

***Academics***

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**University of Maryland at College Park**

Ph.D. in Mathematics, May 2006

Dissertation title: *Orbit discontinuities and topological models for Borel semiflows*

Advisor: Daniel J. Rudolph

**University of North Carolina at Chapel Hill**

B.S. with Highest Honors in Mathematics, May 2000

Undergraduate thesis title: *A study of the dynamics of a family of quadratic rational maps and its corresponding parameter space*

Advisor: Jane M. Hawkins

***Professional Experience***

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**Professor** Ferris State University (Fall 2020-present)

**Associate Professor** Ferris State University (Fall 2015-Spring 2020)

**Assistant Professor** Ferris State University (Fall 2012-Spring 2015)

Courses taught:

- Math 115 (Intermediate Algebra)
- Math 116 (Intermediate Algebra-Numerical Trigonometry)
- Math 120 (Trigonometry)
- Math 122 (Analysis for Business)
- Math 130 (Advanced Algebra & Analytic Trigonometry)
- Math 216 (Applied Calculus)
- Math 220 (Calculus 1)
- Math 230 (Calculus 2)
- Math 320 (Calculus 3)
- Math 322 (Linear Algebra)
- Math 324 (Fundamental Concepts in Mathematics)
- Math 330 (Differential Equations)
- Math 414 (Mathematical Statistics 1)
- Math 416 (Mathematical Statistics 2)
- Math 417 (Problem Solving for Actuarial Exam P)
- Math 420 (Abstract Algebra)
- Math 430 (Advanced Calculus)

**Visiting Assistant Professor** Swarthmore College (Fall 2010-Spring 2012)

Courses taught:

- Math 25 (Calculus II)
- Math 26 (Intensive Calculus II)
- Math 28S (First-Year Honors Seminar in Linear Algebra)
- Math 53 (Topics in Analysis - Dynamics, Chaos and Fractals)
- Math 63 (Real Analysis)

**Boas Assistant Professor** (post-doctoral) Northwestern University (Fall 2007-Spring 2010)

**Lecturer** Northwestern University (Fall 2006-Spring 2007)

Courses taught:

- Math 105-6 (Freshman Seminar - Philosophy of Mathematics)
- Math 202-0 (Finite Mathematics)
- Math 230-0 (Differential Calculus of Functions of Several Variables)
- Math 291-1 (MENU (Honors) Linear Algebra and Multivariable Calculus)
- Math 310-1,2,3 (Probability and Stochastic Processes I, II, III)
- Math 364-0 (Game Theory)

**Teaching Assistant** University of Maryland (Fall 2000-Spring 2006)

Courses taught:

- Math 110 (Finite Mathematics)
- Math 113 (College Algebra)
- Math 113T (College Algebra with Trigonometry)
- Math 115 (Precalculus)
- Math 211 (Topics in Geometry and Probability for Elementary Education Majors)

Teaching assistant for the following courses:

- Math 141 (Calculus II)
- Math 406 (Number Theory)
- Math 461 (Linear Algebra for Scientists and Engineers with MATLAB)
- Math 730 (Topology)
- Math 734 (Algebraic Topology)

**Adjunct Instructor** Colorado State University (Spring 2005)

Taught Math 160 (Calculus for Physical Scientists and Engineers I)

**Substitute Teacher** Polk County Public Schools, Bartow, FL (Summer 2000)

Taught high-school geometry full-time to summer school students

**Tutor** UNC-Chapel Hill Mathematics Department (Fall 1998-Spring 2000)

Tutored students in Calculus I, Calculus III, and Abstract Algebra

**Tutor** UNC-Chapel Hill Peer Tutoring Program (Fall 1998)

Tutored students in Trigonometry and Calculus

**Reader** AP Calculus Exams (Summers 2016 & 2017)

### ***Research Interests***

Ergodic theory and dynamical systems, in particular: symbolic and topological dynamics and ergodic theory of amenable group actions (especially actions of  $\mathbb{Z}^d$ ); equivalence relations in ergodic theory and topological dynamics; cocycles and group extensions

