Academics

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

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

· (with A.S.A. Johnson) **Finite odometer factors of rank one group 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. Brigance and M. Dekker) **Transforming tradition: from one instructor to an entire department**, *PRIMUS* **31** (2021) 532-549.

· (with J. Wilson) **Entropy of LEGO® 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

· 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® 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 "Dyamical 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

· **Dylan Solesby**, Ferris State University undergraduate; course title "Topics in Real Analysis" (Spring 2024)

· **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 Awards

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:
· Hatch*Ed* Celebration of Scholarship and Creative Work Awards (2022, 2023)
· 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
· Ferris State University Math and Actuarial Science Club, October 2023
· 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
- 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

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 Liasion, 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:
- Academic Senate Academic Program Review Committee, Ferris State University (2023-present)
- Faculty Sponsor, Gamma Iota Sigma actuarial science, risk management and insurance fraternity, 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
- American Mathematical Society
- Mathematical Association of America
- Pi Mu Epsilon Honorary Mathematics Fraternity
- Sigma Xi Honorary Scientific Research Society