DAVID E. V. ROSE

November 5, 2025

RESEARCH INTERESTS

- Low-dimensional topology and TQFT

- Representation theory

- Homological algebra and category theory

EDUCATION

2012 **Duke University,** Durham, NC
Ph.D. in Mathematics
Advisor: Lenny Ng
Thesis: *Categorification of Quantum $\mathfrak{sl}_3$ Projectors and the $\mathfrak{sl}_3$ Reshetikhin-Turaev Invariant of Framed Tangles*

2007 **Christ's College, University of Cambridge,** Cambridge, UK
Certificate of Advanced Studies (Part III) with Merit
Essay: *Dirac Operators*

2006 **The College of William and Mary,** Williamsburg, VA
B.S. in Mathematics and Physics, *Summa Cum Laude* with highest (research) honors
Mathematics Advisor: Ilya Spitkovsky
Mathematics Thesis: *Results concerning the Aluthge transform*
Physics Advisor: Christopher Carone
Physics Thesis: *Minimal length uncertainty and the quantum mechanics of non-commutative space-time*

PROFESSIONAL EXPERIENCE

July 2022 –	**University of North Carolina**, Chapel Hill, NC Associate Professor
July 2016 – June 2022	**University of North Carolina**, Chapel Hill, NC Assistant Professor (On research and study leave: Fall 2018)
August 2012 – July 2016	**University of Southern California**, Los Angeles, CA Busemann Assistant Professor (NTT postdoc)

HONORS

- **G. de B. Robinson Award** of the Canadian Mathematical Society, 2024

- **NSF CAREER Award**, 2022

- Invited researcher and group co-leader, **American Institute of Mathematics**, San Jose, CA. *Link homology research community*, Summer and Fall 2021.

- Invited researcher, **Kavli Institute for Theoretical Physics**, Santa Barbara, CA. Program on *Quantum Knot Invariants and Supersymmetric Gauge Theories*, Fall 2018.

- Invited researcher, **Isaac Newton Institute**, Cambridge, UK. Program on *Homology theories in low dimensional topology*, Spring 2017.

- **Bass Fellowship** for designing and teaching the undergraduate course *Algebraic methods in knot theory* at Duke University, Dates: 9/1/2011 – 5/31/2012

- **L.P. and Barbara Smith award for beginning teachers** in the Duke University Mathematics Department, February, 2009

- **Cambridge overseas trust scholarship,** September, 2006

- **William and Mary Prize in Mathematics,** awarded to the top graduating Mathematics major, May 2006

- **Phi Beta Kappa,** College of William and Mary, November, 2005

- **E. G. Clark memorial scholarship,** awarded to the top junior in the William and Mary Department of Physics, May 2005

- **Monroe Scholar,** College of William and Mary, Fall 2002 – Spring 2006

PUBLICATIONS AND PREPRINTS

Authors on papers are listed alphabetically (as is convention in pure mathematical writing) and papers are listed reverse-chronologically within section, in order of completion. Refereed publications are those that have been published (or accepted for publication) as of November 5, 2025. A dagger[+] denotes a collaborator who was a student during the collaboration.

Refereed publications:

1. M. Hogancamp, D.E.V. Rose, and P. Wedrich. **A Kirby color for Khovanov homology**. 2022. *Journal of the European Mathematical Society (JEMS)*. DOI 10.4171/JEMS/1589. *arXiv:2210.05640*. 60 pages.

2. M. Hogancamp, D.E.V. Rose, and P. Wedrich. **A skein relation for singular Soergel bimodules**. 2021. to appear in *Selecta Mathematica*. *arXiv:2107.08117*. 34 pages.

3. M. Hogancamp, D.E.V. Rose, and P. Wedrich. **Link splitting deformation of colored Khovanov–Rozansky homology**. *Proceedings of the London Mathematical Society* (3) 129 (2024), no. 3, Paper No. e12620, 142 pages.

4. D.E.V. Rose and L. Tatham[+]. **On webs in quantum type** C. *Canadian Journal of Mathematics*, 74(3), June 2022, 793–832. (For this paper, we were awarded the **G. de B. Robinson Award** by the CMS.)

5. D.E.V. Rose and D. Tubbenhauer. **HOMFLYPT homology for links in handlebodies via type** A **Soergel bimodules**, *Quantum Topology*, 12 (2021), no. 2, 373–410.

