

# 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

### University of South Carolina

*Visiting Research Assistant Professor*

Aug. 2016 - Present

### University of Georgia

*Graduate Research and Teaching Assistant*

June 2010- May 2016

## Research Interests

Algebra and algebraic geometry: algebraic  $K$ -theory,  $K$ -cohomology, algebraic cycles, motives and motivic cohomology, central simple algebras, algebraic groups, homogeneous and toric varieties, derived categories.

## Publications

1. Zero-cycles with coefficients for the second generalized symplectic involution variety of an algebra of degree 4, J. Pure Appl. Algebra (2018), DOI.
2. (with M. Ballard and A. Duncan) The toric Frobenius morphism and a conjecture of Orlov, European Journal of Mathematics (2018), DOI.
3. 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.

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Last updated October 28, 2018

4. (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

5. (with M. Ballard and A. Duncan) On derived categories of arithmetic toric varieties. arXiv:1709.03574, submitted, 2018.
6. (with M. Ballard and A. Duncan) Derived categories of centrally-symmetric smooth toric Fano varieties. In preparation.

### Physics and Astronomy Research

7. (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.
8. (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.

### Work in Progress

1. Twisted Milnor  $K$ -theory.  
(with M. Nguyen)
2. Kernels for Grassmannians.  
(with M. Ballard, N. Chidambaram, D. Favero, and R. Vandermolen)
3. Patching over fields and étale  $K$ -theory.
4. The Chen-Gibney-Krashen moduli spaces revisited.  
(with P. Gallardo, N. Giansiracusa, and X. Wu).
5. A cocycle-free proof of a theorem of Uematsu on the Brauer group of affine diagonal quadrics.  
(with R. Gordon-Sarney, D. Adams, D. Litt, S. Mathur).

### Awards

#### AMS–Simons Travel Grant

*American Mathematical Society and the Simons Foundation*

July 2018 - June 2020

#### Great Lakes National Scholarship

*Great Lakes Educational Loan Services*

Aug. 2015

#### Outstanding Teaching Assistant

*University of Georgia*

March 2015

#### VIGRE Graduate Fellowship

*National Science Foundation*

Aug. 2011 - July 2012

## Selected Talks

|   |               |
|---|---------------|
| <b>Algebraic cycles on homogeneous varieties</b><br><i>Algebra, Geometry, and Number Theory Seminar, Tufts University</i>   | Oct. 2018     |
| <b>Galois descent for exceptional collections on toric varieties</b><br><i>Algebra Seminar, University of Tennessee, Knoxville</i>                                | Sept. 2018    |
| <b>Exceptional collections on some arithmetic toric varieties</b><br><i>K-theory Conference Workshop, Universidad de Buenos Aires</i>                             | July 2018     |
| <b>Derived categories of arithmetic toric varieties</b><br><i>The 13<sup>th</sup> Brauer Group Conference, Pingree Park, CO</i>                                   | June 2018     |
| <b>Groups of loops: they're fundamental!</b><br><i>PME and Gamecock Math Club, University of South Carolina</i>   | Feb. 2018     |
| <b>Twisted linear algebra</b><br><i>Graduate Colloquium, University of South Carolina</i>   | Feb. 2018     |
| <b>Exceptional collections on toric varieties</b><br><i>Algebraic Geometry Seminar, University of South Carolina</i>  | Nov. 2017     |
| <b>Lectures on noncommutative motives</b><br><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><br><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><br><i>Algebra Seminar, University of Alberta</i> | March 2017    |
| <b>Zero-cycles with coefficients for some twisted homogeneous varieties</b><br><i>Georgia Algebraic Geometry Symposium, University of Georgia</i>                 | March 2017    |
| <b><math>K_1</math>-zero-cycles on twisted Grassmannians</b><br><i>Topological Approaches to Arithmetic and Algebraic Geometry, University of Georgia</i>         | Sept. 2016    |
| <b>Subfields of central simple algebras</b><br><i>Math Department Colloquium, California State University Sacramento</i>  | Feb. 2016     |
| <b>Chow groups with coefficients and generalized Severi-Brauer varieties</b><br><i>Algebra and Number Theory Seminar, Emory University</i>                        | Feb. 2016     |

