Tianruo You

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Education

- **UC Berkeley** — Albany, CA
  Bachelor of Arts in Mathematics GPA: 4.00 — *Aug. 2025 – Jun. 2026 (Expected)*
- **Vanderbilt University** — Nashville, TN
  Bachelor of Arts in Mathematics GPA: 4.00 — *Aug. 2024 – May. 2025*
- **UC Santa Barbara** — Santa Barbara, CA
  Bachelor of Arts in Applied Mathematics GPA: 4.00 — *Sep. 2023 – Jun. 2024*

Relevant Coursework: Advanced Matrix Computations, Advanced Linear Algebra, Abstract Algebra, Real Analysis, Differential Geometry, Topology.

Research Experiences

- **Hairy Ball Theorem and Degree Theory Exploration** — Berkeley, CA
  Research Student under Galen Liang — *Aug. 2025 - Present*
  - Applied degree theory to vector fields on spheres, using the pathway toward the Hairy Ball Theorem to strengthen understanding of algebraic topology methods, invariants such as the degree of a map, and the role of topological obstructions.
  - Co-authoring a thesis on degree theory as an entry point into topology, emphasizing its utility in defining map degree, connecting manifold invariants, and framing classical results like the Hairy Ball Theorem.

- **Paul Atzberger Research Group** — Santa Barbara, CA
  Research Student under Paul Atzberger — *Nov. 2023 - Jun. 2024*
  - Simulated cryptocurrency price triangulation using stochastic processes to model arbitrage opportunities, providing a quantitative explanation of the "kimchi premium."
  - Applied a stochastic immersed boundary method to simulate fluid–structure interactions at microscopic length scales, advancing computational modeling of complex physical systems.

- **NSF Big-Bee Project: Trait Digitalization of Anthophila** — Santa Barbara, CA — Berkeley, CA
  Researcher — *Aug. 2023 - Present*
  - Developed a computer vision pipeline (OpenCV, scikit-learn, Python) to quantify disruptive camouflage in bees by detecting and clustering visual hotspots.
  - Implemented a volumetric measurement pipeline with Agisoft Metashape to model and compare size variation in Bombus species through 3D reconstruction and computational morphometrics.
  - Processed high-resolution imaging sets with ImageJ and Zerene Stacker to generate ultra-resolution photos, contributing finalized images to the NSF Big-Bee library, with one exhibited at the UCSB Main Library and the California Nature Art Museum.

Professional Experiences

- **Syriac Text Digitalization and Database Development** — Nashville, TN
  Data Science Assistant under David A. Michelson — *Aug. 2024 - May. 2025*
  - Repaired discrepancies in the Syriaca.org database by tracing entries back to original Syriac sources and applying targeted HTML edits, supporting the accurate digitalization of Syriac Christian manuscripts.
  - Improved the accuracy and stability of the Syriac Reference Portal, enabling scholars to more reliably search, cross-reference, and analyze Syriac Christian texts.

Projects

- **QuantSoftware Toolkit**: Open source python library for financial data analysis and machine learning for finance.
- **Github Visualization**: Data Visualization of Git Log data using D3 to analyze project trends over time.
- **Recommendation System**: Music and Movie recommender systems using collaborative filtering on public datasets.

Programming Skills

- **Languages**: Scala, Python, Javascript, C++, SQL, Java **Technologies**: AWS, Play, React, Kafka, GCE