6. M. Abram[†], L. Lamberto-Egan[†], A. Lauda, and D.E.V. Rose. **Categorification of the internal braid group action for quantum groups I: 2-functoriality**. *Pacific Journal of Mathematics*, Vol. 328 (2024), No. 1, 1–75.

7. H. Queffelec and D.E.V. Rose. **Sutured annular Khovanov–Rozansky homology**. *Transactions of the AMS*, 370 (2018), 1285–1319.

8. D.E.V. Rose and P. Wedrich. **Deformations of colored $\mathfrak{sl}_n$ link homologies via foams**. *Geometry and Topology*, 20 (2016), no. 6, 3431–3517.

9. D.E.V. Rose and D. Tubbenhauer. **Symmetric webs, Jones–Wenzl recursions, and q-Howe duality**. *International Mathematics Research Notices*, 2016 (17): 5249–5290.

10. H. Queffelec and D.E.V. Rose. **The $\mathfrak{sl}_n$ foam 2-category: a combinatorial formulation of Khovanov–Rozansky homology via categorical skew Howe duality**. *Advances in Mathematics*, 302 (2016), 1251–1339.

11. A. Lauda, H. Queffelec[†], and D.E.V. Rose. **Khovanov homology is a skew Howe 2-representation of categorified quantum $\mathfrak{sl}_m$**. *Algebraic and Geometric Topology*, 15-5 (2015), 2517–2608.

12. D.E.V. Rose. **A note on the Grothendieck group of an additive category**. *Bulletin of Chelyabinsk State University*, 2015. no. 3 (358). Mathematics. Mechanics. Informatics. Issue 17. pp. 135–139 (Proceedings of the *International Conference "Quantum topology"*).

13. D.E.V. Rose. **A categorification of quantum $\mathfrak{sl}_3$ projectors and the $\mathfrak{sl}_3$ Reshetikhin-Turaev invariant of tangles**. *Quantum Topology*, 5 (2014), no. 1, pp. 1–59.

14. D.E.V. Rose and I. Spitkovsky. **On the numerical range behavior under the generalized Aluthge transform**. *Linear and Multilinear Algebra*, vol. 56 no. 1&2 (January, 2008), pp. 163–177.

15. D.E.V. Rose and I. Spitkovsky. **On the stabilization of the Aluthge sequence**. *International Journal of Information and Systems Sciences - Special Issue on Matrix Analysis and Applications*, vol. 4 no. 1 (Spring, 2008), pp. 178–189.

Preprints:

16. E. Bodish, B. Elias, and D.E.V. Rose. **Spin Link Homology**. 2024. Submitted for publication. *Preprint arXiv:2407.00189*. 137 pages.

17. M. Hogancamp, D.E.V. Rose, and P. Wedrich. **Bordered invariants from Khovanov homology**. 2024. Submitted for publication. *Preprint arXiv:2404.06301*. 58 pages.

18. E. Bodish[†], B. Elias, D.E.V. Rose, and L. Tatham. **A note on the Sundaram–Stanley bijection (or, Viennot for up-down tableaux)**. 2021. Under revision at *Abhandlungen aus dem Mathematischen Seminar der Universität Hamburg*. *Preprint arXiv:2108.11528*. 14 pages.

19. E. Bodish[†], B. Elias, D.E.V. Rose, and L. Tatham[†]. **Type C webs**. 2021. Submitted for publication. *Preprint arXiv:2103.14997*. 45 pages.

20. H. Queffelec, D.E.V. Rose, and A. Sartori. **Annular Evaluation and Link Homology**. 2018. Submitted for publication. *Preprint arXiv:1802.04131*. 47 pages.

In preparation:

21. M. Hogancamp, D.E.V. Rose, and P. Wedrich. **A 3-manifold invariant from Khovanov homology**. *In preparation* (arXiv ETA: 2025). Currently 27 pp.

