Daniel Koizumi

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Education

- **University of Texas at Austin** — Austin, TX
  Ph.D. in Mathematics — *August 2024-May 2029*
- **University of Utah** — Salt Lake City, Utah
  Honors Bachelors of Science in Mathematics; GPA: 4.00 — *August 2020-May 2024*

Notable Coursework

- **Graduate Courses**: Riemannian Geometry, Moduli & invariants in Symplectic and Algebraic Geometry, Algebraic Geometry, Complex Geometry, Algebraic Number Theory, Macaulay2 Seminar, Geometric Topology, Modern Algebra, Commutative Algebra, Algebraic Topology (2 semesters), Complex Analysis, Differentiable Manifolds, Lie Groups/Lie Algebras, Real Analysis, Representation Theory

Research

- **Research Experience Undergraduate** — Hebrew University of Jerusalem
  Visiting Research Fellow — *June 2022 - August 2022*
  - **Lefschetz Type Properties**: Did research on a variation of the Hard Lefschetz theorem with Prof. Karim Adiprasito. Worked towards a proof of the Lefschetz property for triangulated manifolds embedded on the moment curve using the biased pairing property and anisotropy. Implemented GPU accelerated polynomial multiplication algorithm in CUDA to apply Lee's degree formula to examples.
- **Research Experience Undergraduate** — University of Utah
  Student Researcher — *May 2021 - May 2024*
  - **Research on Space of Cubic Equations**: Conducting research on the movement of lines on cubic surfaces within a pencil of cubics. Implemented Salmon's discriminant formula in Julia to find the intersection of the discriminant hypersurface with the space of rank 5 cubics. Using Sage, I created animations of cubic surfaces with the lines embedded on them. Presented intermediate results at the Math for All conference in Spring 2022 and Spring 2021.
- **SCaN Higher-Math Applications for Near Space Network Modeling** — NASA
  Intern — *August 2023-December 2023*
  - **Space Communications**: Working on improving the robustness, reliability, and coverage of space networks by doing research on the mathematical modeling. Doing research on shortest-path algorithms on such networks.
  - **Moduli and Path Sheaves**: Worked on a project to study time-varying graphs through algebraic geometry. Testing definitions of path sheaves on various topologies of schemes associated to graphs. Also utilizing moduli spaces of graphs to study notions of curvature on time-varying graphs.
- **Algebraic Geometry Reading Group** — University of Texas at Austin
  Organizer — *Aug 2024 - Dec 2024*
  - **Algebraic Geometry Reading Group**: Graduate students interested in Algebraic Geometry meet to discuss topics in the book and present solutions to problems. I provided presentations and organized the meetings.
- **Directed Reading Program** — University of Utah
  Student — *Jan 2021 - May 2021*
  - **Reading on Riemann Surfaces**: Conducted reading on *Algebraic Curves and Riemann Surfaces* by Rick Miranda with then University of Utah graduate student Yen-An Chen.
  - **Exposition on Čech Cohomology**: Wrote exposition on Riemann surfaces and Čech cohomology in a Modern Algebra course. The document is available on github: A (very) Rough Tour of Sheaves and Čech Cohomology .
- **Model Categories Reading Group** — University of Utah
  Member — *August 2022 - Dec 2022*
  - : Graduate students met to discuss and present topics from the chapter Homotopy theories and model categories by W.G. Dwyer and J. Spalinski. Gave roughly a third of the presentations.

Talks and Presentations

- **Junior Quantum Field Theory Seminar:** Presented on "Mirror Symmetry of the Elliptics and the Quintic Hypersurface in P4" at UT Austin.
- **Taylor Resolutions:** Conducted a presentation on Taylor resolutions with the BIKES seminar.
- **Math for All:** Conducted multiple different presentations with the Math for All satellite conference occurring in Salt Lake City. Presented on braid monodromy, taylor resolutions, and cubic surface visualization.
- **Hebrew University REU Symposium:** Delivered a talk on research results to the REU community at the Einstein Institute. Presented on the Lefschetz property on the moment curve.
- **Utah Symposiums:** Delivered various talks updating the University of Utah's math department on research results. Talks include "Cubic Surface Visualization" and "Braid Monodromy and Curve Complements"

Honors and Awards

- Goldwater Scholarship (2023)
- Provost's Excellence Graduate Fellowship - A fellowship providing support to study at the University of Texas at Austin
- Undergraduate Award for Excellence in Graduate Courses - Annually, professors nominate a student to receive the award for performance in graduate courses (Spring 2022, Spring 2024).
- Awarded George S. and Dolores Doré Eccles Scholarship - A 4-year full-ride scholarship given to 25 students annually (Fall 2020)

Technical Skills

- **Programming/Markup Languages**: C++, Julia, LaTeX, Python, Java