

Haochen Wu

Email: haochen.wu.math@gmail.com; haochen.wu@trincoll.edu

Employment

- *Visiting Assistant Professor*, starting from August 2026
Trinity College, Hartford, CT

Education

- *Dartmouth College*, Hanover, NH, June 2026
Ph.D. in Mathematics
Advisors: John Voight, Asher Auel
- *Wake Forest University*, Winston-Salem, NC, May 2021
M.A. in Mathematics
Advisor: Jeremy Rouse
- *Wake Forest University*, Winston-Salem, NC, May 2019
B.S. in Mathematics & Minor in Music
Honors in Mathematics
Advisor: Jeremy Rouse

Research Interests

Number theory, arithmetic geometry, automorphic forms, quadratic forms

Publications

- *An orthogonal perspective on Gauss composition*, joint with [John Voight](#), submitted, <https://arxiv.org/abs/2511.03987>
We revisit Gauss composition over a general base scheme, with a focus on orthogonal groups. We show that the Clifford and norm functors provide an equivalence of stacks between binary quadratic modules and pseudoregular modules over quadratic algebras. As a consequence, we exhibit a composition law for coprimitive forms over a general base, including a universal version of Dirichlet composition. This perspective synthesizes the constructions of Kneser and Wood, reconciles algebraic and geometric approaches, and clarifies the role of orientations and the natural emergence of narrow class groups.
- *On the number of representations by positive-definite integer-valued quaternary quadratic forms*, *Master thesis*, available at <https://wakespace.lib.wfu.edu/handle/10339/98807>
We revisit Gauss composition over a general base scheme, with a focus on orthogonal groups. We show that the Clifford and norm functors provide a discriminant-preserving equivalence of categories between binary quadratic modules and pseudoregular modules over quadratic algebras. This perspective synthesizes the constructions of Kneser and Wood, reconciling algebraic and geometric approaches and clarifying the role of orientations and the natural emergence of narrow class groups.
As an application, we restrict to lattices and show that binary orthogonal eigenforms correspond to Hecke characters. Using theta series, we show the explicit connection between Hilbert modular

forms and orthogonal modular forms arising from positive definite binary lattices over the ring of integers of a totally real number field.

- *On the number of representations by positive-definite integer-valued quaternary quadratic forms*, Master thesis, available at <https://wakespace.lib.wfu.edu/handle/10339/98807>

Let $\{Q_1, Q_2, \dots, Q_s\}$ be a finite set of positive-definite integer-valued quaternary quadratic forms. We show that there exists a primitive positive-definite integer-valued quaternary quadratic form Q and a positive integer n such that Q represents n more times than Q_i for all $1 \leq i \leq s$.

Talks

- *From Gauss composition to binary orthogonal modular forms*, Wesleyan University, Oct 9, 2026
- *Can you multiply binary quadratic forms*, Trinity College, Sep 17, 20026
- *Binary Hermitian forms and quaternary orthogonal modular forms*, Arizona Winter School, March 11, 2026
- *Hilbert modular forms from orthogonal modular forms on binary lattices*, PANTS, Clemson University, Dec 6, 2025
- *Hilbert modular forms from orthogonal modular forms on binary lattices*, Maine-Quebec Number Theory Conference, Orono, Maine, Oct 4-5, 2025
- *Hilbert modular forms from orthogonal modular forms on binary lattices*, LMFDB, Computation, and Number Theory, ICERM, July 7-11, 2025
- *Hilbert modular forms from orthogonal modular forms on binary lattices*, 37th Automorphic Forms Workshop, University of North Texas, April 30-May 4, 2025
- *Hilbert modular forms from orthogonal modular forms on binary lattices*, UVM-Dartmouth Math Day, University of Vermont, April 27, 2025
- *Generalized Gauss composition and orthogonal modular forms for binary quadratic forms*, Southern Regional Number Theory Conference, Louisiana State University, March 29-30, 2025
- *On the number of representations by primitive positive-definite integer-valued quaternary quadratic forms*, Joint Mathematics Meeting AMS Special Session on Quadratic Forms and Theta Functions, Virtual, January 6, 2021