22. E. Bodish, B. Elias, and D.E.V. Rose. **Type B webs**. *In preparation* (arXiv ETA: 2025). Currently 44 pp.

Grants

To date, I have been awarded $546,000 in grant funding:

- **NSF CAREER Grant DMS-2144463**: *Link homology – in type A and beyond*, PI: David Rose (percent effort: 16.67%), Award Amount $425,000 (direct cost: $285,370), Dates: 7/1/2022 – 6/30/2027

- **Simons Collaboration Grant**: *Research on knot invariants, representation theory, and categorification*, PI: David Rose (percent effort: 0%), Award Amount: $42,000, Direct Cost: $35,000, Dates: 9/1/2017 – 8/31/2022

- **UNC Junior Faculty Development Award**, PI: David Rose (percent effort: 8.88%), Award Amount: $10,000, Dates: 1/1/2019 – 12/31/2019

- **NSA Young Investigator Grant**: *Dualities in higher representation theory and low-dimensional topology*, PI: David Rose (percent effort at UNC: 8.33%), Award Amount: $40,000, Direct Cost (at UNC): $17,391 Dates: 1/21/2016 – 12/31/2017

- **AMS Simons Travel Grant**, PI: David Rose, Award Amount: $4,000, Dates: 7/1/2015 – 12/31/2015

- **Zumberge Fund Individual Grant Award**: *Categorified quantum groups and knot homology*, PI: David Rose, Award Amount: $25,000, Dates: 7/1/2013 – 6/30/2014

Conference and Seminar Talks

1. ICERM Workshop on Webs in Algebra, Geometry, Topology and Combinatorics, *TBD*, December 8–12, 2025 (forthcoming)

2. Categorification in Low Dimensional Topology, Bochum, Germany, *Towards a categorification of the Turaev–Viro TQFT* (four 1.5-hour lectures), July 22–25, 2025

3. Columbia University, Geometric Topology Seminar, *Towards a higher TQFT from Khovanov homology*, March 7, 2025

4. Stanford University, Topology Seminar, *Towards a categorification of the Turaev–Viro TQFT*, June 4, 2024

5. Uppsala University, Algebra Seminar, *Spin link homology*, May 21, 2024

6. UC Berkeley, String-Math Seminar, *Towards a categorification of the Turaev–Viro TQFT*, April 15, 2024

7. Michigan State University, Topology Seminar, *A Kirby color (or two) for Khovanov homology*, September 19, 2023

8. Michigan State University, RTG Seminar, *The Temperley–Lieb and Bar-Natan categories*, September 18, 2023

9. University Quantum Symmetries Lectures (UQSL), *A Kirby color for Khovanov homology*, January 12, 2023

10. QUAntum groups, Categorification, Knot invariants, and Soergel bimodules II, University of Oregon, *A Kirby color for Khovanov homology*, August 11, 2022

11. University of North Carolina at Chapel Hill, Geometric Methods in Representation Theory Seminar, *Type C Webs*, April 29, 2022

12. Categorical Methods in Representation Theory and Quantum Topology, University of Virginia, *Type C Webs*, April 17, 2022

13. Triangle Area Graduate Mathematics Conference (plenary faculty lecture), North Carolina State University, *Quantum knot invariants and webs*, April 2, 2022

14. North Carolina State University, Algebra and Combinatorics Seminar, *Type C Webs*, March 28, 2022

15. Penn State University, Colloquium, *Link Homology*, March 21, 2022

16. American Institute of Mathematics, Fundamentals of Link Homology Seminar, *Triply-graded link homology, Soergel bimodules, (and Traces)*, August 4, 2021

17. American Institute of Mathematics, Fundamentals of Link Homology Seminar, *Basics of Khovanov homology*, June 30, 2021

18. Spring AMS Western Sectional Meeting special session on Diagrammatic and Combinatorial Methods in Representation Theory, *Type C Webs*, May 1, 2021

19. UC Davis, Algebra & Discrete Mathematics Seminar, *Type C Webs*, March 11, 2021

20. Fall AMS Western Sectional Meeting special session on Monoidal Categories in Representation Theory, University of Utah, Salt Lake City, *Webs in Type C*, October 25, 2020

21. QUAntum groups, Categorification, Knot invariants, and Soergel bimodules, University of Oregon, *Webs in Type C*, August 12, 2020

22. Spring AMS Southeastern Sectional Meeting special session on Categorical Representation Theory and Beyond, University of Virginia, *On the quantum type C spider*, March 15, 2020 (Cancelled due to COVID-19 pandemic)

23. ICERM Workshop on Illustrating Number Theory and Algebra, Brown University, *Webs, foams, knot invariants, and representation theory*, October 21, 2019

24. Workshop on Quiver Hecke algebra and its applications to topology, Nagoya, Japan, *Link homology via the categorified skein module of the annulus*, July, 8, 2019

