

# Kirsten Graham Wickelgren

## Curriculum Vitae

### Employment

- **Duke University**, Professor, 2019–present.
- **Georgia Institute of Technology**, Associate Professor, 2018–2019.
- **Georgia Institute of Technology**, Assistant Professor, 2013–2018.
- **Harvard University**, American Institute of Math 5-year Fellow, 2009–2013.

### Visiting positions

- **Institut Mittag-Leffler**, participant in *Algebro-Geometric and Homotopical Methods* research program, Spring 2017.
- **Simons Laufer Mathematical Sciences Institute**, (SLMath/MSRI) research member in *Algebraic Topology*, Spring 2014.

### Education

- **Stanford University**, Ph.D. in mathematics 2009, Advisor: Gunnar Carlsson.
- **L'École Normale Supérieure**, Harvard-ENS Exchange Fellowship 2003-2004. Paris, France.
- **Harvard University**, A.B.-A.M. magna cum laude 2003 A.M. in mathematics.

### Grants/Awards

- **Compositio Mathematica Prize** shortlist for 2020-2022, with J.L. Kass, 2025.
- **National Science Foundation** DMS 2405191 \$405,500, 2024-2027.
- **American Mathematical Society** Fellow, class of 2023.
- **K-theory Foundation** elected member 2021.
- **National Science Foundation** DMS 2103838 \$292,926, 2021–2025.
- **National Science Foundation** DMS 1552730, then 2001890 CAREER, \$442,021.00, 2016-2022.
- **National Science Foundation** DMS1406380, \$143,030.00 , 2014–2017.
- **American Institute of Mathematics** 5-year Fellowship 2009 – 2014.

### Distinguished/Plenary Lectures

- **Ruth Moufang Lectures**, Mainz, Germany, 2025.
- **American Mathematical Society** invited address, Joint Mathematics Meeting 2025.
- **American Mathematical Society** invited address, Spring South Eastern Sectional Meeting 2018.
- **MSRI Evan's lecture** 2014.

## Publications and preprints

Up-to-date information can be found under papers at <https://services.math.duke.edu/~kgw/>.

1. *The Equivariant Degree and an Enriched Count of Rational Cubics*, with Candace Bethea, ArXiv and submitted 2025.
2. *Quadratically Enriched Binomial Coefficients over a Finite Field*, with Chongyao Chen, ArXiv and submitted 2024.
3. *Motivic Configurations on the Line*, with John Igieobo, Stephen McKean, Steven Sanchez, and Dae'Shawn Taylor, ArXiv and submitted 2024.
4. *A Quadratically Enriched Count of Rational Plane Curves* with Jesse Kass, Marc Levine, and Jake Solomon, ArXiv and submitted 2023.
5. *A relative orientation for the moduli space of stable maps to a del Pezzo surface* with Jesse Kass, Marc Levine, and Jake Solomon, ArXiv and submitted 2023.
6. *Quadratic Enrichment of the Logarithmic Derivative of the Zeta Function* with Margaret Bilu, Wei Ho, Padmavathi Srinivasan, and Isabel Vogt, accepted for publication in Transactions of the AMS, 2024.
7. *On Quadratically Enriched Excess and Residual Intersections*, with Tom Bachmann, J. Reine Angew. Math. 802 (2023), 77–123.
8. *Applications to A1-enumerative geometry of the A1-degree*, with Sabrina Pauli, Res. Math. Sci. 8 (2021), no. 2, 24, special volume Arithmetic Topology.
9. *Compactly Supported A1-Euler Characteristic and the Hochschild Complex* with Niny Arcila-Maya, Candace Bethea, Morgan Opie, and Inna Zakharevich, Topology Appl. 316 (2022)
10. *A1-Euler Classes: Six Functors Formalisms, Dualities, Integrality and Linear Subspaces of Complete Intersections*, with Tom Bachmann, Journal of the Institute of Mathematics of Jussieu, Volume 22, Issue 2, 2023 pp 681–746.
11. *Examples of wild ramification in an enriched Riemann–Hurwitz formula* with Candace Bethea and Jesse Kass, Motivic homotopy theory and refined enumerative geometry, 69-82, Contemp. Math., 745, Amer. Math. Soc., Providence, RI, 2020
12. *An Arithmetic Count of the Lines Meeting Four Lines in  $\mathbb{P}^3$*  with Padmavathi Srinivasan, and with an appendix by Borys Kadets, Padmavathi Srinivasan, Ashvin A. Swaminathan, Libby Taylor, and Dennis Tseng An, Trans. Amer. Math. Soc. 374 (2021), no. 5, 3427–3451.
13. *The Galois Action on the Lower Central Series of the Fundamental Group of the Fermat Curve* with Rachel Davis, and Rachel Pries, Israel Journal of Mathematics (2023).

