

Patrick K. McFaddin

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Department of Mathematics
Fordham University

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Education

Ph.D., Mathematics

University of Georgia

May 2016

Athens, GA

· Advisor: Daniel Krashen

· Dissertation: K -cohomology of generalized Severi-Brauer varieties

M.A., Mathematics

University of Georgia

August 2011

Athens, GA

· Advisor: Robert Varley

B.A., with Honors in Mathematics

University of Southern California

May 2010

Los Angeles, CA

Employment

Fordham University

Associate Professor

Sept. 2025 - Present

Fordham University

Assistant Professor

Aug. 2019 - Sept. 2025

University of South Carolina

Visiting Research Assistant Professor

Aug. 2016 - June 2019

University of Georgia

Graduate Research and Teaching Assistant

June 2010- May 2016

Research Interests

Algebra and algebraic geometry: algebraic K -theory, derived categories, algebraic cycles, motives and motivic cohomology, central simple algebras, algebraic groups, homogeneous and toric varieties, Galois cohomology, and categorical approaches to metric and geometric topology.

Publications

1. (with T. Needham) Interleaving distances, monoidal actions and 2-categories. arXiv:2311.11936, to appear in *Algebr. Geom. Topol.*
2. (with M. R. Ballard, A. Duncan, and A. Lamarche) Separable algebras and coflasque resolutions. *Adv. Math.* 444 (2024), Paper No. 109596.

Last updated June 14, 2025

3. (with L. Ji, S. Li, D. Moore, and M. Stevenson) Weil restriction of schemes and beyond. In P. Belmans, W. Ho, & A. De Jong (Eds.), *Stacks Project Expository Collection* (London Mathematical Society Lecture Notes Series, pp. 194-221, 2022). Cambridge: Cambridge University Press.
4. A.T.V.'s for (geometric) off-roading: a gentle introduction to arithmetic toric varieties. *Notices Amer. Math. Soc.* 69 (2022), no. 7, 1113–1125.
5. (with M. R. Ballard and A. Duncan) Derived categories of centrally-symmetric smooth toric Fano varieties. *Math. Nachr.* 295 (2022), no. 2, 218–241.
6. (with M. R. Ballard, N. K. Chidambaram, D. Favero, and R. R. Vandermolen) Kernels for Grassmann flops. *J. Math. Pures Appl.* (9) 147 (2021), 29-59.
7. (with M. R. Ballard and A. Duncan) On derived categories of arithmetic toric varieties. *Ann. K-Theory* 4 (2019), no. 2, 211-242.
8. Zero-cycles with coefficients for the second generalized symplectic involution variety of an algebra of degree 4, *J. Pure Appl. Algebra*, 223 (2019), no. 7, 2822-2830.
9. (with M. R. Ballard and A. Duncan) The toric Frobenius morphism and a conjecture of Orlov, *Eur. J. Math.* 5 (2019), no. 3, 640-645.
10. The group of K_1 -zero-cycles on the second generalized Severi-Brauer variety of an algebra of index 4. *J. Algebra* 479 (2017), 192-202.
11. (with V. Alexeev, et al.) Extended Torelli map to the Igusa blowup in genus 6, 7, and 8. *Exp. Math.* 21 (2012), no. 2, 193-203.

Submitted articles and preprints

12. (with M. R. Ballard, A. Duncan, and A. Lamarche) Consequences of the existence of exceptional collections in arithmetic and rationality. arXiv:2009.10175, submitted 2023.
13. (with N. A. Castro and J. Joseph) Relative group trisections. arXiv:2406.14530, submitted 2024.

Physics and Astronomy Research

14. (with E. J. Rhodes, et al.) Temporal changes in the frequencies and widths of the solar p-mode oscillations. Proceedings of SOHO 24/GONG 2010, pp. 134-138, 2011.
15. (with E. J. Rhodes, et al.) Temporal changes in the frequencies of the solar p-mode oscillations during solar cycle 23. Proceedings of the IAU, Vol. 6, Symposium S273, pp. 389-393, 2011.

