Keystone Academy
  ◦ Full tuition coverage for final HS year and first undergraduate year.

Skills

Languages: English (Fluent), French (B1), Mandarin (Native).
Coding: Python (numpy, scipy), MATLAB (Chebfun)
Teaching: Tutoring for mock interviews; maths classes for summer school students (70+ hrs); creation of problem sets and exam papers.

References

Available upon request.