

JOSHUA RUITER

Visiting Assistant Professor – Batten University – Department of Mathematics

CONTACT INFORMATION

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EDUCATION

Ph.D., Mathematics, Michigan State University September 2016 - May 2022
Advisor: Igor Rapinchuk

B.A., Mathematics, Calvin College September 2012-May 2016
Thesis advisor: Christopher Mosely

EMPLOYMENT

2024-present Batten University, Visiting Assistant Professor
2022-2024 Grinnell College, Assistant Professor

RESEARCH

Current interests: Abstract homomorphisms/representations of algebraic groups, focusing on special unitary and special orthogonal groups. Also interested in stochastic games with absorbing states. Also interested in educational/pedagogical research related to how students can learn visualization and graphing skills more effectively in introductory calculus courses.

Publications:

- On abstract homomorphisms of some special unitary groups. With coauthor Igor Rapinchuk. Proceedings of the American Mathematical Society. <https://www.ams.org/journals/proc/0000-000-00/S0002-9939-2022-15991-7/home.html>
- Consensus and clustering in opinion formation on networks. With coauthors Julia Bujalski, Grace Dwyer, Todd Kapitula, Quang-Nhat Le, Harjasleen Malvai, Jordan Rosenthal-Kay. 376. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*. <http://doi.org/10.1098/rsta.2017.0186>
- An Algebraic Characterization of Highly Connected $2n$ -Manifolds. With coauthors Shamuel Ayeung, Daiwei Zhang. *Rose-Hulman Undergraduate Mathematics Journal*: Vol. 17 : Iss. 2 , Article 5. <https://scholar.rose-hulman.edu/rhumj/vol17/iss2/5>

Seminar participation:

- Derived categories (MSU) Spring 2022
- St. Petersburg University algebraic groups seminar
- Quadratic forms, linear algebraic groups, and beyond (QFLAG)
- ALGAR 2021: Systems of quadratic forms over arithmetic fields Summer 2021
(University of Antwerp)
- MSU Student algebra seminar (organizer 2020-2021)
- Group cohomology, Brauer groups, and local class field theory Spring 2019
(Lead organizer, MSU)
- Derived categories (MSU) Spring 2018
- Algebraic K -theory (MSU) Spring 2018

Talks:

- *The Big Match*
Christopher Newport University Spring 2025
- *Abstract homomorphisms of some special unitary groups*
Algebra 2022 and beyond, Indiana University Summer 2022
- *Abstract homomorphisms of algebraic groups: sometimes you get more than you ask for*
BUGCAT online conference Fall 2021
- *Abstract homomorphisms of some special unitary groups*
University of Virginia Algebra Seminar Fall 2021
- *Abstract homomorphisms of some special unitary groups*
St. Petersburg University algebraic groups seminar Fall 2021
- *$GL_n(\mathbb{R})$ is a beautiful butterfly*
Calvin University Math Colloquium Fall 2021
- *Abstract homomorphisms of special unitary groups*
MSU Student Algebra Seminar Fall 2021
- *Pinnings of algebraic groups*
MSU Student Algebra Seminar Spring 2021
- *An algebraic approach to musical scales*
MSU GAUSS Seminar Fall 2020
- *Galois descent*
MSU Student Algebra Seminar Fall 2020
- *The norm torus*
MSU Student Algebra Seminar Fall 2019
- *Extending the norm map to $\mathbb{G}_m$*
MSU Student Algebra Seminar Fall 2019
- *Root systems with plentiful examples*
MSU Student Algebra Seminar Fall 2019
- *Universal central extensions of groups with connections to K-theory*
MSU Student Algebra Seminar Fall 2018
- *Absolute values on the rational numbers and Ostrowski's theorem*
Calvin College Math Colloquium Fall 2018
- *Absolute values, Ostrowski's theorem, and completions of fields*
MSU Student Algebra Seminar Fall 2018
- *The Galois correspondence for infinite Galois extensions*
MSU Student Algebra Seminar Spring 2018
- *Lie algebras and their root systems*
Calvin College Math Colloquium Spring 2016
- *Classification of manifolds via homotopy*
Calvin College Math Colloquium Spring 2015
- *Is it possible to play in tune?*
Calvin College Math Colloquium Fall 2015

TEACHING

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- Math 333 - Number Theory, Batten University Fall 2026
 - Math 171 - Calculus 1, Batten University Fall 2026

• Math 419 - Algebraic Structures 2, Virginia Wesleyan University	Spring 2026
• Math 205 - Foundations of Logic and Proof, Virginia Wesleyan University	Spring 2026
• Math 171 - Calculus 1, Virginia Wesleyan University	Fall 2025
• Math 205 - Foundations of Logic and Proof, Virginia Wesleyan University	Spring 2025
• Math 171 - Calculus 1, Virginia Wesleyan University	Spring 2025
• Math 319 - Algebraic Structures, Virginia Wesleyan University	Fall 2024
• Math 171 - Calculus 1, Virginia Wesleyan University	Fall 2024
• Math 215 - Linear Algebra, Grinnell College	Spring 2024
• Math 215 - Linear Algebra, Grinnell College	Fall 2023
• Math 131 - Calculus 1, Grinnell College	Fall 2023
• Math 131 - Calculus 1, Grinnell College	Spring 2023
• Math 321 - Abstract Algebra, Grinnell College	Fall 2022
• Math 131 - Calculus 1, Grinnell College	Fall 2022
• Math 234 - Multivariable calculus, Lead TA, MSU	Fall 2021-Spring 2022
• Math 299 - Transitions to proofs, MSU	Spring 2021
• Math 299 - Transitions to proofs, MSU	Fall 2020
• Math 235 - Ordinary differential equations, MSU	Summer 2020
• Math 299 - Transitions to proofs, MSU	Spring 2020
• Math 299 - Transitions to proofs, MSU	Fall 2019
• Math 133 - Calculus 2, MSU	Summer 2019
• Math 124 - Survey of calculus, MSU	Spring 2019
• Math 124 - Survey of calculus, MSU	Fall 2018
• Math 234 - Multivariable calculus, MSU	Summer 2018
• Math 234 - Multivariable calculus, MSU	Summer 2017

EXPERIENCE AND TRAINING

• Deep Learning Bootcamp, Erdős Institute	Spring 2026
• Data Science Bootcamp, Erdős Institute	Fall 2025
• Facilitating accessible and inclusive mathematics learning environments (seminar)	Spring 2022
• Diversity, equity, and inclusion training seminar	August 2021
• Student mentoring workshop with Council on Undergraduate Research	June 2020
• Spartan Online Instructional Readiness Education Experience (workshop on online teaching)	May 2020
• Instructor for Mathnasium of Okemos.	August 2019-December 2020
• Graduate assistant for summer REU in dynamical systems at ICERM, with Todd Kapitula and Bjorn Sandstede	Summer 2016

SERVICE

• Graduate student panel for SURIEM REU	June 2021
• Graduate student panel for Marian University AWM chapter	February 2022
• Faith Friends mentor at St. John's Lutheran Church	Fall 2023

HONORS AND AWARDS

• Dissertation Completion Fellowship	Summer 2021
• TA Award for Excellence in Teaching, MSU Department of Mathematics	Spring 2021
• Herbert T. Graham Scholarship	Spring 2021
• MSU College of Natural Science Recruiting Fellowship	2016-2017