LUKE CONNERS

UNC Department of Mathematics ⋄ Phillips Hall, CB 3250, UNC-CH ⋄ Chapel Hill, NC, 27599
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RESEARCH INTERESTS

- Link Homology, Categorification, Low-Dimensional Topology

EDUCATION

University of North Carolina, Chapel Hill, NC *August 2019 - Present*
Ph.D. in Pure Mathematics
Advisor: David E.V. Rose
Current Research Topic: Colored Triply-Graded Link Homology
Advanced to Candidacy: May 2021
Expected Graduation Date: May 2025

Rice University, Houston, TX *August 2015 - May 2019*
B.S. in Mathematics, B.A. in Physics *Cum Laude*

GRANTS, HONORS AND AWARDS

- **UNC-Chapel Hill Graduate Summer Research Fellowship**, Summer 2023
- **Early-career AMS-NSF-Simons-ICM Travel Grant**, awarded for travel to and local expenses at the 2022 International Congress of Mathematicians in St. Petersburg, Russia. (Canceled due to international conflict.)
- **Rice University Trustee Distinguished Scholar**, 2015-2019
- **United States Presidential Scholar**, awarded annually to one male and one female graduating senior from each U.S. state and territory (Kansas, 2015)

PUBLICATIONS AND PREPRINTS

Reviewed Publications

1. L. Conners. **Row-Column Mirror Symmetry for Colored Torus Knot Homology**. 87 pages. *Selecta Mathematica*, vol. 30, no. 97 (2024). Available at *arXiv:2303.16271*.

Preprints

2. L. Conners. **Fray Functors and Equivalence of Colored HOMFLYPT Homologies**. 2024. 79 pages. Under review at *Quantum Topology*. Available at *arXiv:2405.00875*.

SOFTWARE

- **Colored Torus Knot Homology** (2024): Software package computing HOMFLY homology of exterior-colored torus knots.

  Available at https://github.com/lukegconners/Colored-Torus-Knot-Homology.

TEACHING ACTIVITIES

University of North Carolina - Chapel Hill August 2019 - Present
Chapel Hill, NC

Lead Instructor:

· MATH 347 (Linear Algebra), Summer 2022 (19 students)
· MATH 381 (Discrete Mathematics), Spring 2022 (29 students)
· MATH 383 (Differential Equations), Fall 2021 (16 students)
· MATH 232 (Calculus II), Summer 2021 (23 students)
· MATH 117 (Aspects of Finite Mathematics), Spring 2021 (34 students)

Teaching Assistant:
· MATH 347 (Linear Algebra), Spring 2022
· MATH 233 (Calculus III; also led multiple recitation sections), Fall 2021
· MATH 551 (Euclidean and Non-Euclidean Geometry), Fall 2020
· MATH 233 (Calculus III; also led multiple recitation sections), Fall 2020
· MATH 533 (Elementary Number Theory), Summer 2020
· MATH 381 (Discrete Mathematics), Summer 2020
· MATH 233 (Calculus III; also led recitation), Summer 2020
· MATH 231 (Calculus I; also led recitation), Summer 2020
· MATH 578 (Algebraic Structures), Spring 2020
· MATH 577 (Linear Algebra), Spring 2020
· MATH 383 (Differential Equations), Fall 2019

PROFESSIONAL SERVICE

- UNC Graduate and Professional Student Government (GPSG) Vice President for Communications, Spring 2023 - Spring 2024
- UNC Graduate Mathematics Association (GMA) President, Spring 2022 - Spring 2023
- UNC GMA Vice President, Spring 2021 - Spring 2022
- Organizing Committee Member for UNC Directed Reading Program, Fall 2021 - Spring 2023
- Co-organizer of UNC-Chapel Hill Graduate Mathematics Seminar, Summer 2020 - Spring 2022
- Co-organizer of Launch Point (North Carolina mathematics conference targeting undergraduate students from historically underrepresented groups), April 2021
- American Mathematical Society (AMS) UNC Chapter Secretary, Fall 2020 - Spring 2021
- Co-organizer of MathGems undergraduate seminar series, Fall 2020 - Spring 2021
- UNC GPSG senator, Spring 2020 - Spring 2021
- Co-organizer of Triangle Area Graduate Mathematics Conference (TAGMaC), December 2020