Grant Proposals and Awards

FRG: Combinatorial approach to Bondal's Conjecture (Award: \$5,500) 2023-2024
Fordham University

Academic Year Faculty Fellowship Spring 2023
Fordham University

PIC Math Program (Award: \$6,000) Summer 2021-Summer 2022
Mathematical Association of America

Fordham A&S Deans' Challenge Grant (Award: \$9,500) Spring 2021
Enhancing the Flipped-Hybrid Approach, Leader: Melkana Brakalova

Fordham A&S Deans' Challenge Grant (Award: \$10,000) Fall 2020
Flipped-Hybrid Approach to Math Instruction, Leader: Melkana Brakalova

AMS–Simons Travel Grant (Award: \$4,000) <i>American Mathematical Society and the Simons Foundation</i>	July 2018–June 2021
Great Lakes National Scholarship <i>Great Lakes Educational Loan Services</i>	Aug. 2015
Outstanding Teaching Assistant <i>University of Georgia</i>	March 2015
VIGRE Graduate Fellowship <i>National Science Foundation</i>	Aug. 2011–July 2012

Selected Talks

Categorical approaches to interleaving distance <i>Algebra Seminar, Fordham University</i>	Nov. 2024
Coflasque resolutions, torsors, and rationality <i>AMS Central Sectional Meeting, University of Wisconsin, Milwaukee</i>	April 2024
Galois cohomology and limitations of the derived category <i>AGNT Seminar, Rice University</i>	April 2024
Fundamentals of groups of loops <i>Undergraduate Colloquium, Rice University</i>	April 2024
(Co)flasque resolutions and Brauer indistinguishability <i>AMS Southeastern Sectional Meeting, Florida State University</i>	March 2024
Analogues of simplicial/singular homology for schemes <i>Algebra Seminar, Fordham University</i>	Feb. 2024
Tori, toric varieties, and K-theory <i>Algebra Seminar, Fordham University</i>	Oct. 2023
Derived categories and rationality of twisted forms <i>Derived, Birational, and Categorical Algebraic Geometry, BIRS</i>	Nov. 2021
Ciphers, cryptography, and modular arithmetic <i>Mobile Math Circle, University of South Alabama</i>	March 2021
Separable algebras and rationality of arithmetic toric varieties <i>Algebra Seminar, Rutgers University</i>	Feb. 2021
Derived categories and rationality of twisted forms of toric varieties <i>JMM Special Session on Galois Cohomology and Arithmetic Geometry</i>	Jan. 2021
Algebraic groups, torsors, and twisted forms <i>Lincoln Center Math Seminar, Fordham University</i>	Jan. 2020
Twisted forms of toric varieties, their derived categories, and rationality <i>Brauer Groups, Derived Categories and Birational Geometry, BIRS</i>	Nov. 2019
Arithmetic and geometry of algebraic cycles <i>Lincoln Center Math Seminar, Fordham University</i>	Oct. 2019
Resolutions of tori and derived categories of toric varieties <i>Emerging Research in Alg. Groups, Motives, and K-Theory, St. Petersburg, Russia</i>	Sept. 2019

Toric varieties and their derived categories <i>Mathematics Department Colloquium, Georgia Southern University</i>	Feb. 2019
Geometric study of subfields of some non-commutative algebras <i>Carolina Math Seminar, University of South Carolina</i>	Nov. 2018
Algebraic cycles on homogeneous varieties <i>Algebra, Geometry, and Number Theory Seminar, Tufts University</i>	Oct. 2018
Galois descent for exceptional collections on toric varieties <i>Algebra Seminar, University of Tennessee, Knoxville</i>	Sept. 2018
Exceptional collections on some arithmetic toric varieties <i>K-theory Conference Workshop, Universidad de Buenos Aires</i>	July 2018
Derived categories of arithmetic toric varieties <i>The 13th Brauer Group Conference, Pingree Park, CO</i>	June 2018
Introduction to Algebraic Cycles <i>Motives Seminar, University of South Carolina</i>	Feb. 2018
Exceptional collections on toric varieties <i>Algebraic Geometry Seminar, University of South Carolina</i>	Nov. 2017
Lectures on non-commutative motives <i>K-theory and related fields trimester program, Hausdorff Institute</i>	May–June 2017
Chow groups with coefficients for some twisted homogeneous varieties <i>Algebraic Geometry Seminar, Courant Institute of Mathematical Sciences</i>	March 2017
K_1-zero-cycles for some homogeneous varieties of type A_n and C_n <i>Algebra Seminar, University of Alberta</i>	March 2017
Zero-cycles with coefficients for some twisted homogeneous varieties <i>Georgia Algebraic Geometry Symposium, University of Georgia</i>	March 2017
K_1-zero-cycles on twisted Grassmannians <i>Topological Approaches to Arithmetic and Algebraic Geometry, University of Georgia</i>	Sept. 2016
Chow groups with coefficients and generalized Severi-Brauer varieties <i>Algebra and Number Theory Seminar, Emory University</i>	Feb. 2016