## ***Publications***

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- (with A.S.A. Johnson) **Finite odometer factors of rank one  $\mathbb{Z}^d$ -actions** submitted (2023).
- (with A.S.A. Johnson) **Topological speedups of  $\mathbb{Z}^d$ -actions** *Dyn. Syst.* **37** (2022), 222-261.
- (with M. Nadrowski) **An analysis of methods used to measure college football recruiting classes and assign star ratings to recruits**, *Mathematics and Sports* **3** (2021), 1-20.
- (with K. Weller, J. Trouba, S. Brigrance and M. Dekker) **Transforming tradition: from one instructor to an entire department**, *PRIMUS* **31** (2021) 532-549.
- (with J. Wilson) **Entropy of LEGO<sup>®</sup> jumper plates**, in J. Beineke and J. Rosenhouse (Eds), *The Mathematics of Various Entertaining Subjects Volume 3*, Princeton University Press (2019), 287-311.
- (with A.S.A. Johnson) **Speedups and orbit equivalence of finite extensions of ergodic  $\mathbb{Z}^d$ -actions**, *New York J. Math.* **21** (2015) 1371-1387.
- **On the maximal Weyl complexity of families of four polynomials**, preprint, cited in lit.
- (with A.S.A. Johnson) **Speedups of ergodic group extensions of  $\mathbb{Z}^d$ -actions** *Dyn. Syst.* **29** (2014), 255-284.
- **An Ambrose-Kakutani representation theorem for countable-to-1 semiflows** *Discrete Contin. Dyn. Syst. Ser. S* **2** (2009), 251-268.
- **Continuity of conditional measures associated to measure-preserving semiflows** *Trans. AMS* **361** (2009), 331-341.
- **A study of the dynamics of a family of quadratic rational maps and its corresponding parameter space** UNC-Chapel Hill Undergraduate Honors Thesis (2000), cited in lit.

## ***Undergraduate Research Projects Directed***

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- Advised **Ahmad Naqshbandi**, Ferris State University undergraduate, on his undergraduate research project "3-D Cassaigne sequences" (2022-2023)
- Advised **Michael Nadrowski**, Ferris State University undergraduate, on his undergraduate research project "Optimal weight functions for ratings of college football recruiting classes" (2020-2021) (this paper appeared in *Mathematics and Sports* **3** (2021))
- Advised **Jon Wilson**, Ferris State University undergraduate, on his undergraduate research project "Entropy of non-standard LEGO<sup>®</sup> bricks" (2017-2019) (this paper appeared in *The Mathematics of Various Entertaining Subjects Volume 3* (2019))
- Advised **Anzhané Lance**, Ferris State University undergraduate, on her undergraduate research project "Dynamics of the family  $f(z) = \lambda(z + \frac{1}{z} + 1)$ " (2017-2018)
- Advised **Jacob Kaminski**, Ferris State University undergraduate, on his undergraduate research project "Statistical analysis of college football polls" (2017-2018)
- Advised **Allie Wicklund**, Ferris State University undergraduate, on her undergraduate research project "A density-dependent sex-age model for white-tailed deer population incorporating annual harvest" (2016)
- Advised the senior honors symposium of **Andrew Elenbaas**, Ferris State University undergraduate, on "The hot-hand fallacy" (2015)
- Advised **Tyler George**, Ferris State University undergraduate, on his undergraduate research project "*E*-ergodicity and speedups of ergodic systems" (2014) (this paper appeared in *Rose-Hulman Undergraduate Mathematics Journal* **16** (2015))

- Advised **Mickelle Bradley** and **Jaime Mullen**, Ferris State University undergraduates, on their poster presentation “The Raindrop Function: Looks can be Deceiving” (2014)
- Advised **Steve Crow** and **Tyler George**, Ferris State University undergraduates, on their colloquium talk and poster presentation “Dynamical systems and chaos” (2013)
- Advised **Yuwen Wang**, Swarthmore College undergraduate, on her summer project “A new approach to computing Weyl complexity” (2012)
- Advised **Keith Goldner**, Northwestern University undergraduate, on his thesis “A Markov model of American football” (2010) (this paper appeared in *Journal of Quantitative Analysis in Sports* 8 (2012))