MENTORSHIP

Graduate Students

- Selected to lead nine-week review sessions preparing graduate students for written comprehensive exam in the following topics:
  - Geometry/topology: Summer 2022 and 2021
  - Algebra: Summer 2024

Undergraduate Students

- John Shook, Directed Reading Program Advisor, Spring 2023. Topic: Smooth Manifolds and Lie Groups

- Lauren Copperthwwaite, Directed Reading Program Advisor, Fall 2021. Topic: Applications of Dynamical Systems to Neuroscientific Phenomena
- Monty Evans, Directed Reading Program Advisor, Spring 2021. Topic: Applications of Dynamical Systems to Neuroscientific Phenomena

INVITED CONFERENCE AND SEMINAR TALKS

- Virginia Tech, Geometry/Topology Seminar, *Row-Column Mirror Symmetry for Colored Torus Knot Homology*, October 15, 2024
- UNC-Chapel Hill, Graduate Mathematics Seminar, *Reidemeister's theorem using transversality*, August 26, 2024
- UC Davis, Algebra and Discrete Mathematics Seminar, *Row-Column Mirror Symmetry for Colored Torus Knot Homology*, April 23, 2024
- MIT, Geometry and Topology Seminar, *Row-Column Mirror Symmetry for Colored Torus Knot Homology*, February 26, 2024
- UNC-Chapel Hill, Geometric Methods in Representation Theory Seminar, *Row-Column Mirror Symmetry for Colored Torus Knot Homology*, February 9, 2024
- UNC-Chapel Hill, Graduate Mathematics Seminar, *Introduction to Categorification and Link Homology*, September 18, 2023
- Duke University, Triangle Area Graduate Mathematics Conference (TAGMaC), *Link Polynomials from Representation Theory*, February 25, 2023
- UNC-Chapel Hill, Graduate Mathematics Seminar, *Introduction to Categorification*, October 25, 2022
- Duke University, TAGMaC, *Introduction to Categorification and Link Homology*, November 13, 2021
- UNC-Chapel Hill, Advanced Graduate Mathematics Seminar, *An Invitation to Derived Categories and Derived Functors*, September 27, 2021
- AIM Link Homology Seminar, *Computing Hochschild Cohomology of the Full Twist*, August 11, 2021

Notes and slides for all talks available upon request.

SELECTED CONFERENCES AND SEMINARS ATTENDED

- Summer School - New structures in low-dimensional topology, Rényi Institute (Budapest, Hungary), July 1 - 5, 2024
- Workshop on Algebra and Representation Theory, Held on Oregonian Grounds (WARTHOG) 24 - Coherent-constructible equivalences in local Geometric Langlands and Representation Theory, University of Oregon, July 22-26, 2024
- Quantum Structures in Lie Theory, University of Virginia, March 1-3, 2024
- Workshop on Algebra and Representation Theory, Held on Oregonian Grounds (WARTHOG) 23 - Categorified Coulomb Branches, University of Oregon, July 10-14, 2023
- Summer School in Geometric Representation Theory, Coulomb Branches and Knot Homology, MIT, June 19-23, 2023
- Quantum Groups, Categorification, Knot Invariants, and Soergel Bimodules (QUACKS II: QUACKS Reducks), University of Oregon, August 8-12, 2022

- Workshop on Algebra and Representation Theory, Held on Oregonian Grounds (WARTHOG) 22 - Infinite Dimensional Methods in Commutative Algebra, University of Oregon, June 26-30 2022
- Categorical Methods in Representation Theory and Quantum Topology, University of Virginia, April 15-17, 2022
- ICERM Foam Evaluation workshop, Brown University, November 5-7 2021
- Member of AIM Link Homology Research Community, Summer 2021 - Spring 2022
- HOMFLYPT Homology Seminar, Spring 2021 (Held virtually)
- Quantum Groups, Categorification, Knot Invariants, and Soergel Bimodules (QUACKS), University of Oregon, August 10-14, 2020 (Held virtually due to COVID-19 pandemic)
- Categorification Virtual Learning Seminar, Summer 2020 - Spring 2021