Teaching and Training

Fordham University

Instructor of Record

· Math 1100–Finite Mathematics	Spring 2025
· Math 1207–Calculus II	Spring 2025
· Math 1100–Finite Mathematics (VIA)	Fall 2024
· Math 1100–Finite Mathematics	Fall 2024
· Math 1108–Math for Business: Finite	Fall 2024
· Math 1100–Finite Mathematics	Spring 2024
· Math 3005–Abstract Algebra	Spring 2024
· Math 1100–Finite Mathematics (2 sections)	Fall 2023
· Math 2006–Linear Algebra	Fall 2023

- Math 1206–Calculus I Summer 2022
- Math 3005–Abstract Algebra Spring 2022
- Math 4002–Preparation for Industrial Careers in Math Spring 2022
- Math 1100–Finite Mathematics (2 sections) Fall 2021
- Math 3002–Differential Equations Fall 2021
- Math 3005–Abstract Algebra Summer 2021
- Math 3005–Abstract Algebra Spring 2021
- Math 2004–Multivariable Calculus I (2 sections) Fall 2020
- Math 3002–Differential Equations Fall 2020
- Math 1203–Applied Calculus Spring 2020
- Math 1205–Applied Statistics Spring 2020
- Math 1100–Finite Mathematics (VIA) Fall 2019
- Math 1108–Math for Business: Finite Fall 2019

Recitation Instructor

- Math 2005–Multivariable Calculus II Spring 2022
- Math 2005–Multivariable Calculus II Spring 2021

University of South Carolina

Instructor of Record

- Math 599–Abstract Algebra and Music Fall 2018
- Math 544–Linear Algebra Spring 2018
- Math 142–Calculus I (2 sections) Fall 2017
- Math 747–Algebraic Geometry: Schemes Spring 2017
- Math 242–Elementary Differential Equations (2 sections) Fall 2016

University of Georgia

Instructor of Record

- Math 2260–Calculus II for Science and Engineering Fall 2015
- Math 1113–Pre-Calculus Spring 2015
- Math 2250–Calculus I for Science and Engineering Spring 2014
- Math 1113–Pre-Calculus Fall 2013

Recitation Instructor

- Math 2200–Analytic Geometry and Calculus Spring 2011
- Math 2200–Analytic Geometry and Calculus Fall 2010

Instructor for Math Kangaroo Course Level 3-4

Fall 2022

Math Kangaroo USA

Instructor for independent tutorial course on ring theory

Summer 2021

Students: F. Azad, Z. Chen, Z. van Zant

Mental Health and International Students

Nov. 2018

International Accelerator Program, University of South Carolina

FLIP (Focus on Learning, Innovation and Pedagogy) Participant

Fall 2017

Center for Teaching Excellence, University of South Carolina

Observer of first-time graduate instructors
University of Georgia, supervised by Lisa Townsley

Spring 2015

UGA graduate student teacher training
Courses with Robert Rumley, Jon Hanke, Matt Mastin, and Lisa Townsley

2010- 2014

Professional Activities

MoMath Math Gym Host
National Museum of Mathematics, New York, NY

May 2020–Present

Faculty Advisor for the 3-2 Combined Engineering Program
Fordham University

Fall 2024–Present

Faculty Advisor for Math-CISC Major
Fordham University

Fall 2019–Present

Journal Referee

2017–Present

- *Épjournal de Géométrie Algébrique*
- *Journal of Algebra*
- *Journal of the European Mathematical Society*
- *Notices of the American Mathematical Society*
- *Pacific Journal of Mathematics*

Member of the Website Committee
Department of Mathematics, Fordham University

Fall 2024–Present

Faculty Panelist on Academic Life
Spring Preview, Fordham University

April 2025

Presentation on Careers in Mathematics
Math Club, Fordham University

April 2025

STEM Forum Faculty Panelist
Fordham University

Spring 2025

Member of the Major Assessment Committee
Department of Mathematics, Fordham University

