

Patrick K. McFaddin

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Department of Mathematics
Fordham University

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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 (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. *Mathematische Nachrichten*. 2022, 1–24. <https://doi.org/10.1002/mana.201900358>
2. (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.

Last updated January 10, 2022

3. (with M. Ballard, N. Chidambaram, D. Favero, and R. Vandermolen) Kernels for Grassmann flops. *J. Math. Pures Appl.* (9) 147 (2021), 29-59.
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.

Submitted articles and preprints

9. (with M. Ballard, A. Duncan, A. Lamarche) Separable algebras and coflasque resolutions. arXiv:2006.06876, submitted, 2020.
10. (with M. Ballard, A. Duncan, A. Lamarche) Consequences of the existence of exceptional collections in arithmetic and rationality. arXiv:2009.10175, submitted, 2021.

Physics and Astronomy Research

11. (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.
12. (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)

Summer 2021-Summer 2022

Mathematical Association of America

Fordham A&S Deans' Challenge Grant (Award: \$9,500)

Spring 2021

Enhancing the Flipped-Hybrid Approach, Grant Leader: Melkana Brakalova

Fordham A&S Deans' Challenge Grant (Award: \$10,000)

Fall 2020

Flipped-Hybrid Approach to Math Instruction, Grant Leader: Melkana Brakalova

AMS-Simons Travel Grant (Award: \$4,000)

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

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| 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 |

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| 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

| | |
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| · 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

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| · Math 2005–Multivariable Calculus II | Spring 2022 |
| · Math 2005–Multivariable Calculus II | Spring 2021 |

University of South Carolina

Instructor of Record

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|---|-------------|
| · 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

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| · Math 2260–Calculus II for Science and Engineering | Fall 2015 |
| · Math 1113–Pre-Calculus | Spring 2015 |

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| · 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

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| 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

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| 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 |

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| 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 |

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| 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 |