25. UC Berkeley, String-Math Seminar, $\mathfrak{gl}_n$ *homologies, annular evaluation, and symmetric webs*, October 8, 2018

26. Interactions of low-dimensional topology and "higher" representation theory, Universität Zürich, Switzerland, $\mathfrak{gl}_n$ *homologies, annular evaluation, and symmetric webs*, September 19, 2018

27. CQ3MI workshop, University of Southern California, $\mathfrak{gl}_n$ *homologies, annular evaluation, and symmetric webs*, July 19, 2018

28. Categorification and Higher Representation Theory, Institute-Mittag Leffler, Djursholm, Sweden, $\mathfrak{gl}_n$ *homologies, annular evaluation, and symmetric webs*, July 10, 2018

29. Quantum Knot Homology and Supersymmetric Gauge Theory, Aspen Center for Physics, *Annular evaluation and link homology*, March 5, 2018

30. Mathematical Conference of the Americas, Special Session on Symmetry in Algebra, Topology, and Physics, Montreal, Canada, *Annular evaluation and link homology*, July 26, 2017

31. Quantum topology and categorified representation theory, Isaac Newton Institute, Cambridge University, *Traces, ~~current algebras~~, and link homologies*, June 26, 2017

32. Triangle Area Graduate Mathematics Conference (plenary faculty lecture), Duke University, *Knot invariants and dualities*, April 23, 2017

33. North Carolina State University, Geometry and Topology Seminar, *Quantum knot and link invariants from the symmetric perspective*, March 1st, 2017

34. Institut Montpellérain Alexander Grothendieck, Séminaire Topologies, *Quantum knot and link invariants from the symmetric perspective*, September 22, 2016

35. University of North Carolina at Chapel Hill, *Link homology via traces, current algebras, and dualities*, February 17, 2016

36. University of North Carolina at Chapel Hill, Mathematics Colloquium, *Low-dimensional topology, representation theory, and categorification*, February 16, 2016

37. Dartmouth College, Mathematics Colloquium, *Low-dimensional topology, representation theory, and categorification*, February 9, 2016

38. Joint Mathematics Meeting, AMS special session on Geometric and categorical methods in representation theory, Seattle, Washington, *Current algebras, Khovanov-Rozansky homology, and annular link invariants*, January 8, 2016

39. Joint Mathematics Meeting, AMS special session on Topological Representation Theory, Seattle, Washington, *Howe dualities and link invariants*, January 6, 2016

40. Knots in Washington – Plenary Talk, George Washington University, *Khovanov-Rozansky homology and current algebras*, December 4th, 2015

41. Duke University, Geometry/Topology Seminar, *Quantum knot invariants and Howe dualities*, April 7th, 2015

42. North Carolina State University, Geometry and Topology Seminar, *Quantum knot invariants and Howe dualities*, April 6th, 2015

43. University of North Carolina, Physically Inspired Mathematics Seminar, *Annular Khovanov-Rozansky homology*, April 2nd, 2015

44. University at Buffalo (SUNY), Mathematics Colloquium, *Categorification in topology and representation theory*, December 8th, 2014

45. The Joint Los Angeles Topology Seminar, UCLA, *Annular Khovanov homology via trace decategorification*, December 1, 2014

46. UC Davis, Algebra & Discrete Mathematics Seminar, *Khovanov-Rozansky homology via categorified quantum groups and skew Howe duality*, November 24, 2014

47. Fall AMS Southeastern Section Meeting special session on Algebraic structures motivated by Knot Theory, University of North Carolina at Greensboro, *Annular Khovanov homology via trace decategorification*, November 8, 2014

48. Centre for quantum geometry of moduli spaces (QGM), Aarhus, Denmark, *From the Jones polynomial to Khovanov-Rozansky homology via skew Howe duality*, July 30, 2014

49. NSF/CBMS Regional Conference on Higher Representation Theory, North Carolina State University, *From the Jones polynomial to Khovanov-Rozansky homology via skew Howe duality*, July 7, 2014

50. Centre de recherches mathématiques workshop on Categorification and geometric representation theory, Montreal, *The $\mathfrak{sl}_n$ foam 2-category via skew Howe duality*, June 9, 2014

51. Australian National University, Algebra and Topology Seminar, *Quantum link invariants and skew Howe duality*, March 18, 2014