Fall 2024

Member of the Special Projects Committee
National Association of Mathematicians

Fall 2022–Spring 2024

Faculty Development Retreat
Fordham University

May 2024

Core Curriculum Committee
Fordham University

Fall 2020–Spring 2023

Math Kangaroo State Directors Meeting
Math Kangaroo USA

Oct. 2022

Seminar on the Future of Jesuit Higher Education
Fordham University

Fall 2022

AMS-SMF-EMS Special Session on Derived Cat. and Rationality <i>Co-organizer with M. Ballard and E. Macrì; Grenoble, France</i>	July 2022
Early-Career Faculty Panelist <i>New Faculty Orientation, Fordham University</i>	Aug. 2021
Career Day Volunteer <i>The Equity Project Charter School</i>	Jan. 2020
New Faculty Seminar on Mission <i>Fordham University</i>	Fall 2019
New Beginnings Life Skills Program Volunteer <i>South Carolina Department of Juvenile Justice</i>	Fall 2018–Summer 2019
Magellan Explorer Project Advisor <i>for Danielle Wood, University of South Carolina</i>	Spring 2017–Spring 2018
Top Scholar Review Committee Member and Interviewer <i>University of South Carolina</i>	Fall 2017–Spring 2018
Motives at South Carolina <i>Seminar Organizer</i>	Spring 2018
Comprehensive Exam Committee Member <i>University of South Carolina</i> <ul style="list-style-type: none"> · Candace Bethea · Tracy Huggins · Alicia Lamarche · Robert Vandermolen 	Spring 2017–Fall 2018
South Carolina 4 Square Club (SC4SC) <i>Club Advisor</i>	Fall 2017–Spring 2019
USC Graduate Student Seminar <i>Job Market Panelist</i>	April 2019 Sept. 2017
UGA conference on algebraic and analytic aspects of quadratic forms <i>Co-organizer with D. Krashen, P. Clark, and K. Thompson</i>	July 2017
University of South Carolina High School Math Competition <i>Volunteer Judge and Proctor</i>	Feb. 2017 Feb. 2018
UGA Graduate Student Bootcamp <i>Job Market Panelist/Speaker on “How to give a good math talk”</i>	June 2016
University of Georgia Math Camp <i>Graduate Instructor</i>	June 2016 July 2014
Project REFOCUS <i>21st Century Skills Program Volunteer</i>	Spring 2016 Fall 2015
University of Georgia High School Math Tournament <i>Volunteer</i>	Nov. 2014 Nov. 2013
A Place Called Home Non-Profit Youth Center <i>Volunteer Tutor, K-12, all subjects</i>	Spring 2008

Member of the American Mathematical Society

Member of the National Association of Mathematicians

Skills

Technology

Self-instructed coding in Python, HTML, website building, Mathematica, Sage, Git, \LaTeX , MyMathLab, MyLab Math, WebAssign, WebWork, BlackBoard, experience with Windows, Mac, Linux (via Ubuntu) operating systems.

Language

- French, limited working proficiency
- Spanish, elementary proficiency

Conferences and Workshops Attended

Special Session on ramification in algebraic and arithmetic geometry <i>AMS Central Sectional Meeting, University of Wisconsin, Milwaukee</i>	April 2024
Special Session on algebraic groups and local-global principles <i>AMS Southeastern Sectional Meeting, Florida State University</i>	March 2024
Syzygies and Mirror Symmetry <i>American Institute of Mathematics, Pasadena, CA</i>	Sept. 2023
MAA MathFest <i>Philadelphia, PA</i>	Aug. 2022
Derived, Birational, and Categorical Algebraic Geometry <i>Banff International Research Station, Banff, AB, Canada</i>	Nov. 2021
Undergraduate Faculty Program on Motivic Milnor Numbers <i>Park City Math Institute and Institute for Advanced Study</i>	Aug. 2021
Quadratic forms, linear algebraic groups and beyond <i>Organizers: P. Gille, Z. Reichstein, K. Zainoulline</i>	May 2020-July 2022
Algebraic groups and algebraic geometry <i>In honor of Zinovy Reichstein's 60th birthday</i>	June 2021
PIC Math Faculty Workshop <i>Mathematical Association of America</i>	June 2021
Algebra and Geometry of Homogeneous Spaces <i>Organizers: N. Karpenko, N. Lemire, K. Zaynullin</i>	June 2021
Joint Mathematics Meetings <i>Washington, D.C.</i>	Jan. 2021
Derived categories and (non)commutative algebraic geometry <i>Canadian Mathematical Society Winter Meeting</i>	Dec. 2020
Birational, categorical, and derived algebraic geometry <i>Banff International Research Station, Banff, AB, Canada</i>	Nov. 2020

