Patrick K. McFaddin

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Education

Ph.D., Mathematics — May 2016
University of Georgia — Athens, GA

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

M.A., Mathematics — August 2011
University of Georgia — Athens, GA

- Advisor: Robert Varley

B.A., with Honors in Mathematics — May 2010
University of Southern California — Los Angeles, CA

Employment

Fordham University — Aug. 2019 - Present
Assistant Professor (tenure-track)

University of South Carolina — Aug. 2016 - June 2019
Visiting Research Assistant Professor

University of Georgia — June 2010- May 2016
Graduate Research and Teaching Assistant

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

4. 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.

5. (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

6. (with M. Ballard, N. Chidambaram, D. Favero, and R. Vandermolen) Kernels for Grassmann flops. arXiv:1904.12195, submitted.

7. (with M. Ballard and A. Duncan) Derived categories of centrally-symmetric smooth toric Fano varieties. arXiv:1812.09392, to appear in *Mathematische Nachrichten*.

8. (with M. Ballard, A. Duncan, A. Lamarche) Separable algebras and coflasque resolutions. arXiv:2006.06876, 2020.

9. (with M. Ballard, A. Duncan, A. Lamarche) Consequences of the existence of exceptional collections in arithmetic and rationality. In preparation, 2020.

Physics and Astronomy Research

10. (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.

11. (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

AMS–Simons Travel Grant July 2018 - June 2021
American Mathematical Society and the Simons Foundation

Great Lakes National Scholarship Aug. 2015
Great Lakes Educational Loan Services

Outstanding Teaching Assistant March 2015
University of Georgia

VIGRE Graduate Fellowship Aug. 2011 - July 2012
National Science Foundation

Selected Talks

Algebraic groups, torsors, and twisted forms Jan. 2020
Lincoln Center Math Seminar, Fordham University

Twisted forms of toric varieties, their derived categories, and rationality Nov. 2019
Brauer Groups, Derived Categories and Birational Geometry, BIRS

Arithmetic and geometry of algebraic cycles Oct. 2019
Lincoln Center Math Seminar, Fordham University

Resolutions of tori and derived categories of toric varieties Sept. 2019
Emerging Research in Alg. Groups, Motives, and K-Theory, St. Petersburg, Russia

Toric varieties and their derived categories Feb. 2019
Mathematics Department Colloquium, Georgia Southern University

Geometric study of subfields of some non-commutative algebras Nov. 2018
Carolina Math Seminar, University of South Carolina

Algebraic cycles on homogeneous varieties Oct. 2018
Algebra, Geometry, and Number Theory Seminar, Tufts University

Galois descent for exceptional collections on toric varieties Sept. 2018
Algebra Seminar, University of Tennessee, Knoxville

Exceptional collections on some arithmetic toric varieties July 2018
K-theory Conference Workshop, Universidad de Buenos Aires

Derived categories of arithmetic toric varieties June 2018
The 13^{th} Brauer Group Conference, Pingree Park, CO

Groups of loops: they're fundamental! Feb. 2018
PME and Gamecock Math Club, University of South Carolina

Exceptional collections on toric varieties Nov. 2017
Algebraic Geometry Seminar, University of South Carolina

Lectures on non-commutative motives May-June 2017
K-theory and related fields trimester program, Hausdorff Institute

Chow groups with coefficients for some twisted homogeneous varieties March 2017
Algebraic Geometry Seminar, Courant Institute of Mathematical Sciences

K_1-zero-cycles for some homogeneous varieties of type A_n and C_n March 2017
Algebra Seminar, University of Alberta

Zero-cycles with coefficients for some twisted homogeneous varieties March 2017
Georgia Algebraic Geometry Symposium, University of Georgia

K_1-zero-cycles on twisted Grassmannians Sept. 2016
Topological Approaches to Arithmetic and Algebraic Geometry, University of Georgia

Chow groups with coefficients and generalized Severi-Brauer varieties Feb. 2016
Algebra and Number Theory Seminar, Emory University

Teaching and Training

Fordham University
Instructor of Record

- 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

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, Fall 2010

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 — Spring 2015
University of Georgia, supervised by Lisa Townsley

UGA graduate student teacher training — 2010- 2014
Courses with Robert Rumley, Jon Hanke, Matt Mastin, and Lisa Townsley

Professional Activities

MoMath Math Gym Host (via Zoom) — May 2020
National Museum of Mathematics, New York, NY

Career Day Volunteer — Jan. 2020
The Equity Project Charter School

Faculty Advisor for Math-CISC Major — Fall 2019- Present
Fordham University

New Beginnings Life Skills Program Volunteer — Fall 2018- Summer 2019
South Carolina Department of Juvenile Justice

Magellan Explorer Project Advisor — Spring 2017- Spring 2018
for Danielle Wood, University of South Carolina

Top Scholar Review Committee Member and Interviewer — Fall 2017-Spring 2018
University of South Carolina

Motives at South Carolina — Spring 2018
Seminar Organizer

Comprehensive Exam Committee Member — Spring 2017-Fall 2018
University of South Carolina
· Candace Bethea
· Tracy Huggins
· Alicia Lamarche
· Robert Vandermolen

Referee 2017-2020
Pac. J. Math and J. Eur. Math. Soc.