52. Institut de Mathématiques de Jussieu, Paris, *Khovanov homology via categorified quantum groups*, December 17, 2013

53. University of North Carolina, Physically Inspired Mathematics Seminar, *Quantum link invariants and (higher) representation theory via skew Howe duality*, March 22, 2013

54. George Washington University, Topology Seminar, *Quantum link invariants and (higher) representation theory via skew Howe duality*, March 21, 2013

55. UC Riverside, Topology Seminar, *Quantum link invariants and (higher) representation theory via skew Howe duality*, March 5, 2013

56. Caltech, Geometry and Topology Seminar, *Khovanov homology, categorified quantum groups, and skew-Howe duality*, January 18, 2013

57. Claremont Colleges, Topology Seminar, *Quantum link invariants and (higher) representation theory via skew Howe duality*, October 30, 2012

58. UCLA, Topology Seminar, *Foams, Khovanov Homology, and Categorical Skew Howe Duality*, October 10, 2012

59. University of Southern California, Geometry and Topology Seminar, *A categorification of quantum $\mathfrak{sl}_3$ projectors and the $\mathfrak{sl}_3$ Reshetikhin-Turaev invariant of tangles*, April 27, 2012

60. University of Virginia, Geometry Seminar, *A categorification of quantum $\mathfrak{sl}_3$ projectors and the $\mathfrak{sl}_3$ Reshetikhin-Turaev invariant of tangles*, February 7, 2012

61. Baton Rouge Young Topologists Research Retreat, Louisiana State University, *A categorification of quantum $\mathfrak{sl}_3$ projectors and the $\mathfrak{sl}_3$ Reshetikhin-Turaev invariant of tangles*, January 9, 2012

62. Rice University, VIGRE Topology Seminar, *On Bar-Natan's "Khovanov's homology for tangles and cobordisms"*, March 9, 2010

63. The eighth workshop on numerical ranges and numerical radii (WONRA), Universität Bremen, *On the numerical range behavior under the generalized Aluthge transform*, July 15, 2006

ADVISING AND TEACHING ACTIVITIES

Postdoctoral researchers supervised:

- Calvin McPhail-Snyder, Fall 2021–Fall 2022

Graduate students supervised:

- Terence Carey (PhD expected: Spring 2028)

- Logan Gray (PhD expected: Spring 2026)
  Mentored Awards: Linker award, 2025

- Luke Conners, PhD, Spring 2025
  Dissertation: "Colored torus link homology"
  Placement: Postdoc at Universität Zurich
  Mentored Awards: International Congress of Chinese Mathematicians GTA Silver Award, 2024; Summer Research Fellowship, 2023
  Mentored Publications:

– L. Conners, **Fray functors and equivalence of colored HOMFLYPT homologies**. 2024. *Preprint arXiv:2405.00875*. 79 pages.

– L. Conners, **Row-Column Mirror Symmetry for Colored Torus Knot Homology**. Selecta Mathematica, 30 (2024), no. 97. 86 pages.

- Andrew Adair, PhD, Spring 2024
  Dissertation: "Categorification of braid group representations"
  Placement: Mathematician at the Department of Defense
  Mentored Awards: Royster Society of Fellows, 2023–2024; Dissertation Completion Fellowship, 2023–2024; Summer Research Fellowship, 2022

- Logan Tatham, PhD, Summer 2020
  Dissertation: "On the quantum type C spider"
  Placement: Mathematician at the Department of Defense
  Mentored Awards: G. de B. Robinson Award of the Canadian Mathematical Society, 2024

Undergraduate students supervised:

- Gillian Taylor, Honors thesis advisor (defended: March 31, 2022)
  Thesis: "3-manifold invariants in the category $\mathbf{Web}(\mathfrak{sp}_4)$"

- Abby Watkins, Honors thesis advisor (defended: April 16, 2021)
  Thesis: "The Temperley–Lieb Category and its Trace"
  Placement: Indiana University PhD program in mathematics

- Lily Gergle, Honors thesis advisor (defended: April 8, 2021 with Highest Honors)
  Thesis: "Categorification techniques for the Temperley-Lieb category and $\mathbf{Web}(\mathfrak{sp}_4)$"
  Placement: University of Cambridge (Part III) and University of Illinois Urbana-Champaign PhD program in mathematics
  Mentored Awards: UNC Brauer Prize, 2021

