

Xingyu Cheng
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Education

University of North Carolina at Chapel Hill

2021—2026 (Expected)

PhD Mathematics

Advisor: Prakash Belkale

Purdue University, West Lafayette, IN

2017—2021

BS Mathematics (Honors) *with distinction*

Minors: German, Computer Science

Online

Website: <https://www.tigercheng.xyz/>

Github: <https://github.com/Xyxyxx>

Papers

4. **Stability of parabolic systems of Hodge bundles over punctured \mathbb{P}^1 .** Preprint. <https://arxiv.org/abs/2511.09887> (2025)

3. **Quantum Difference Equations for Grassmannians** (joint with Reese Lance, Nikhil Nagabandi, Andrey Smirnov). Preprint. <https://arxiv.org/abs/2510.21653> (2025)

Undergraduate Publications:

2. **Linking number of monotonic cycles in random book embeddings of complete graphs** (joint with Yasmin Aguillon, Eric Burkholder, Spencer Eddins, Emma Harrell, Kenji Kozai, Elijah Leake, Pedro Morales). *J. Knot Theory Ramif.* <https://www.worldscientific.com/doi/pdf/10.1142/S0218216523500438> (2023)

1. **The Mean Sum of Squared Linking Numbers of Random Piecewise-Linear Embeddings of K_n** (joint with Yasmin Aguillon, Spencer Eddins, Pedro Morales). *Rose-Hulman Undergrad. Math. J.* <https://scholar.rose-hulman.edu/rhumj/vol24/iss2/3/> (2023)

Conferences attended

- **Richmond Geometry Meeting**, Virginia Commonwealth University, 2025. (Poster presented)
- **SRI in Algebraic Geometry (week 2)**, Colorado State University, 2025.
- **GAGS 2025**, University of Georgia Athens, 2025.
- **MAAGC**, Virginia Commonwealth University, 2023.
- **SLMath/MSRI Summer School Commutative Algebra and its Interaction with Algebraic Geometry**, Notre Dame University, Summer 2023.
- **Georgia Algebraic Geometry Symposium**, University of Georgia, 2023.
- **Summer 2020 Indiana REU Conference**, Indiana University, 2020.
Talk given: ‘Extensions of the uniform random polygon model’ (joint talk with Pedro Morales).

Teaching

Courses taught:

- **Fall 2025:** Math 381 Discrete Mathematics
- **Summer 2025:** Math 533 Elementary Number Theory
- **Fall 2024:** Math 152 Business Calculus
- **Summer 2023:** Math 118 Aspects of Modern Mathematics
- **Fall 2022:** Math 110 College Algebra

Recitations lead:

- **Spring 2024:** Math 233 Multivariate Calculus
- **Fall 2022:**
 - Math 231H Calculus I Honors
 - Math 110L Recitation for College Algebra
- **Spring 2022:** Math 233 Multivariate Calculus
- **Fall 2021:** Math 233 Multivariate Calculus

Service

- **Graduate Mathematics Association Visions Seminar Organizer** (2024—2025)
- **Geometry/Topology Comprehensive Exam Review Leader** (Summer 2024)
This is a 9 week review session designed to prepare graduate students for the written comprehensive exam
- **Junior Geometric Methods in Representation Theory Seminar (JGMRT) Organizer** (2024)
- **Tea Time Coordinator (Tea Tsar)** (2023—2024)

Directed Reading Program

From <https://math.unc.edu/undergraduate/opportunities/>: “The Directed Reading Program (DRP) pairs undergraduate students with graduate student mentors for semester-long independent study projects. It is an opportunity for motivated students to get one-on-one mentorship as they learn about a math topic of their interest but is out of the scope of the courses offered at UNC.”

- **Fall 2025:** With Vanessa Almelor. We will follow *Ideals, Varieties, and Algorithms* by Cox, Little, and O’Shea.
- **Spring 2025:** With Yuxin Ge. We learned some basics of Galois theory through Milne’s notes. In particular, we focused on learning about fields and field automorphisms.
- **Spring 2024:** with Yan Zhu. We learned some basic number theory and abstract algebra from Ireland and Rosen.
- **Fall 2023:** with Paul Hamrick. We went through Reid’s *Undergraduate Algebraic Geometry* with a particular focus on the proof of the 27 lines on a cubic.
- **Spring 2023:** with Aryan Kokkanti. ‘Foundations of Knot Theory.’
- **Fall 2022:** with Marleigh Purgar-Mcdonald. ‘Hilbert Nullstellensatz, Affine Varieties and Ideals.’