

# Sierra A Knavel

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## CONTACT INFORMATION

Mathematics Department  
Georgia Institute of Technology  
Skiles Classroom Building, Office 252

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Atlanta, Georgia, 30318

## RESEARCH INTERESTS

Low-dimensional topology, symplectic and contact topology, symplectic structures and Lefschetz fibrations, fundamental groups of symplectic manifolds, minimal number of singular fibers in LFs, contact structures of 3-manifolds, mapping class groups, braids

## TEACHING CERTIFICATIONS

Summer 2021 **CornellX CIRT Network MOOC**  
*An Introduction to Evidence-Based Undergraduate STEM Teaching*  
Certification completion with distinction

**Tech to Teaching** Certificate Program  
Completed Spring 2023, Capstone course was Multivariate Calculus 2551

## EDUCATION

### Georgia Institute of Technology

Ph.D. Candidate, expected date of completion: May 2025  
Advisor: John Etnyre

RTG Fellowship (Aug 2020-Aug 2023)  
President's Fellowship (Aug 2020 - Current)  
Goizueta Fellowship (Aug 2022 - Current)  
UCEM-PhD Fellowship (Aug 2023 - Current)

### Ohio University

B.S. Mathematics, Honors Tutorial College (May 2020)  
John Newton Templeton Scholar  
Edwin L. Kennedy Leadership Award for Outstanding Community Service

## PUBLICATIONS

Sierra Knavel, R Trapp. *Embedded totally geodesic surfaces in fully augmented links*.  
Communications in Analysis and Geometry Volume 23, Number 4, 797–826, 2021

R. Bycofski, B. Klein, and S Knavel. (2020, Release Jan 2.). The Pancake Problem. In, D. Auckly, B. Klein, A. Sereney, and T. Shubin (Eds.) *Inspiring Mathematics: Lessons from the Navajo Nation Math Circles*. Jointly published by the American Mathematical Society (AMS) and the Mathematical Sciences Research Institute (MSRI) as Volume 24 of the Math Circles Library. <https://bookstore.ams.org/mcl-24/>

S. Knavel, T. Savin, M. Mroz, M. Kordesch, C. Eads, J. Sadowski, and S. Tenney. *A Mathematical Model of Solid-State Dewetting of Barium Thin Films on W(112)*.  
Mathematical Modelling of Natural Phenomena. EDP Sciences, 2019.

## INVITED TALKS

- **Future:** *Title TBD*, Oct 2024, Topology Seminar, Vanderbilt University
- **Future:** *Title TBD*, Oct 2024, AMS in Savannah, GA
- “Lefschetz fibrations with Abelian fundamental groups,”  
March 2024, AMS in Tallahassee, FL
- “Lefschetz fibrations with fixed finitely presented fundamental groups,”

- Jan 2024, JMM in San Francisco, CA
- “Fundamental Groups of genus-2 Lefschetz fibrations,”  
Dec 2023, Tech Topology Winter School, Atlanta GA
- “Possible fundamental groups for genus-2 Lefschetz fibrations,”  
Oct 2023, Georgia Tech Student Topology Seminar
- “An introduction to 4-manifolds,”  
Sep 2023, Georgia Tech Student Topology Seminar
- “A Lefschetz fibration construction with arbitrary finitely presented fundamental groups”  
July 2023, Lightning talk at Tech Topology Summer School, Georgia Tech
- “An exotic 4-manifold,”  
Feb 2022, Georgia Tech Student Topology Seminar
- “An introduction to 4-manifolds,”  
Sep 2022, Georgia Tech Student Topology Seminar
- “Constructing Exotic 4-manifolds via cork twists, Gluck twists, and log transforms,”  
Dec 2021, Georgia Tech Student Topology Seminar

#### Other

- 2020, 2019 JMM Poster Presentation (CSUSB REU, VERUM REU)
- 2019, 2018 OHIO, Student Research Symposium, First Place in Mathematics (2018 and 2019)
- 2018 OHIO, Presentation on Gender Issues in Mathematics
- 2018 REU Conference, Indiana University in Bloomington

#### TEACHING EXPERIENCES

#### **Instructor, FYSA@Oxford**

First Year Study Abroad in Oxford, United Kingdom  
Teaching MATH 1551, MATH 1711 at Mansfield College

#### **Teaching Assistantships**

Linear Algebra (Fall 2023)  
Multivariable Calculus (Fall 2021, Spring 2022, Summer 2022)

#### **Substitute Instructor**

Multivariate Calculus, 2 Lectures, Fall 2021  
Multivariate Calculus, 2 Lectures, Spring 2023  
Pre-Calculus, 1/5th of the course, Summer 2023

#### **Directed Reading Program | Organizer since Fall 2024**

The DRP at Georgia Tech pairs undergraduate students with graduate students to undertake independent study projects or explore advanced topics in mathematics.