### ***Independent Studies Directed***

- **Danielle Blackford**, Ferris State University undergraduate; course title: “Topics in Real Analysis” (Spring 2022)
- **Danielle Blackford**, Ferris State University undergraduate; course title: “Abstract Algebra and Galois Theory” (Fall 2021)
- **Michael Nadrowski**, Ferris State University undergraduate; course title: “Applications of Statistics to Sports” (Fall 2020)
- **Ben Doyle**, Ferris State University undergraduate; course title: “Advanced Topics in Abstract and Linear Algebra” (Spring 2020)
- **Anzhané Lance**, Ferris State University undergraduate; course title: “Complex Dynamics” (Fall 2018)
- **Philip Renne**, Ferris State University undergraduate; course title: “Introduction to Topology” (Fall 2017)
- **Allie Wicklund**, Ferris State University undergraduate; course title: “Mathematical Biology” (Fall 2015 & Spring 2016)
- **Jaime Mullen**, Ferris State University undergraduate; course title: “Introduction to Measure Theory” (Fall 2014)
- **Mickelle Bradley** and **Jaime Mullen**, Ferris State University undergraduates; course title: “Topics in Real Analysis” (Spring 2014)
- **Joel McGorman**, Ferris State University undergraduate; course title: “Advanced Calculus II” (2013)

### ***Course-Level Honors Projects Directed***

- **Matthew Northrup**, Ferris State University undergraduate; project title: “Actuarial Science for Life Contingent Risks” (Mathematical Statistics 1, Fall 2022)
- **Ahmad Naqshbandi**, Ferris State University undergraduate; project title: “Differential Geometry and Curvilinear Motion” (Calculus 3, Fall 2021)
- **Matthew Northrup**, Ferris State University undergraduate; project title: “Introduction to Stochastic Calculus” (Calculus 3, Fall 2021)
- **Matthew Northrup**, Ferris State University undergraduate; project title: “Applications of Calculus to Actuarial Science” (Calculus 1, Fall 2020)
- **Arianna Lozano**, Ferris State University undergraduate; project title: “Applications of Trigonometry in Medicine” (Trigonometry, Fall 2018)

- **Cameron Bourlier**, Ferris State University undergraduate; project title: “The Snowplow Problem” (Differential Equations, Fall 2017)
- **Felicia Rohn**, Ferris State University undergraduate; project title: “History of Calculus” (Calculus 1, Spring 2017)

### ***Honors, Grants and Fellowships***

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#### **Teaching-related:**

- Honors Program Faculty, Ferris State University (2021-present)
- Ferris Foundation Exceptional Merit Grant “Student-centered, technology-based reform in calculus” (2013)
- Winner, Northwestern University Department of Mathematics Excellence in Teaching Award (2010)
- Nominated for University of Maryland Excellence in Teaching Award (2001, 2002, 2004)
- UNC-Chapel Hill Math Tutor of the Year (1999 and 2000)

#### **Research-related:**

- HatchEd Celebration of Scholarship and Creative Work Award (2022)
- Co-PI, Little School Dynamics (online research community sponsored by American Institute of Mathematics) (2021-2023)
- Sabbatical Leave, Ferris State University (2020)
- Ferris State University Student Research Fellowship (faculty mentor, 2017)
- Jacob Timme Travel Grants (2015, 2013, 2012)
- Swarthmore College Research Grant (2011)
- Research Member, Mathematical Sciences Research Institute (2009)
- Winner, Monroe Martin Prize, University of Maryland Spotlight on Graduate Research Competition (2005)
- Jacob K. Goldhaber Travel Grant (2005)
- University of Maryland VIGRE Travel Grant (2004, 2005)
- University of Maryland Mathematics Department Fellowship (2002-2004)
- University of Maryland Graduate School Fellowship (2000-2002)
- Alfred Brauer Prize for excellence in Algebra and Number Theory (2000)