Madison Moduli Weekend <i>University of Wisconsin, Madison</i>	Sept. 2020
Workshop on ∞-categories and applications <i>Max Planck Institute for Mathematics</i>	Aug. 2020
Online Inquiry Based Learning <i>Mathematical Association of America</i>	July 2020
Electronic Algebraic K-Theory Seminar <i>Organizers: B. Antieau, E. Elmanto, A. Mathew, M. Yakerson</i>	June 2020
Teaching as a legitimate application of college mathematics <i>META Math Webinar, Mathematical Association of America</i>	May 2020
Brauer Groups, Derived Categories and Birational Geometry <i>Banff International Research Station, Banff, AB, Canada</i>	Nov. 2019
Emerging Research in Algebraic Groups, Motives, and K-Theory <i>Euler International Mathematical Institute, St. Petersburg, Russia</i>	Sept. 2019
Rationality problems in algebraic geometry <i>American Institute of Mathematics, San Jose, CA</i>	July 2019
Derived algebraic geometry and its applications <i>Mathematical Sciences Research Institute, Berkeley, CA</i>	March 2019
Joint Mathematics Meetings <i>Baltimore, MD</i>	Jan. 2019
Carolina Math Seminar <i>University of South Carolina</i>	Nov. 2018
K-theory Conference Workshop (ICM Satellite) <i>Universidad de Buenos Aires, Argentina</i>	July 2018
K-theory Conference School (ICM Satellite) <i>Universidad Nacional de La Plata, Argentina</i>	July 2018
The 13th Brauer Group Conference <i>Colorado State Mountain Campus, Pingree Park, CO</i>	June 2018
Discover USC <i>Mentor for Danielle Wood, University of South Carolina</i>	April 2018
A Day of Algebraic Geometry in Savannah <i>Georgia Southern University</i>	March 2018
Georgia Algebraic Geometry Symposium <i>Georgia Institute of Technology</i>	Feb. 2018
Joint Mathematics Meetings <i>San Diego, CA</i>	Jan. 2018
Stacks Project Workshop <i>University of Michigan</i>	July-Aug. 2017
CAAATQuaFs (Conference on Quadratic Forms) <i>University of Georgia</i>	July 2017
K-theory and Related Fields Trimester Program <i>Hausdorff Research Institute for Mathematics</i>	May-June 2017
Georgia Algebraic Geometry Symposium <i>University of Georgia</i>	March 2017

Lectures in Arithmetic Geometry at Rice <i>Rice University</i>	Feb. 2017
Topological Approaches to Arithmetic and Algebraic Geometry <i>University of Georgia</i>	Sept. 2016
Arithmetic Algebraic Geometry <i>Courant Institute of Mathematical Sciences</i>	Aug. 2016
Joint Mathematics Meetings <i>Seattle, WA</i>	Jan. 2016
Georgia Algebraic Geometry Symposium <i>Emory University</i>	Oct. 2015
Local-Global Principles and Their Obstructions <i>University of Pennsylvania</i>	Oct. 2015
Grad Student Bootcamp for the Alg. Geom. Research Institute <i>University of Utah</i>	July 2015
The 12th Brauer Group Conference <i>Colorado State Mountain Campus, Pingree Park, CO</i>	June 2015
Arizona Winter School: Arithmetic and Higher-Dimensional Varieties <i>University of Arizona</i>	March 2015
Georgia Algebraic Geometry Symposium <i>University of Georgia</i>	Oct. 2014
Representation Theory and K-Theory <i>University of Southern California</i>	May 2014
Southeastern Lie Theory Workshop <i>University of Georgia</i>	May 2014
Georgia Algebraic Geometry Symposium <i>University of Georgia</i>	Oct. 2013
Torsors, Nonassociative Algebras, and Cohomological Invariants <i>Fields Institute</i>	June 2013
Homotopical Methods in Algebraic Geometry <i>University of Southern California</i>	May 2013
Workshop on Torsors, Motives, and Cohomological Invariants <i>Fields Institute</i>	May 2013
Oberwolfach Seminar on Algebraic Groups and Patching <i>Mathematisches Forschungsinstitut Oberwolfach</i>	Oct. 2012
Georgia Algebraic Geometry Symposium <i>University of Georgia</i>	May 2012
VIGRE Summer School Program in Algebraic Geometry <i>University of Georgia</i>	May 2012
Arizona Winter School: Ramification and Geometry <i>University of Arizona</i>	March 2012
Algebraic Geometry Northeastern Series Workshop <i>Stony Brook University</i>	Oct. 2011
A Celebration of Algebraic Geometry <i>Harvard University</i>	Aug. 2011

***K*-Theory and Motives**

University of California, Los Angeles

March 2011

Compact Moduli and Vector Bundles

University of Georgia

May 2010