(Spring 2024) *Applications of Knot Theory to Games*

With Beatrix Lidl and Armani Smith

(Fall 2023) *Introduction to Riemann Surfaces*

With Arya Karthik

(Fall 2022) *Introduction to Topology and Algebraic Topology*

with Maya Mims

(Spring 2022) *Chaos Theory*

with Mark Rodriguez & Matthew Walloch

(Fall 2021) *Math and Physics Simulations in Python*

with Cara Bennett

(Spring 2021) *Introduction to Knot Theory*

with Ethan Botelho

(Fall 2020) *Self-Similar Fractals, Hausdorff Dimension & Geometry*

with Avery Williams

**Assistant to the Director of Teaching Assistants**

Observing and training all incoming undergraduate Teaching Assistants for Fall 2023 under Klara Grodzinsky

AWARDS

**Outstanding Student Evaluations** | Georgia Tech School of Mathematics

Academic year 2021-2022 | Awarded to Graduate Student TAs in the SoM

**Thank-a-Teacher Program** | Center for Teaching and Learning

Fall 2021, Spring 2022

PROFESSIONAL  
DEVELOPMENT

**Safe Space Training**, LGBTQIA Resource Center, Jan 2024

Fall 2022 **GTx MGT1000 MOOC**

*Innovation Leadership*  
Certification completion

Summer 2021 **CornellX CIRTL Network MOOC**

*An Introduction to Evidence-Based Undergraduate STEM Teaching*  
Certification completion with distinction

PROFESSIONAL  
SERVICE  
&  
MATH  
OUTREACH

**Advisor, Research Experience for Undergraduates at Georgia Tech**

Co-advisor with John Etnyre to 4 undergraduate students

Summer 2024, Georgia Tech REU

Project: Fundamental groups of Lefschetz Fibrations

**Graduate Student Council** | School of Mathematics

Councilmember, Aug 2022 – May 2024

**Organization Membership**

Association for Women in Math, Chapter at Georgia Tech,

American Mathematical Society, Chapter at Georgia Tech

**High School Math Competition Volunteer** | Georgia Tech

April 22, 2023

**Studypalooza Volunteer** | Office of Tutoring & Academic Support

Fall 2022, Spring 2023 Study Session Leader in Mathematics

**Allegiance of Indigenous Math Circles Math Camp** | Dine Preparatory School

Farmington, New México | Summer 2017

Peer mentor to over 30 students from Navajo (Dine), Apache, or Hopi tribe and assistant to Dr. Robert Klein

CONFERENCES  
ATTENDED

**(Future) American Mathematical Society (AMS) Sectional**

Oct 5-6, 2024 | Savannah, GA

**Georgia Topology Conference**

May 15-19, 2024 | University of Georgia, Athens, GA

**American Mathematical Society (AMS) Sectional**  
March 23-24, 2024 | Tallahassee, Florida, US

**Joint Mathematics Meeting (JMM)**  
Jan 3-6, 2024 | San Francisco, California, US

**Tech Topology Conference** at Georgia Tech  
Dec 8-10, 2023 | Atlanta, Georgia, US

**Tech Topology Summer School** at Georgia Tech  
July 24-28, 2023 | Atlanta, Georgia, US

**Moab Topology Conference** at Utah State University Moab  
May 1-3, 2023 | Moab, Utah, US

**BIRS Workshop, Interactions between Symplectic and Holomorphic Convexity in 4-dimensions** at Banff Centre for Arts and Creativity  
April 9-14, 2023 | Banff, Alberta, Canada

**Singularities and Low Dimensional Topology** Winter School at Renyi Institute  
January 20-27, 2023 | Budapest, Hungary

**Tech Topology Conference** at Georgia Tech  
December 9-11, 2022 | Atlanta, Georgia, US

**Frontiers in Geometry and Topology** Summer School  
The Abdus Salam International Centre for Theoretical Physics  
August 1-5, 2022 | Trieste, Italy

**Graduate Student Topology and Geometry Conference (GSTGC)** at Georgia Tech  
Co-organizer  
April 1-3, 2022 | Atlanta, Georgia, US

**Tech Topology Summer School** at Georgia Tech  
July 26-30, 2021 | Atlanta, Georgia, US

**Mathematics Teacher-Scholar Symposium (MaTSS)** at Reed College  
May 22-23, 2021 | Portland, Oregon, US

UNDERGRADUATE  
RESEARCH

(advisor) **Fundamental Groups of Lefschetz Fibrations**  
Summer 204 | Funded by NSF TB  
Co-advising four undergraduate students with John Etnyre

(participant) **California State University San Bernardino REU**  
Summer 2019 | Funded by NSF Grant 175 8020  
Advisor: Rollie Trapp  
Paper: *Totally embedded geodesic surfaces in fully augmented link complements.*

(participant) **Valparaiso University REU (VERUM)**  
Summer 2018 | Funded by NSF Grant DMS-155 9912  
Advisor: Jon Begley

Paper: *On copoint graphs of convex geometries.*