### ***Presentations***

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- Carolina Dynamics Symposium, Davidson, NC, April 2023
- Joint Mathematics Meetings-Special Session on Dynamics Research at Primarily Undergraduate Institutions, online, April 2022
- MAA Michigan Section Meeting, Grand Rapids, April 2022
- Spring Topology and Dynamical Systems Conference (hosted by Murray State University), online, May 2021
- Little School Dynamics Seeding Session (sponsored by AIM), online, March 2021
- AMS-MAA Joint Meetings-Contributed Paper Session on Active Learning in Introductory Courses–Insights from Math Departments in the Process of Change, Denver, January 2020
- AMS-MAA Joint Meetings-Special Session on Ergodic Theory and Dynamical Systems–to Celebrate the Work of Jane Hawkins, San Diego, January 2018
- AMS-MAA Joint Meetings-Special Session on Innovative and Effective Ways to Teach Linear Algebra, San Diego, January 2018

- Colloquium, Ferris State University, November 2017
- AMS-MAA Joint Meetings-Special Session on Inquiry Based Teaching and Learning, Seattle, January 2016
- AMS Fall Central Section Meeting-Special Session on Ergodic Theory and Symbolic Dynamics of Amenable Group Actions, Chicago, October 2015
- Colloquium, Hope College, March 2015
- Pingree Park Dynamics Workshop, Fort Collins, CO, July 2014
- AMS-MAA Joint Meetings-Special Session on Ergodic Theory and Symbolic Dynamics, Baltimore, January 2014
- AMS Spring Southeastern Section Meeting-Special Session on Ergodic Theory and Fractal Geometry, Oxford, MS, March 2013
- Luncheon Speaker, Ferris State University Honors Program, November 2012
- Seminar, Oxford College of Emory University, February 2012
- Colloquium, Muskingum College, January 2012
- Colloquium, Ferris State University, January 2012
- AMS-MAA Joint Meetings, Boston, January 2012
- Guest Lecture, Delta Sigma Pi Business Fraternity, Northwestern University, April 2010
- Colloquium, Swarthmore College, March 2010
- Analysis Seminar, Luther College, January 2010
- Joint Meeting of the AMS and Korean Mathematical Society-Special Session on Ergodic Theory and Dynamical Systems, Seoul, December 2009
- Northwestern Undergraduate Math Society, October 2009
- Northwest Dynamics Symposium, Victoria, August 2008
- AMS Fall Central Section Meeting-Special Session on Ergodic Theory and Symbolic Dynamical Systems, Chicago, October 2007
- Joint Meeting of the AMS and Polish Mathematical Society-Special Session on Ergodic Theory and Topological Dynamics, Warsaw, August 2007
- Logic Seminar, University of Illinois at Chicago, April 2007
- Analysis Seminar, DePaul University, February 2007
- AMS-MAA Joint Meetings, New Orleans, January 2007
- AMS Fall Central Section Meeting-Special Session on Ergodic Theory, Cincinnati, October 2006
- Dynamical Systems Seminar, Northwestern University, October 2006
- Graduation Conference, University of Maryland, April 2006
- Maryland-Penn State Semi-Annual Workshop in Dynamical Systems, March 2006
- Canadian Mathematical Society Winter Meeting, Victoria, December 2005
- University of Maryland Spotlight on Graduate Research Competition, November 2005

### ***Conferences and Summer Schools Attended***

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- Carolina Dynamics Symposium, Davidson, NC, April 2023
- MAA Michigan Section Meeting, Alma, April 2023
- Summer Institute on Designing for Engagement, Ferris State University, July 2022
- Joint Mathematics Meetings (sponsored by AMS), online, April 2022
- MAA Michigan Section Meeting, Grand Rapids, April 2022
- Spring Topology and Dynamical Systems Conference (hosted by Murray State University), online, May 2021

