

Patrick K. McFaddin

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Department of Mathematics
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Education

Ph.D., Mathematics

University of Georgia

- Advisor: Daniel Krashen
- Dissertation: K -cohomology of generalized Severi-Brauer varieties

May 2016
Athens, GA

M.A., Mathematics

University of Georgia

- Advisor: Robert Varley

August 2011
Athens, GA

B.A., with Honors in Mathematics

University of Southern California

May 2010
Los Angeles, CA

Employment

Fordham University

Assistant Professor (tenure-track)

Aug. 2019 - Present

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, and Galois cohomology.

Publications

1. 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.
2. (with M. Ballard and A. Duncan) Derived categories of centrally-symmetric smooth toric Fano varieties. *Math. Nachr.* 295 (2022), no. 2, 218–241.
3. (with M. Ballard, N. Chidambaram, D. Favero, and R. Vandermolen) Kernels for Grassmann flops. *J. Math. Pures Appl.* (9) 147 (2021), 29–59.

Last updated August 12, 2022

4. (with M. Ballard and A. Duncan) On derived categories of arithmetic toric varieties. *Ann. K-Theory* 4 (2019), no. 2, 211-242.
5. 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.
6. (with M. Ballard and A. Duncan) The toric Frobenius morphism and a conjecture of Orlov, *Eur. J. Math.* 5 (2019), no. 3, 640-645.
7. 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.
8. (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.

Articles accepted for publication

9. (with L. Ji, S. Li, D. Moore, M. Stevenson) Weil restriction of schemes and beyond, to appear in *SPEC: Stacks Project Expository Collection*, London Mathematical Society Lecture Notes, Cambridge University Press.

Submitted articles and preprints

10. (with M. Ballard, A. Duncan, A. Lamarche) Separable algebras and coflasque resolutions. arXiv:2006.06876, submitted 2021.
11. (with M. Ballard, A. Duncan, A. Lamarche) Consequences of the existence of exceptional collections in arithmetic and rationality. arXiv:2009.10175, submitted 2022.

Physics and Astronomy Research

12. (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.
13. (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.

Awards

Academic Year Faculty Fellowship <i>Fordham University</i>	Spring 2023
PIC Math Program (Award: \$6,000) <i>Mathematical Association of America</i>	Summer 2021-Summer 2022
Fordham A&S Deans' Challenge Grant (Award: \$9,500) <i>Enhancing the Flipped-Hybrid Approach, Grant Leader: Melkana Brakalova</i>	Spring 2021
Fordham A&S Deans' Challenge Grant (Award: \$10,000) <i>Flipped-Hybrid Approach to Math Instruction, Grant Leader: Melkana Brakalova</i>	Fall 2020
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

Selected Talks

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
Groups of loops: they're fundamental! <i>PME and Gamecock Math Club, University of South Carolina</i>	Feb. 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 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	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
<i>Recitation Instructor</i>	
· Math 2200–Analytic Geometry and Calculus	Spring 2011
	Fall 2010
Instructor for independent tutorial course on ring theory	Summer 2021
<i>Students: F. Azad, Z. Chen, Z. van Zant</i>	
Mental Health and International Students	Nov. 2018
<i>International Accelerator Program, University of South Carolina</i>	
FLIP (Focus on Learning, Innovation and Pedagogy) Participant	Fall 2017
<i>Center for Teaching Excellence, University of South Carolina</i>	
Observer of first-time graduate instructors	Spring 2015
<i>University of Georgia, supervised by Lisa Townsley</i>	
UGA graduate student teacher training	2010- 2014
<i>Courses with Robert Rumley, Jon Hanke, Matt Mastin, and Lisa Townsley</i>	

Professional Activities

AMS-SMF-EMS Special Session on Derived Cat. and Rationality	July 2022
<i>Co-organizer with M. Ballard and E. Macrì; Grenoble, France</i>	
Core Curriculum Committee	Nov. 2020–Present
<i>Fordham University</i>	
MoMath Math Gym Host	May 2020–Present
<i>National Museum of Mathematics, New York, NY</i>	
Faculty Advisor for Math-CISC Major	Fall 2019–Present
<i>Fordham University</i>	
Early-Career Faculty Panelist	Aug. 2021
<i>New Faculty Orientation, Fordham University</i>	
Career Day Volunteer	Jan. 2020
<i>The Equity Project Charter School</i>	
New Beginnings Life Skills Program Volunteer	Fall 2018–Summer 2019
<i>South Carolina Department of Juvenile Justice</i>	
Magellan Explorer Project Advisor	Spring 2017–Spring 2018
<i>for Danielle Wood, University of South Carolina</i>	
Top Scholar Review Committee Member and Interviewer	Fall 2017–Spring 2018
<i>University of South Carolina</i>	
Motives at South Carolina	Spring 2018
<i>Seminar Organizer</i>	

Comprehensive Exam Committee Member

Spring 2017–Fall 2018

University of South Carolina

- Candace Bethea
- Tracy Huggins
- Alicia Lamarche
- Robert Vandermolen

Journal Referee

2017–Present

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

South Carolina 4 Square Club (SC4SC)

Fall 2017–Spring 2019

*Club Advisor***USC Graduate Student Seminar**

April 2019

Job Market Panelist

Sept. 2017

UGA conference on algebraic and analytic aspects of quadratic forms

July 2017

*Co-organizer with D. Krashen, P. Clark, and K. Thompson***University of South Carolina High School Math Competition**

Feb. 2017

Volunteer Judge and Proctor

Feb. 2018

UGA Graduate Student Bootcamp

June 2016

*Job Market Panelist/Speaker on “How to give a good math talk”***University of Georgia Math Camp**

June 2016

Graduate Instructor

July 2014

Project REFOCUS

Spring 2016

21st Century Skills Program Volunteer

Fall 2015

University of Georgia High School Math Tournament

Nov. 2014

Volunteer

Nov. 2013

A Place Called Home Non-Profit Youth Center

Spring 2008

*Volunteer Tutor, K-12, all subjects***Member of the American Mathematical Society****Skills****Technology**

Self-instructed coding in Python, HTML, website building, Mathematica, Sage, Git, L^AT_EX, 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

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-present
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 <i>University of California, Los Angeles</i>	March 2011
Compact Moduli and Vector Bundles <i>University of Georgia</i>	May 2010