## Teaching and Training

### 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

## **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**

### **Magellan Explorer Project Advisor**

Spring 2017- Present

*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-Fall 2017

*University of South Carolina*

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

### **Referee**

2017-2018

*Pacific Journal of Mathematics*

### **South Carolina 4 Square Club (SC4SC)**

Fall 2017

*Club Advisor*

### **USC Graduate Student Seminar**

Sept. 2017

*Job Market Panelist*

### **UGA conference on algebraic and analytic aspects of quadratic forms**

July 2017

*Co-organizer with D. Krashen, P. Clark, and K. Thompson*

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

## Skills

### Technology

Self-instructed coding in Python, HTML, website building, Mathematica, Sage, Git, L<sup>A</sup>T<sub>E</sub>X, 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>K-theory Conference Workshop (ICM Satellite)</b>           | July 2018  |
| <i>Universidad de Buenos Aires, Argentina</i>                 |            |
| <b>K-theory Conference School (ICM Satellite)</b>             | July 2018  |
| <i>Universidad Nacional de La Plata, Argentina</i>            |            |
| <b>The 13<sup>th</sup> Brauer Group Conference</b>            | June 2018  |
| <i>Colorado State Mountain Campus, Pingree Park, CO</i>       |            |
| <b>Discover USC</b>   | April 2018 |
| <i>Mentor for Danielle Wood, University of South Carolina</i> |            |
| <b>A Day of Algebraic Geometry in Savannah</b>                | March 2018 |
| <i>Georgia Southern University</i>                            |            |
| <b>Georgia Algebraic Geometry Symposium</b>                   | Feb. 2018  |
| <i>Georgia Institute of Technology</i>                        |            |
| <b>Joint Mathematics Meetings</b>                             | Jan. 2018  |
| <i>San Diego, CA</i>  |            |

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| <b>Stacks Project Workshop</b><br><i>University of Michigan</i>   | July-Aug. 2017 |
| <b>CAAATQuaFs (Conference on Quadratic Forms)</b><br><i>University of Georgia</i>                                   | July 2017      |
| <b>K-theory and Related Fields Trimester Program</b><br><i>Hausdorff Research Institute for Mathematics</i>         | May-June 2017  |
| <b>Georgia Algebraic Geometry Symposium</b><br><i>University of Georgia</i>   | March 2017     |
| <b>Lectures in Arithmetic Geometry at Rice</b><br><i>Rice University</i>  | Feb. 2017      |
| <b>Topological Approaches to Arithmetic and Algebraic Geometry</b><br><i>University of Georgia</i>                  | Sept. 2016     |
| <b>Arithmetic Algebraic Geometry</b><br><i>Courant Institute of Mathematical Sciences</i>                           | Aug. 2016      |
| <b>Joint Mathematics Meetings</b><br><i>Seattle, WA</i>   | Jan. 2016      |
| <b>Georgia Algebraic Geometry Symposium</b><br><i>Emory University</i>  | Oct. 2015      |
| <b>Local-Global Principles and Their Obstructions</b><br><i>University of Pennsylvania</i>                          | Oct. 2015      |
| <b>Grad Student Bootcamp for the Alg. Geom. Research Institute</b><br><i>University of Utah</i>                     | July 2015      |
| <b>The 12<sup>th</sup> Brauer Group Conference</b><br><i>Colorado State Mountain Campus, Pingree Park, CO</i>       | June 2015      |
| <b>Arizona Winter School: Arithmetic and Higher-Dimensional Varieties</b><br><i>University of Arizona</i>           | March 2015     |
| <b>Georgia Algebraic Geometry Symposium</b><br><i>University of Georgia</i>   | Oct. 2014      |
| <b>Representation Theory and K-Theory</b><br><i>University of Southern California</i>                               | May 2014       |
| <b>Southeastern Lie Theory Workshop</b><br><i>University of Georgia</i>   | May 2014       |
| <b>Georgia Algebraic Geometry Symposium</b><br><i>University of Georgia</i>   | Oct. 2013      |
| <b>Torsors, Nonassociative Algebras, and Cohomological Invariants</b><br><i>Fields Institute</i>                    | June 2013      |
| <b>Homotopical Methods in Algebraic Geometry</b><br><i>University of Southern California</i>                        | May 2013       |
| <b>Workshop on Torsors, Motives, and Cohomological Invariants</b><br><i>Fields Institute</i>                        | May 2013       |
| <b>Oberwolfach Seminar on Algebraic Groups and Patching</b><br><i>Mathematisches Forschungsinstitut Oberwolfach</i> | Oct. 2012      |
| <b>Georgia Algebraic Geometry Symposium</b><br><i>University of Georgia</i>   | May 2012       |

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| <b>VIGRE Summer School Program in Algebraic Geometry</b><br><i>University of Georgia</i> | May 2012   |
| <b>Arizona Winter School: Ramification and Geometry</b><br><i>University of Arizona</i>  | March 2012 |
| <b>Algebraic Geometry Northeastern Series Workshop</b><br><i>Stony Brook University</i>  | Oct. 2011  |
| <b>A Celebration of Algebraic Geometry</b><br><i>Harvard University</i>                  | Aug. 2011  |
| <b>K-Theory and Motives</b><br><i>University of California, Los Angeles</i>              | March 2011 |
| <b>Compact Moduli and Vector Bundles</b><br><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