Conferences Attended

- Arizona Winter School, Tucson, AZ, March 7-11, 2026
- Joint Mathematics Meetings, Washington, D.C., Jan 4-7, 2026
- Palmetto Number Theory Series (PANTS), Clemson University, Dec 6-7, 2025
- Maine-Quebec Number Theory Conference, Orono, Maine, Oct 4-5, 2025
- LMFDB, Computation, and Number Theory, ICERM, July 7-11, 2025
- 37th Automorphic Forms Workshop, University of North Texas, April 30-May 4, 2025
- UVM-Dartmouth Math Day, University of Vermont, April 27, 2025
- Southern Regional Number Theory Conference, Louisiana State University, March 29-30, 2025
- Simons Collaboration on Arithmetic Geometry, Number Theory, and Computation Annual Meeting, New York, Jan 15-16, 2025
- Joint Mathematics Meetings, Seattle, Jan 8-11, 2025
- Algebraic Geometry Northeastern Series, Dartmouth College, Nov 8-10, 2024

- Sixteenth Algorithmic Number Theory Symposium, Massachusetts Institute of Technology, July 18, 2024
- CTNT 2024 Conference, University of Connecticut, June 14-16, 2024
- Langenhop Lecture & SIU Conference in Integral Quadratic Forms, Southern Illinois University, May 16-17, 2024
- Dartmouth-UVM Day, Dartmouth College, Feb 10, 2024
- Simons Collaboration on Arithmetic Geometry, Number Theory, and Computation Annual Meeting, New York, Jan 11-12, 2024
- Joint Mathematics Meetings, San Francisco, Jan 3-6, 2024
- Maine-Québec Number Theory Conference, University of Maine, September 31-October 1, 2023
- Monthly Meeting of Simons Collaboration on Arithmetic Geometry, Number Theory, and Computation, Dartmouth College, September 16, 2023
- University of North Carolina at Greensboro Summer School: Applications of Expander Graphs to Number Theory and Computer Science, May 24-28, 2021
- Joint Mathematics Meetings AMS Special Session on Quadratic Forms and Theta Functions, Virtual, January 6, 2021
- PAImetto Joint Arithmetic, Modularity, and Analysis Series, University of South Carolina, September 19-20, 2020
- Connecticut Summer School in Number Theory Conference, Virtual, June 12-14, 2020
- Arithmetic Geometry is Online in Zoom, Everyone, Virtual, March 25, 2020
- PAImetto Number Theory Series XXXIII, Clemson University, December 14-15, 2019
- Southeast Regional Meeting on Numbers, University of North Carolina at Greensboro, April 13-14, 2019

Professional Experience

- *Instructor*, Trinity College
 - *Math 127*: Precalculus, Fall 2026
 - *Math 131*: Calculus 1, Fall 2026
- *Instructor*, Dartmouth College
 - Math 22: Linear Algebra, Fall 2025
 - Math 8: Calculus of Functions of One and Several Variables, Fall 2024
 - Math 3: Calculus, Fall 2023
- *Teaching Assistant*, Dartmouth College
 - Math 13: Calculus of Vector-Valued Functions, Spring 2023
 - Math 24: Linear Algebra, Spring 2023
 - Math 11: Accelerated Multivariable Calculus, Fall 2022
 - Math 13: Calculus of Vector-Valued Functions, Winter 2022
 - Math 3: Calculus, Fall 2021
- *Teaching Assistant*, Wake Forest University
 - MTH 121: Linear Algebra, Spring 2021
 - MTH 121: Linear Algebra, Fall 2020

- MTH 117: Discrete Mathematics, Summer 2020
- MTH 121: Linear Algebra, Summer 2020
- MTH 112: Calculus with Analytic Geometry II, Spring 2020
- MTH 113: Multivariable Calculus, Fall 2019
- *Tutor*, Math Center, Wake Forest University, September 2018 – May 2021

Outreach

- Family Math Night, Marion Cross School, Norwich VT, Nov 14 2024

Awards

- Outstanding Graduate Student Award in Mathematics, 2020
- Dean's List at Wake Forest University, 2016-2019
- The Joseph Pleasant and Marguerite Nutt Sloan Memorial Fund, 2017-2018
- Boteler Prize for the Pursuit of Excellence in Music, 2018