

# Patrick K. McFaddin

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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

*Assistant Professor*

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) 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.

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Last updated January 13, 2020

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, 2019.
7. (with M. Ballard and A. Duncan) Derived categories of centrally-symmetric smooth toric Fano varieties. arXiv:1812.09392, 2018.

#### Physics and Astronomy Research

8. (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.
9. (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

<b>AMS–Simons Travel Grant</b> <i>American Mathematical Society and the Simons Foundation</i>	July 2018 - June 2020
<b>Great Lakes National Scholarship</b> <i>Great Lakes Educational Loan Services</i>	Aug. 2015
<b>Outstanding Teaching Assistant</b> <i>University of Georgia</i>	March 2015
<b>VIGRE Graduate Fellowship</b> <i>National Science Foundation</i>	Aug. 2011 - July 2012

#### Selected Talks

<b>Twisted forms of toric varieties, their derived categories, and rationality</b> <i>Brauer Groups, Derived Categories and Birational Geometry, BIRS</i>	Nov. 2019
<b>Arithmetic and geometry of algebraic cycles</b> <i>Lincoln Center Math Seminar, Fordham University</i>	Oct. 2019
<b>Resolutions of tori and derived categories of toric varieties</b> <i>Emerging Research in Alg. Groups, Motives, and K-Theory, St. Petersburg, Russia</i>	Sept. 2019
<b>Toric varieties and their derived categories</b> <i>Mathematics Department Colloquium, Georgia Southern University</i>	Feb. 2019
<b>Geometric study of subfields of some non-commutative algebras</b> <i>Carolina Math Seminar, University of South Carolina</i>	Nov. 2018
<b>Algebraic cycles on homogeneous varieties</b> <i>Algebra, Geometry, and Number Theory Seminar, Tufts University</i>	Oct. 2018

<b>Galois descent for exceptional collections on toric varieties</b> <i>Algebra Seminar, University of Tennessee, Knoxville</i>	Sept. 2018
<b>Exceptional collections on some arithmetic toric varieties</b> <i>K-theory Conference Workshop, Universidad de Buenos Aires</i>	July 2018
<b>Derived categories of arithmetic toric varieties</b> <i>The 13<sup>th</sup> Brauer Group Conference, Pingree Park, CO</i>	June 2018
<b>Groups of loops: they're fundamental!</b> <i>PME and Gamecock Math Club, University of South Carolina</i>	Feb. 2018
<b>Exceptional collections on toric varieties</b> <i>Algebraic Geometry Seminar, University of South Carolina</i>	Nov. 2017
<b>Lectures on non-commutative motives</b> <i>K-theory and related fields trimester program, Hausdorff Institute</i>	May-June 2017
<b>Chow groups with coefficients for some twisted homogeneous varieties</b> <i>Algebraic Geometry Seminar, Courant Institute of Mathematical Sciences</i>	March 2017
<b><math>K_1</math>-zero-cycles for some homogeneous varieties of type <math>A_n</math> and <math>C_n</math></b> <i>Algebra Seminar, University of Alberta</i>	March 2017
<b>Zero-cycles with coefficients for some twisted homogeneous varieties</b> <i>Georgia Algebraic Geometry Symposium, University of Georgia</i>	March 2017
<b><math>K_1</math>-zero-cycles on twisted Grassmannians</b> <i>Topological Approaches to Arithmetic and Algebraic Geometry, University of Georgia</i>	Sept. 2016
<b>Chow groups with coefficients and generalized Severi-Brauer varieties</b> <i>Algebra and Number Theory Seminar, Emory University</i>	Feb. 2016

## 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
<i>Recitation Instructor</i>	
· Math 2200- Analytic Geometry and Calculus	Spring 2011
	Fall 2010
<b>Mental Health and International Students</b>	Nov. 2018
<i>International Accelerator Program, University of South Carolina</i>	
<b>FLIP (Focus on Learning, Innovation and Pedagogy) Participant</b>	Fall 2017
<i>Center for Teaching Excellence, University of South Carolina</i>	
<b>Observer of first-time graduate instructors</b>	Spring 2015
<i>University of Georgia, supervised by Lisa Townsley</i>	
<b>UGA graduate student teacher training</b>	2010- 2014
<i>Courses with Robert Rumley, Jon Hanke, Matt Mastin, and Lisa Townsley</i>	

