

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. (with M. Ballard and A. Duncan) Derived categories of centrally-symmetric smooth toric Fano varieties. *Math. Nachr.* 295 (2022), no. 2, 218–241.
2. (with M. Ballard, N. Chidambaram, D. Favero, and R. Vandermolen) Kernels for Grassmann flops. *J. Math. Pures Appl.* (9) 147 (2021), 29–59.
3. (with M. Ballard and A. Duncan) On derived categories of arithmetic toric varieties. *Ann. K-Theory* 4 (2019), no. 2, 211–242.

Last updated May 4, 2022

4. 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.
5. (with M. Ballard and A. Duncan) The toric Frobenius morphism and a conjecture of Orlov, *Eur. J. Math.* 5 (2019), no. 3, 640-645.
6. 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.
7. (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

8. A.T.V.'s for (geometric) off-roading: a gentle introduction to arithmetic toric varieties, to appear in *Notices of the American Mathematical Society*, 2022.
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.
11. (with M. Ballard, A. Duncan, A. Lamarche) Consequences of the existence of exceptional collections in arithmetic and rationality. arXiv:2009.10175, submitted.

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

PIC Math Program (Award: \$5,000) <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
VIGRE Graduate Fellowship <i>National Science Foundation</i>	Aug. 2011-July 2012

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

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