- Little School Dynamics Seeding Session (sponsored by AIM), online, March 2021
- SIMIODE Expo 2021, online, February 2021
- Expanding Dynamics workshop series, online (sponsored by Northwestern University and Universidad de Chile), May 2020-January 2021
- AMS-MAA Joint Mathematics Meetings, Denver, January 2020
- MAA Michigan Section Meeting, Detroit, April 2019
- Inquiry-Based Teaching and Learning and Teaching in Mathematics, Austin, May 2018
- AMS-MAA Joint Mathematics Meetings, San Diego, January 2018
- MOVES (Mathematics of Various Entertaining Subjects) Conference, New York City, August 2017
- Pingree Park Dynamics Workshop, Fort Collins, CO, July 2017
- SUMMR (Summer Undergraduate Michigan Mathematics Research) Conference, Allendale, MI, July 2017
- MAA Michigan Section Meeting, Big Rapids, MI, April 2017
- MAA Michigan Section Meeting, Hillsdale, MI, April 2016
- AMS-MAA Joint Mathematics Meetings, Seattle, January 2016
- Gamma Iota Sigma International Conference, Rosemont, IL, October 2015
- AMS-MAA Fall Central Section Meeting, Chicago, October 2015
- MAA Michigan Section Meeting, Hope College, April 2015
- Pingree Park Dynamics Workshop, Fort Collins, CO, July 2014
- AMS-MAA Joint Mathematics Meetings, Baltimore, January 2014
- AMS Spring Southeastern Section Meeting, Oxford, MS, March 2013
- Michigan Undergraduate Mathematics Conference, Adrian, MI, February 2013
- Williams College Ergodic Theory Conference, July 2012
- AMS-MAA Joint Mathematics Meetings, Boston, January 2012
- MAA Eastern Pennsylvania and Delaware Section Meeting, Bryn Mawr, November 2011
- AMS-MAA Joint Mathematics Meetings, New Orleans, January 2011
- Oxtoby Centennial Conference, Bryn Mawr, October 2010
- Maryland-Penn State Workshop on Dynamical Systems and Related Topics, University of Maryland, April 2010
- AMS-MAA Joint Mathematics Meetings, San Francisco, January 2010
- Joint Meeting of the American Mathematical Society and the Korean Mathematical Society, Seoul, December 2009
- Midwest Dynamical Systems Workshop, Chicago, November 2009
- Pingree Park Dynamics Workshop, Fort Collins, CO, August 2009
- Dynamical Systems and Randomness, IHP, Paris, May 2009
- Discrete Rigidity Phenomena in Additive Combinatorics, MSRI, November 2008
- Introduction to Ergodic Theory and Additive Combinatorics, MSRI, August 2008
- Northwest Dynamics Symposium, Victoria, August 2008
- Maryland-Penn State Workshop on Dynamical Systems and Related Topics, University of Maryland, March 2008
- AMS Fall Central Section Meeting, Chicago, October 2007
- Joint Meeting of the American Mathematical Society and the Polish Mathematical Society, Warsaw, August 2007
- Clay Mathematics Institute Summer School: Homogeneous Flows, Moduli Spaces and

- Arithmetic, Pisa, June 2007
- “Set theory and the reals” Workshop, University of Florida, May 2007
  - Maryland-Penn State Workshop on Dynamical Systems and Related Topics, University of Maryland, March 2007
  - AMS-MAA Joint Mathematics Meetings, New Orleans, January 2007
  - AMS Fall Central Section Meeting, Cincinnati, October 2006
  - BIRS Workshop on Measurable Dynamics, Theory and Applications, Banff, August 2006
  - Maryland-Penn State Workshop on Dynamical Systems and Related Topics, University of Maryland, March 2006
  - AMS-MAA Joint Mathematics Meetings, San Antonio, January 2006
  - Canadian Mathematical Society Winter 2005 Meeting, Victoria, December 2005
  - Semi-annual Workshop in Dynamical Systems and Related Topics, Pennsylvania State University, October 2005
  - Maryland-Penn State Workshop on Dynamical Systems and Related Topics, University of Maryland, March 2005
  - Semi-annual Workshop in Dynamical Systems and Related Topics, Pennsylvania State University, October 2004
  - Maryland-Penn State Workshop on Dynamical Systems and Related Topics, University of Maryland, March 2004
  - Semi-annual Workshop in Dynamical Systems and Related Topics, Pennsylvania State University, October 2003
  - Maryland-Penn State Workshop on Dynamical Systems and Related Topics, University of Maryland, March 2002

## *Service*

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### **Department-level service activities:**