14. *An Explicit Self-Duality*, with Nikolas Kuhn, Devlin Mallory, Vaidehee Thatte. Stacks Project Expository Collection, edited by Pieter Belmans, Wei Ho, and Aise Johan de Jong, London Mathematical Society Lecture Note Series 480, Cambridge University Press, 2022.
15. *An Arithmetic Count of the Lines on a Smooth Cubic Surface* with Jesse Kass, Compos. Math. 157 (2021), no. 4, 677-709.
16. *An Étale Realization Functor Which Does Not Exist* with Jesse Kass, New Directions in Homotopy Theory, proceedings of the second Mid-Atlantic Topology Conference, edited by N. Kitchloo, M. Merling, J. Morava, E. Riehl, W.S. Wilson, Contemporary Mathematics, Volume 707, p.11-31, 2018.
17. *The Galois Action and Cohomology of a Relative Homology Group of Fermat Curves*, with Rachel Davis, Rachel Pries, and Vesna Stojanoska, J. Algebra **505**, 2018, 33–69.
18. *Unstable Motivic Homotopy Theory*, with Ben Williams, chapter of the Handbook of Homotopy Theory, edited by Haynes Miller, CRC Press, 2020.
19. *The Class of Eisenbud – Khimshiashvili – Levine is the Local  $A^1$ -Brouwer Degree*, with Jesse Kass, Duke Mathematical Journal, Vol. 168, No. 3 429–469, 2019.
20.  *$\mathbb{A}^1$ -Milnor Number*, with Jesse Kass, Oberwolfach Report 35(2016), 19 August, 2016.
21. *Classification of Problematic Subgroups of  $U(n)$*  with Julie E. Bergner, Ruth Joachimi, Kathryn Lesh, and Vesna Stojanoska, Trans. Amer. Math. Soc. 371 (2019), no. 10, 6739-6777.
22. *Massey Products  $\langle y, x, x, \dots, x, x, y \rangle$  in Galois Cohomology via Rational Points*, Journal of Pure and Applied Algebra, Volume 221, Issue 7, July 2017, pages 1845-1866.
23. *A Classical Proof that the Algebraic Homotopy Class of a Rational Function is the Residue Pairing* with Jesse Kass, Linear Algebra and Its Applications 595 (2020) 157–181.
24. *The Simplicial Suspension Sequence in  $\mathbb{A}^1$ -homotopy*, with Aravind Asok and Ben Williams, Geometry & Topology 21-4 (2017), 2093–2160.
25. *Desuspensions of  $S^1 \wedge \mathbb{P}_{\mathbb{Q}}^1 - \{0, 1, \infty\}$* , International Journal of Mathematics, June 2016, Vol. 27, No. 07.
26. *The Simplicial EHP Sequence in  $\mathbb{A}^1$ -Algebraic Topology*, with Ben Williams, Geometry & Topology 23-4 (2019), 1691–1777. DOI 10.2140/gt.2019.23.1691
27. *An Arithmetic Count of the Lines on a Smooth Cubic Surface*, expository article on joint work with Jesse Kass, Notices Amer. Math. Soc. 65 (2018), no. 4, 404-405.
28. *What is an anabelian scheme?* Notices of the AMS, March 2016, Volume 63 No 3, p. 285-286.
29. *Splitting Varieties for Triple Massey Products*, with Michael J. Hopkins, Journal of Pure and Applied Algebra 219 (2015), pp. 1304-1319.
30. *An Abel map to the compactified Picard scheme realizes Poincaré duality*, with Jesse Kass, Algebraic & Geometric Topology 15-1 (2015), 319–369.
31. *Fixed points of  $p$ -toral groups acting on partition complexes* with Julie E. Bergner, Ruth Joachimi, Kathryn Lesh, and Vesna Stojanoska, Contemporary Math. 641 Women in Topology: Collaborations in Homotopy Theory, AMS, 2015.

