

Joanna Furno

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EDUCATION

University of North Carolina

Doctor of Philosophy, Mathematics

Chapel Hill, NC

May 2013

○ Thesis title: *Ergodic Theory of p -adic Transformations*

○ Thesis advisor: Jane Hawkins

Wisconsin Lutheran College

Bachelor of Science, Mathematics

Milwaukee, WI

May 2008

EMPLOYMENT

University of Houston

Research Associate 1, Lecturer

Houston, TX

2017–present

Indiana University–Purdue University Indianapolis

Postdoctoral Fellow

Indianapolis, IN

2015–2017

Wesleyan University

Visiting Assistant Professor of Mathematics

Middletown, CT

2014–2015

Dickinson College

Visiting Assistant Professor

Carlisle, PA

2013–2014

University of North Carolina

Graduate Assistant

Chapel Hill, NC

2008–2013

PUBLICATIONS

“Natural extensions for p -adic beta shifts and other scaling maps,” submitted.

“Bounded remainder sets for rotations on the adelic torus,” with Alan Haynes and Henna Koivusalo, *Proceedings of the AMS*, accepted. <https://arxiv.org/abs/1803.10559>

“Relating singularly perturbed rational maps to families of entire maps,” with Lorelei Koss, *Carolina Dynamics Proceedings, Contemporary Mathematics*, accepted.

“Rational families converging to a family of exponential maps,” with Jane Hawkins and Lorelei Koss, *Journal of Fractal Geometry*, Vol. 6, Issue 1, 2019, 89–108.

“Everywhere divergence of the one-sided ergodic Hilbert transform for circle rotations by Liouville numbers,” with David Constantine, *New York Journal of Mathematics*, Vol. 23, 2017, 273–294.

“Haar measures and Hausdorff dimensions of p -adic Julia sets,” in *Ergodic Theory, Dynamical Systems, and the Continuing Influence of John C. Oxtoby*, Contemporary Mathematics, Vol. 678, 2016, 187-196.

“Approximations for p -adic transitive isometries.” *Topology Proceedings*, Vol. 46, Oct. 2015, 323-338.

“Singular p -adic transformations for Bernoulli product measures.” *New York Journal of Mathematics*, Vol. 20, 2014, 799-812.

“Orbit equivalence of p -adic transformations and their iterates.” *Monatshefte für Mathematik*, Vol. 175, Issue 2, Oct. 2014, 249-276.

UNDERGRADUATE PUBLICATIONS

Kuehn, Kerry, Jonathan Polfer, Joanna Furno, and Nathan Finke. “Apparatus for real-time acoustic imaging of Rayleigh-Bénard convection.” *Review of Scientific Instruments*, Vol. 78, Issue 11, Nov. 2007.

Furno, Joanna and Kerry Kuehn. “Tidal pattern instabilities on multi-moon planets.” *Icarus*, Vol. 189, Issue 1, Jul. 2007, 246-255.

“Investigations regarding partitions and multipartitions,” with Patrick Waters and advised by Holly Swisher, *Proceedings of the Research Experiences for Undergraduates Program in Mathematics*, Oregon State University, Summer 2007.

AWARDS

- AWM-NSF Mentoring Travel Grant, Summer 2015.
- Graduate Assistance in Areas of National Need Fellowship, Spring 2013.
- Pre-Dissertation Travel Award, Summer 2010.

CLASSES TAUGHT

University of Houston:

- Math 3331 Differential Equations, Spring 2019
- Math 3333 Intermediate Analysis, Fall 2018.
- Math 3338 Probability, Fall 2017, Spring 2018.

Indiana University–Purdue University Indianapolis:

- Math 16500 Analytic Geometry & Calculus, Fall 2015 (2 sections).
- Math 27600 Discrete Mathematics and Its Applications, Spring 2016.
- Math 30000 Logic and the Foundations of Algebra, Fall 2016.
- Math 35100 Linear Algebra, Fall 2016.
- Math 45600 Number Theory, Spring 2017.