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, LaTeX, MyMathLab, WebAssign, WebWork, BlackBoard, experience with Windows, Mac, Linux (via Ubuntu) operating systems.

Language

- French, limited working proficiency
- Spanish, elementary proficiency

Conferences and Workshops Attended

Electronic Algebraic K-Theory Seminar June 2020
Organizers: B. Antieau, E. Elmanto, A. Mathew, M. Yakerson

Quadratic forms, linear algebraic groups and beyond May-June 2020
Organizers: P. Gille, Z. Reichstein, K. Zainoulline

Teaching as a legitimate application of college mathematics May 2020
META Math Webinar, Mathematical Association of America

Brauer Groups, Derived Categories and Birational Geometry Nov. 2019
Banff International Research Station, Banff, AB, Canada

Emerging Research in Algebraic Groups, Motives, and K-Theory Sept. 2019
Euler International Mathematical Institute, St. Petersburg, Russia

Rationality problems in algebraic geometry July 2019
American Institute of Mathematics, San Jose, CA

Derived algebraic geometry and its applications March 2019
Mathematical Sciences Research Institute, Berkeley, CA

Joint Mathematics Meetings Jan. 2019
Baltimore, MD

Carolina Math Seminar Nov. 2018
University of South Carolina

K-theory Conference Workshop (ICM Satellite) July 2018
Universidad de Buenos Aires, Argentina

K-theory Conference School (ICM Satellite) July 2018
Universidad Nacional de La Plata, Argentina

The 13$^{\text{th}}$ Brauer Group Conference June 2018
Colorado State Mountain Campus, Pingree Park, CO

Discover USC April 2018
Mentor for Danielle Wood, University of South Carolina

A Day of Algebraic Geometry in Savannah March 2018
Georgia Southern University

Georgia Algebraic Geometry Symposium Feb. 2018
Georgia Institute of Technology

Joint Mathematics Meetings Jan. 2018
San Diego, CA

Stacks Project Workshop July-Aug. 2017
University of Michigan

CAAATQuaFs (Conference on Quadratic Forms) July 2017
University of Georgia

K-theory and Related Fields Trimester Program May-June 2017
Hausdorff Research Institute for Mathematics

Georgia Algebraic Geometry Symposium March 2017
University of Georgia

Lectures in Arithmetic Geometry at Rice Feb. 2017
Rice University

Topological Approaches to Arithmetic and Algebraic Geometry Sept. 2016
University of Georgia

Arithmetic Algebraic Geometry Aug. 2016
Courant Institute of Mathematical Sciences

Joint Mathematics Meetings Jan. 2016
Seattle, WA

Georgia Algebraic Geometry Symposium Oct. 2015
Emory University

Local-Global Principles and Their Obstructions Oct. 2015
University of Pennsylvania

Grad Student Bootcamp for the Alg. Geom. Research Institute July 2015
University of Utah

The 12$^{\text{th}}$ Brauer Group Conference June 2015
Colorado State Mountain Campus, Pingree Park, CO

Arizona Winter School: Arithmetic and Higher-Dimensional Varieties March 2015
University of Arizona

Georgia Algebraic Geometry Symposium Oct. 2014
University of Georgia

Representation Theory and K-Theory May 2014
University of Southern California

Southeastern Lie Theory Workshop May 2014
University of Georgia

Georgia Algebraic Geometry Symposium Oct. 2013
University of Georgia

Torsors, Nonassociative Algebras, and Cohomological Invariants June 2013
Fields Institute

Homotopical Methods in Algebraic Geometry May 2013
University of Southern California

Workshop on Torsors, Motives, and Cohomological Invariants May 2013
Fields Institute

Oberwolfach Seminar on Algebraic Groups and Patching Oct. 2012
Mathematisches Forschungsinstitut Oberwolfach

Georgia Algebraic Geometry Symposium May 2012
University of Georgia

VIGRE Summer School Program in Algebraic Geometry May 2012
University of Georgia

Arizona Winter School: Ramification and Geometry March 2012
University of Arizona

Algebraic Geometry Northeastern Series Workshop Oct. 2011
Stony Brook University

A Celebration of Algebraic Geometry Aug. 2011
Harvard University

K-Theory and Motives March 2011
University of California, Los Angeles

Compact Moduli and Vector Bundles May 2010
University of Georgia