## Professional Activities

<b>Faculty Advisor for Math-CISC Major</b>	Fall 2019- Present
<i>Fordham University</i>	
<b>New Beginnings Life Skills Program Volunteer</b>	Fall 2018- Summer 2019
<i>South Carolina Department of Juvenile Justice</i>	
<b>Magellan Explorer Project Advisor</b>	Spring 2017- Spring 2018
<i>for Danielle Wood, University of South Carolina</i>	
<b>Top Scholar Review Committee Member and Interviewer</b>	Fall 2017-Spring 2018
<i>University of South Carolina</i>	
<b>Motives at South Carolina</b>	Spring 2018
<i>Seminar Organizer</i>	
<b>Comprehensive Exam Committee Member</b>	Spring 2017-Fall 2018
<i>University of South Carolina</i>	
· Candace Bethea	
· Tracy Huggins	
· Alicia Lamarche	
· Robert Vandermolen	
<b>Referee</b>	2017-2018
<i>Pacific Journal of Mathematics</i>	
<b>South Carolina 4 Square Club (SC4SC)</b>	Fall 2017- Spring 2019
<i>Club Advisor</i>	
<b>USC Graduate Student Seminar</b>	April 2019
<i>Job Market Panelist</i>	Sept. 2017
<b>UGA conference on algebraic and analytic aspects of quadratic forms</b>	July 2017
<i>Co-organizer with D. Krashen, P. Clark, and K. Thompson</i>	
<b>University of South Carolina High School Math Competition</b>	Feb. 2017
<i>Volunteer Judge and Proctor</i>	Feb. 2018

<b>UGA Graduate Student Bootcamp</b> <i>Job Market Panelist/Speaker on “How to give a good math talk”</i>	June 2016
<b>University of Georgia Math Camp</b> <i>Graduate Instructor</i>	June 2016 July 2014
<b>Project REFOCUS</b> <i>21st Century Skills Program Volunteer</i>	Spring 2016 Fall 2015
<b>University of Georgia High School Math Tournament</b> <i>Volunteer</i>	Nov. 2014 Nov. 2013
<b>A Place Called Home Non-Profit Youth Center</b> <i>Volunteer Tutor, K-12, all subjects</i>	Spring 2008
<b>Member of the American Mathematical Society</b>	

## Skills

### Technology

Self-instructed coding in Python, HTML, website building, Mathematica, Sage, Git,  $\text{\LaTeX}$ , 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

<b>Brauer Groups, Derived Categories and Birational Geometry</b> <i>Banff International Research Station, Banff, AB, Canada</i>	Nov. 2019
<b>Emerging Research in Algebraic Groups, Motives, and K-Theory</b> <i>Euler International Mathematical Institute, St. Petersburg, Russia</i>	Sept. 2019
<b>Rationality problems in algebraic geometry</b> <i>American Institute of Mathematics, San Jose, CA</i>	July 2019
<b>Derived algebraic geometry and its applications</b> <i>Mathematical Sciences Research Institute, Berkeley, CA</i>	March 2019
<b>Joint Mathematics Meetings</b> <i>Baltimore, MD</i>	Jan. 2019
<b>Carolina Math Seminar</b> <i>University of South Carolina</i>	Nov. 2018
<b>K-theory Conference Workshop (ICM Satellite)</b> <i>Universidad de Buenos Aires, Argentina</i>	July 2018
<b>K-theory Conference School (ICM Satellite)</b> <i>Universidad Nacional de La Plata, Argentina</i>	July 2018