Wesleyan University:

- Math 121 Calculus I, Part I, Fall 2014.
- Math 122 Calculus I, Part II, Spring 2015 (2 sections).
- Math 221 Vectors and Matrices, Spring 2015.
- Math 222 Multivariable Calculus, Fall 2014.

Dickinson College:

- Math 121 Elementary Statistics, Fall 2013 (2 sections), Spring 2014 (2 sections).
- Math 171 Multivariable Calculus, Fall 2013.

University of North Carolina at Chapel Hill:

- Math 110 Algebra, Spring 2009.
- Math 118 Selected Topics in Mathematics, Fall 2009, Spring and Summer 2010, Spring and Fall 2012.
- Math 231 Calculus 1, Fall 2010.
- Math 232 Calculus 2, Spring 2011, Fall 2011 (2 sections), and Summer 2012.
- Math 521 Advanced Calculus I, Summer 2013.

CONFERENCE TALKS

- “Relating singularly perturbed rational maps to families of entire maps,” AMS Contributed Paper Session on Dynamical Systems and Ergodic Theory, Joint Mathematics Meeting, Jan. 16-19, 2019.
- “Basics of ergodic theory,” with Alan Haynes, Houston Summer School on Dynamical Systems, May 16-24, 2018.
- “The natural extension for a p -adic beta-shift,” Carolina Dynamics Symposium, Agnes Scott College, Apr. 13-15, 2018.
- “Volumes of bounded remainder sets for rotations on the adelic torus,” Dynamical Systems session of the 52nd Spring Topology and Dynamical Systems Conference, Auburn University, Mar. 14-17, 2018.
- “Seeing repelling dynamics,” AMS Special Session on Ergodic Theory and Dynamical Systems—to Celebrate the Work of Jane Hawkins, Joint Mathematics Meeting, Jan 10-13, 2018.
- “The Denjoy-Koksma lemma and convergence of the one-sided ergodic Hilbert transform,” Geometry, Groups and Dynamics Workshop, University of Illinois, Oct. 7, 2017.
- “Ultrafilter constructions for group topologies,” Session on Shape, Homotopy, and Attractors, Mathematical Congress of the Americas, Jul. 24-28, 2017.
- “Liouville numbers and one-sided ergodic Hilbert transforms,” Topology + Dynamics and Continuum Theory session of the 32nd Summer Conference on Topology and its Applications, University of Dayton, Jun. 27-30, 2017.
- “One-sided ergodic Hilbert transforms for circle rotations by Liouville numbers,” Eastern

- Illinois Integrated Conference in Geometry, Dynamics, and Topology, Eastern Illinois University, Apr. 7-9, 2017.
- “Radon-Nikodym derivatives for rational p -adic translations,” AMS Special Session on Measure and Measurable Dynamics (In Memory of Dorothy Maharam, 1917-2014), Joint Mathematics Meetings, Jan. 4-7, 2017.
- “Rational families converging to an exponential family of maps,” Midwest Dynamical Systems Seminar, Indiana University–Purdue University Indianapolis, Nov. 4-6, 2016.
- “Application of the compactness theorem for subharmonic functions to Brodin’s Theorem,” learning talk for Connections between Complex Dynamics, Statistical Physics, and Limiting Spectra of Self-similar Group Actions, Indiana University–Purdue University Indianapolis, Aug. 15-19, 2016.
- “Cantor sets within Cantor sets: Hausdorff dimensions of p -adic Julia sets,” Fractal Geometry, Dynamical Systems, and Their Applications Special Session, AIMS Conference on Dynamical Systems, Differential Equations and Applications, Jul. 1-5, 2016.
- “Sizes of p -adic Julia sets,” 50th Spring Topology and Dynamical Systems Conference, Baylor University, Mar. 10-13, 2016.
- “Bifurcation loci for quadratic rational maps,” with Daniel Cuzzocreo and Scott Kaschner, Young People Seminar, Dynamical Developments: A Conference in Complex Dynamics and Teichmüller Theory, Jacobs University, Aug. 17-21, 2015.
- “A comparison of Julia sets in two fourth-degree families,” Carolina Dynamics Symposium, Agnes Scott College, Apr. 24-26, 2015.
- “Two fourth-degree families: A comparison of Julia sets,” AMS Special Session on Fractal Geometry and Ergodic Theory, University of Alabama, Mar. 27-29, 2015.
- “A measure-preserving transformation on the p -adic numbers,” AMS Special Session on Topological Measures of Complexity: Inverse Limits, Entropy, and Structure of Attractors, Joint Mathematics Meetings, Jan. 10-13, 2015.
- “Approximations and digraph representations of p -adic transformations,” Special Session on Symbolic Dynamics and Combinatorics on Words, Fall Eastern AMS Sectional Meeting, Dalhousie University, Oct. 18-19, 2014.
- “Haar measures and Hausdorff dimensions of non-Archimedean Julia sets,” Special Session on Fractal Geometry and Ergodic Theory, Southeastern Spring AMS Sectional Meeting, University of Tennessee, Mar. 21-23, 2014.
- “Cutting and stacking in p -adic dynamics,” 48th Spring Topology and Dynamics Conference, University of Richmond, Mar. 13-15, 2014.
- “Haar measures and Hausdorff dimensions of p -adic Julia sets,” AMS Special Session on Complex Dynamics. “Orbit equivalence classes of p -adic transformations,” AMS Special Session on Ergodic Theory and Symbolic Dynamics, Joint Mathematics Meetings, Jan. 15-18, 2014.
- “A transformation preserving Haar measure on the p -adic numbers,” Carolina Dynamics Symposium, University of North Carolina at Chapel Hill, Apr. 12-14, 2013.