- Dylan O'Connor, Honors thesis advisor (defended: May 17, 2020)
  Thesis: "An Introduction to the Volume Conjecture"
  Placement: CUNY graduate center PhD program in mathematics

Courses Taught at UNC:

- Math 296: Directed Exploration in Mathematics (Monoidal Category Theory), Summer 2025 (1 student)

- Math 776: Algebraic Topology, Spring 2025 (11 students)

- Math 381: Discrete Mathematics, Spring 2025 (39 students)

- Math 891: Categorification in Algebra and Topology, Fall 2024 (8 students)

- Math 89: First Year Seminar in Knot Theory, Spring 2024 (24 students)

- Math 534: Elements of Modern Algebra, Spring 2024 (25 students)

- Math 681: Introductory Topology, Fall 2023 (10 students)

- Math 550: Topology, Fall 2022 (23 students)

- Math 692H: Honors Thesis in Mathematics, Spring 2022 (1 students)

- Math 381: Discrete Mathematics, Spring 2022 (39 students)

- Math 691H: Honors Research in Mathematics, Fall 2021 (1 student)

- Math 550: Topology, Fall 2021 (28 students)

- Math 231: Calculus of Functions of One Variable I, Fall 2021 (138 students)

- Math 692H: Honors Thesis in Mathematics, Spring 2021 (2 students)

- Math 578: Algebraic Structures, Spring 2021 (30 students)

- Math 691H: Honors Research in Mathematics, Fall 2020 (2 students)

- Math 676: Modules, Linear Algebra, and Groups, Fall 2020 (12 students)

- Math 381: Discrete Mathematics, Fall 2020 (42 students)

- Math 296: Directed Exploration in Mathematics (Research on Quantum Invariants), Fall 2020 (1 student)

- Math 920: Seminar and Directed Readings (Derived Categories), Spring 2020 (2 students)

- Math 692H: Honors Thesis in Mathematics, Spring 2020 (1 student)

- Math 681: Introductory Topology, Spring 2020 (11 students)

- Math 534: Elements of Modern Algebra, Spring 2020 (40 students)

- Math 296: Directed Exploration in Mathematics (Category Theory), Spring 2020 (2 students)

- Math 920: Seminar and Directed Readings (Homological Algebra), Fall 2019 (2 students)

- Math 676: Modules, Linear Algebra, and Groups, Fall 2019 (15 students)

- Math 691H: Honors Research in Mathematics, Fall 2019 (1 student)

- Math 381: Discrete Mathematics, Summer 2019 (9 students)

- Math 776: Algebraic Topology, Spring 2019 (10 students)

- Math 381: Discrete Mathematics, Spring 2019 (42 students)

- Math 891: Categorification in algebra and topology, Spring 2018 (8 students)

- Math 231: Calculus of Functions of One Variable I, Fall 2017 (148 students)

- Math 534: Elements of Modern Algebra, Spring 2017 (40 students)

- Math 920: Seminar and Directed Readings (Low-dimensional Topology), Spring 2017 (1 student)

- Math 231: Calculus of Functions of One Variable I, Fall 2016 (136 students)

Courses Taught at USC:

- Math 245: Mathematics of Physics and Engineering I, Fall 2015

- Math 225: Linear algebra and linear differential equations, Fall 2015

- Math 225: Linear algebra and linear differential equations, Spring 2015

- Math 226: Calculus III, Fall 2014 (2 sections)

- Math 435: Vector Analysis and Introduction to Differential Geometry, Spring 2014

- Math 226: Calculus III, Spring 2014

- Math 440: Topology, Fall 2013

- Math 225: Linear algebra and linear differential equations, Spring 2013

- Math 226: Calculus III, Fall 2012 (2 sections)

Courses Taught at Duke University:

- Math 490: Algebraic methods in knot theory, Spring 2012

- Math 105L: Laboratory Calculus and Functions I, Spring 2010

- Math 122: Introductory Calculus II, Fall 2008

Curriculum design:

- I designed the *First year seminar in knot theory* (Math 89) at UNC, an inquiry-based seminar on elementary knot theory.

- I designed the graduate course Math 891, *Categorification in algebra and topology* at UNC. This course served as an introduction to two aspects of the categorification program: link homology theories and higher representation theory, focusing on the $\mathfrak{sl}_2$ case.