- Coach, Ferris State University Math Teams (2018-present)
- Mathematics Department Assessment Committee, Ferris State University (2012-present)
- Mathematics Department Course Committees, Ferris State University (2016-present) (*Math 220, 230, 320, 322, 414, 416, 417, 430*)
- Ad hoc committee on restructuring departmental committees, Ferris State University Mathematics Department (2021-2022)
- Hiring Committee, Data and Computer Science tenure-track search, Ferris State University (2019-2020)
- Calculus Working Group, Ferris State University (chair, 2018-2019)
- Mathematics Department Core and Theoretical Division Committees, Ferris State University (2012-2016)
- Hiring Committee, Mathematics tenure-track searches, Ferris State University (2013-2015)
- Conducted workshop series on the use of *Mathematica* as a teaching tool, Ferris State University (2013)
- Organized and conducted summer study sessions for Actuarial Exam P/1, Ferris State University (2013)
- Member, committee to develop proposal for new actuarial science major, Ferris State University (2013)
- First-year Mathematics Placement Advisor, Swarthmore College (2011-2012)



- MAA Liason, Swarthmore College (2010-2011)
- Sponsor, Northwestern University COMAP Mathematical Contest in Modeling Team (2010) (team was selected Meritorious Winner)
- Organizer, Northwestern University Dynamical Systems Seminar (2007-2010)
- Interviewed candidates for Strauss Undergraduate TA Positions, Northwestern University (2008-2010)
- Organizer of inaugural University of Maryland Graduation Conference (2006)
- Student Helper at Maryland-Penn State Workshops on Dynamical Systems and Related Topics (2002-2006)
- Mentored undergraduate and beginning graduate students in Research Interaction Teams, University of Maryland (2002-2005)

**College-level service activities:**

- Undergraduate Academic Advisor, College of Arts, Sciences and Education, Ferris State University (2013-present)
- Promotion & Merit Committee, College of Arts, Sciences and Education, Ferris State University (2021-2023; chair 2022-2023)
- Task force to revise Promotion & Merit policies, College of Arts, Sciences and Education, Ferris State University (2021-2022)
- Planning Committee, College of Arts and Sciences, Ferris State University (2014-2018; recorder 2017-2018)
- Freshman Advisor, Weinberg College of Arts and Sciences, Northwestern University (2007)

**University-wide service activities:**

- Faculty Sponsor, Gamma Iota Sigma actuarial science, risk management and insurancefraternity, Ferris State University (2012-present)
- Risk Management and Insurance Program Advisory Board, Ferris State University (2013-present)
- Academic Program Review Committee, Risk Management and Insurance Program, Ferris State University (2019-2020)
- Academic Affairs Assessment Committee, Ferris State University (2016-2019)
- HLC Reaffirmation Criterion 4 Subcommittee, Ferris State University (2018-2019)
- Academic Senate Professional Development Committee, Ferris State University (2015-2018; chair 2017-2018)
- Faculty Sponsor, Swarthmore College Bridge Club (2010-2012)

**Service to the profession:**

- Reviewer, Mathematical Reviews (MathSciNet) (2016-present)
- Referee for journals including *Illinois J. Math.*, *Annals of Probability*, *Memoirs of the AMS*, *Transactions of the AMS*, *Discrete and Continuous Dynamical Systems*, *PRIMUS* (2007-present)
- Colloquium Organizer, Little School Dynamics online research community (sponsored by American Institute of Mathematics) (2021-2023)
- Grant Review Panelist, National Science Foundation Division of Mathematical Sciences (2023)
- Organizer, Special Session in Cool Research in Dynamical Systems at PUIs, Joint Mathematics Meetings, Boston (2023)
- Organizer, Special Session in Dynamics Research at Primarily Undergraduate Institutions, Joint Mathematics Meetings, online (2022)
- Program Committee, 2017 MAA Michigan Section Meeting (2016-2017)

- Local Organizing Committee, 2017 MAA Michigan Section Meeting (2015-2017)

***Professional Memberships***

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- American Mathematical Society
- Mathematical Association of America
- Pi Mu Epsilon Honorary Mathematics Fraternity
- Sigma Xi Honorary Scientific Research Society