<b>The 13<sup>th</sup> Brauer Group Conference</b> <i>Colorado State Mountain Campus, Pingree Park, CO</i>	June 2018
<b>Discover USC</b> <i>Mentor for Danielle Wood, University of South Carolina</i>	April 2018
<b>A Day of Algebraic Geometry in Savannah</b> <i>Georgia Southern University</i>	March 2018
<b>Georgia Algebraic Geometry Symposium</b> <i>Georgia Institute of Technology</i>	Feb. 2018
<b>Joint Mathematics Meetings</b> <i>San Diego, CA</i>	Jan. 2018
<b>Stacks Project Workshop</b> <i>University of Michigan</i>	July-Aug. 2017
<b>CAAATQuaFs (Conference on Quadratic Forms)</b> <i>University of Georgia</i>	July 2017
<b>K-theory and Related Fields Trimester Program</b> <i>Hausdorff Research Institute for Mathematics</i>	May-June 2017
<b>Georgia Algebraic Geometry Symposium</b> <i>University of Georgia</i>	March 2017
<b>Lectures in Arithmetic Geometry at Rice</b> <i>Rice University</i>	Feb. 2017
<b>Topological Approaches to Arithmetic and Algebraic Geometry</b> <i>University of Georgia</i>	Sept. 2016
<b>Arithmetic Algebraic Geometry</b> <i>Courant Institute of Mathematical Sciences</i>	Aug. 2016
<b>Joint Mathematics Meetings</b> <i>Seattle, WA</i>	Jan. 2016
<b>Georgia Algebraic Geometry Symposium</b> <i>Emory University</i>	Oct. 2015
<b>Local-Global Principles and Their Obstructions</b> <i>University of Pennsylvania</i>	Oct. 2015
<b>Grad Student Bootcamp for the Alg. Geom. Research Institute</b> <i>University of Utah</i>	July 2015
<b>The 12<sup>th</sup> Brauer Group Conference</b> <i>Colorado State Mountain Campus, Pingree Park, CO</i>	June 2015
<b>Arizona Winter School: Arithmetic and Higher-Dimensional Varieties</b> <i>University of Arizona</i>	March 2015
<b>Georgia Algebraic Geometry Symposium</b> <i>University of Georgia</i>	Oct. 2014
<b>Representation Theory and K-Theory</b> <i>University of Southern California</i>	May 2014
<b>Southeastern Lie Theory Workshop</b> <i>University of Georgia</i>	May 2014
<b>Georgia Algebraic Geometry Symposium</b> <i>University of Georgia</i>	Oct. 2013

<b>Torsors, Nonassociative Algebras, and Cohomological Invariants</b> <i>Fields Institute</i>	June 2013
<b>Homotopical Methods in Algebraic Geometry</b> <i>University of Southern California</i>	May 2013
<b>Workshop on Torsors, Motives, and Cohomological Invariants</b> <i>Fields Institute</i>	May 2013
<b>Oberwolfach Seminar on Algebraic Groups and Patching</b> <i>Mathematisches Forschungsinstitut Oberwolfach</i>	Oct. 2012
<b>Georgia Algebraic Geometry Symposium</b> <i>University of Georgia</i>	May 2012
<b>VIGRE Summer School Program in Algebraic Geometry</b> <i>University of Georgia</i>	May 2012
<b>Arizona Winter School: Ramification and Geometry</b> <i>University of Arizona</i>	March 2012
<b>Algebraic Geometry Northeastern Series Workshop</b> <i>Stony Brook University</i>	Oct. 2011
<b>A Celebration of Algebraic Geometry</b> <i>Harvard University</i>	Aug. 2011
<b>K-Theory and Motives</b> <i>University of California, Los Angeles</i>	March 2011
<b>Compact Moduli and Vector Bundles</b> <i>University of Georgia</i>	May 2010

## References

**Matthew Ballard**  
Department of Mathematics  
University of South Carolina

**Vladimir Chernousov**  
Department of Mathematical and  
Statistical Sciences  
University of Alberta

**Daniel Krashen**  
Department of Mathematics  
Rutgers University

**Andrew Kustin** (Teaching)  
Department of Mathematics  
University of South Carolina

**Alexander Merkurjev**  
Department of Mathematics  
University of California, Los Angeles

**Lisa Townsley** (Teaching)  
Department of Mathematics  
University of Georgia