32. *2-Nilpotent Real Section Conjecture*, *Mathematische Annalen*: Vol. 358, Issue 1 (2014), pp. 361-387.
33. *Cartier's first theorem for Witt vectors on  $\mathbb{Z}_{\geq 0}^n$* , *Algebraic Topology: Applications and New Directions*, Stanford Symposium 2012, Ulrike Tillmann, Soren Galatius, Dev Sinha editors, *Contemporary Mathematics* 620, AMS, 2014.
34. *Grothendieck's Anabelian Conjectures*, *The Harvard College Mathematics Review*, Faculty Feature Article, Vol. 5, 2013, p. 77-83.
35. *n-Nilpotent obstructions to  $\pi_1$ -sections of  $\mathbf{P}^1 - \{0, 1, \infty\}$  and Massey products*, *Advanced Studies in Pure Mathematics* 63, 2012, *Proceedings for Conferences in Kyoto*, pp 579-600.
36. *Universal Covering Spaces and Fundamental Groups in Algebraic Geometry as Schemes*, with Ravi Vakil, *Journal de Théorie des Nombres de Bordeaux*, 23 no. 2 (2011), p.489-526.

### Mentoring

- **Postdoctoral scholars:** Candace Bethea, Niny Arcila-Maya, Jonathan Campbell, Louis Pereira, Padma Srinivasan.
- **PhD students:** Chongyao Chen (2025 expected Duke University, co-advised with Colleen Robles), Thomas Brazelton (2023, University of Pennsylvania, co-advised with Mona Merling), Cameron Darwin (2022 Duke University), Stephen McKean (2022 Duke University), Sabrina Pauli (2020 University of Oslo, co-advised with Paul Arne Østvaer).
- **co-PI National Science Foundation DMS 2231514 Research Training Grant: Duke Number Theory**, 2023-2028.
- **co-PI National Science Foundation DMS 1745583 Research Training Grant: Georgia Tech Geometry and Topology**, 2017-2022.
- **Undergraduate research students:** De'Asia Brodie, Zoe Valentine, Aram Lindroth, Marie Bennett, John Igieobo, Steven Sanchez, and Dae'Shawn Taylor, Brandon Boggess.
- **Mathematics Employment Experience for High School Students** director 2017–2024.

### Professional Activities

- **Editorial work:** *Journal of Topology* (London Mathematical Society. 2021– present), *New York Journal of Mathematics* (2022– present), *Annals of K-theory* (2022– present).
- **Conference co-organization:** *SLMath/ MSRI* (Fall 2026 expected, *Connections* 2019), *AMS Summer Research Institute session Connections between Algebraic Geometry and Algebraic Topology* (2025 expected), *Abel Symposium* (2025 expected), *Banff International Research Station* (2024, 2017), *IAS/Park City Summer Program* (2024, 2021), *Motivic Homotopy* Oslo, Norway (2022), *Algebraic Topology and Topological Data Analysis: a Conference in Honor of Gunnar Carlsson* (2022), *A room of one's own* 2020, *AMS Special Sessions* (2025, 2018, 2012), *TAAAG: Topological Approaches to Algebra and Arithmetic Geometry* (2016), *West Coast Algebraic Topology Summer School* (2016), *Workshop on Unstable Motivic Homotopy* Münster, Germany (2016).

- Oswald Veblen Prize in Geometry Committee 2021–2024.
- MSRI Human Resources Advisory Committee, 2021–2023.
- Georgia Tech College of Sciences Diversity Council, 2016–2019.

### Colloquia, Lecture Series, Conference talks, Seminars

**Lecture Series:** IAS/PCMI 2024, Yanqi Lake Beijing Institute of Mathematical Sciences and Applications (BIMSA) 2023, Regensburg Germany 2019, Arizona Winter School 2019, Clay Math Institute/Imperial College London 2018.

**Colloquia:** University of Chicago (2024, 2019), University of South Carolina (2023), Brown University (2022, 2019), University of North Carolina (2022), Rutgers (2022), UPenn (2021), Brandeis–Harvard–MIT–Northeastern (2021), Pitt (2021), University of Nevada (2021), University of Utah (2020), Reed College (2020), Vanderbilt University (2020), University of Virginia (2020), University Warwick UK(2020), Berkeley (2019), Northeastern University (2019), UCLA (2019), University of Notre Dame (2019), University of Wisconsin (2013), Emory (2012, 2011), Case Western Reserve (2010), Harvard (2010).

over 30 **Conference talks** including: Anabelian and Motivic Homotopy Theory (2024), Regulators V (2024), Computational and Applied Enumerative Geometry (2024), Real Algebraic K-theory and Trace Methods (2024), Motives in Mainz (2024), A Panorama of Homotopy Theory — A Conference in Honour of Mike Hopkins (2023), Recent Advances in Algebraic K-theory, IHES (2023), Motivic Geometry Oslo (2023).

over 40 **Seminar talks** including: IAS/Princeton Arithmetic Geometry Seminar (2025), Columbia Informal Math/Physics Seminar (2024), Columbia Algebraic Geometry Seminar (2024), University of Minnesota Topology Seminar (2024).