- I designed the undergraduate course Math 490, *Algebraic methods in knot theory* at Duke University, through the Bass Fellowship program. This course served as an introduction to knot theory, the Jones polynomial, and Khovanov homology.

Other teaching activities:

- Program Leader for *UNC Math in Stockholm*, a study abroad opportunity in which students travel to Sweden to learn Discrete Mathematics in a focused and immersed setting, Summer 2018 – present.

- I worked with high school students from Augustus Hawkins High School in South Central Los Angeles during their mathematical game day at USC on May 6, 2014. Working with undergraduate students and Aaron Lauda, I devised a game in which the visiting students analyzed prime knots with up to seven crossings. During the game, we explored topics in knot theory including alternating knots, reduced diagrams, the Tait conjectures, and the Jones polynomial.

- During August 2010 and 2011, I was selected to lead week-long programs helping incoming Duke mathematics PhD students prepare for their written qualifying exams.

PROFESSIONAL SERVICE

Within UNC Chapel Hill:

- Organizer for Mathematics Department Exhibitions at UNC Science Expo, Spring 2017 – present

- UNC organizer of the Triangle Topology Seminar, Fall 2016 – Fall 2019, Fall 2024 – present

- Founder and program leader of UNC Math in Stockholm program, Summer 2018 – present

- UNC Mathematics Department ~~Diversity~~ Community and Outreach Committee, Summer 2020 – present

- Faculty coörganizer for Girls Talk Math, Spring 2025 – present

- UNC Mathematics Undergraduate Advising Committee, Fall 2021 – Spring 2023, Spring 2025 – present

- UNC Mathematics Tenure-Track Mentoring Committee (for Daping Weng), Fall 2024 – present

- Geometry/Topology Comprehensive Exam Committee, Summer 2022 – present,
  Summer 2020 – Summer 2021

- J. Burton Linker Award Selection Committee, Spring 2024 – present

- Organizer for UNC Topology Seminar, Fall 2024 – Spring 2025

- UNC Chancellor's Science Scholars program

    – Faculty interviewer, 2025
    – Research mentor, 2020–2021

- UNC Mathematics Colloquium Committee, Summer 2021 – Spring 2023

- Algebra Comprehensive Exam Committee, Summer 2021 – Summer 2022,
  Summer 2019 – Summer 2020

- UNC Mathematics Tenure-track hiring committee, Fall 2022

- UNC Computation Medicine Tenure-track hiring committee, Spring 2022

- Course coordinator for UNC Math 231, Fall 2021

- UNC Mathematics Advising Policy Committee, Spring 2018 – Fall 2018

- Organizer for Topology Reading Group on Equivariant Cohomology, Fall 2017

- UNC Mathematics Postdoctoral Hiring Committee, Spring 2017

- UNC Mathematics Calculus Reform Working Group, Spring 2016 – Fall 2017

- Triangle Area Graduate Mathematics Conference Job Panel, December 3, 2016

- UNC Association for Women in Mathematics Academic Job Search Panel, October 26, 2016

To discipline:

- Referee and/or quick opinion for *Advances in Mathematics*, *Algebraic and Geometric Topology*, *Annales scientifiques de l'École normale supérieure*, *Compositio Mathematica*, *Fundamenta Mathematicae*, *Geometry and Topology*, *International Mathematics Research Notices*, *Inventiones Mathematicae*, *Journal of the London Mathematical Society*, *Mathematische Annalen*, *Mathematische Zeitschrift*, and *Quantum Topology*, July 2013 – present

- Coörganizer of the American Institute of Mathematics reading group *Fundamentals of Link Homology*, Summer 2021 – Winter 2021

- Grant reviewer for Simons Foundation, Spring 2019

- Organizer for USC Geometry/Topology Seminar, August 2012 – Spring 2015

- USC Geometry/Topology qualifying exam committee, Fall 2013 – Fall 2015

- Coörganizer of the *Workshop on Categorification and Representation Theory*, Los Angeles, CA, October 30–31, 2014

- Coörganizer of the special session *Categorification in representation theory* at the AMS Fall sectional meeting, Riverside, CA, November 2–3 2013

- Organizer for USC graduate Topology reading group on Characteristic Classes, Spring 2013

- Organizer for Duke Mathematics Department Graduate/Faculty Seminar, January 2010 – December 2011