- “Haar measures of p -adic Julia sets,” AMS Session on Difference Equations, Dynamical Systems, and Applications, Joint Mathematics Meetings, Jan. 9-12, 2013.
- “Orbit equivalence of p -adic transformations,” RTG Workshop and Lecture Series on Complex and Non-Archimedean Dynamics, University of Michigan, Dec. 7-9, 2012.
- “Measures of p -adic Julia sets,” Carolina Dynamics Symposium, Clemson University, Apr. 13-15 2012.

SEMINAR TALKS

- “Approximation of irrational rotations and Birkhoff sums,” University of Houston, Downtown, Feb. 23, 2018.
- “Measure and Hausdorff dimension for p -adic Julia sets,” Topology/Geometry Seminar, The University of Tennessee, Knoxville, Apr. 28, 2017.
- “Complex dynamics of rational families that converge to an exponential family,” Jacobs University, Feb. 10, 2017.
- “Complex dynamics, parameter spaces, and approximation,” South Dakota State University, Jan. 20, 2017.
- “Rational families converging to a transcendental family,” Complex Analysis, Dynamics and Geometry Seminar, University of Michigan, Oct. 24, 2016.
- “Measuring balls and Julia sets in finite extensions of the p -adic numbers,” DnA (Dynamics and Analysis) Seminar, Wesleyan University, Mar. 29, 2016.
- “Perils and pleasures in p -adic calculus,” Math Lunch Talk, Smith College, Oct. 22, 2015.
- “Singular p -adic transformations,” Mathematics Department Colloquium, University of Massachusetts Lowell, Oct. 20, 2014.
- “Ergodic properties and dynamics of p -adic transformations,” Dynamical Systems Seminar, Northwestern University, Nov. 26, 2013.
- “Orbit equivalence and transformation types,” Ajou University, Aug. 10, 2010.

SERVICE

Community outreach:

- Sonia Kovalevsky Day at UNC Chapel Hill, May 5, 2012 and Apr. 4, 2009.
- UNC Science Expo, Sept. 25, 2010.
- Family Math Day at UNC Chapel Hill, Oct. 17, 2009

Organized writing circles:

- Wesleyan University, Spring 2015.
- Dickinson College, Spring 2014.

Referee:

- American Mathematical Monthly, 2016.
- Applied Mathematics-A Journal of Chinese Universities, 2017.
- Journal of Difference Equations and Applications, 2017.
- Reviewer for Mathematical Reviews, 2015-present.

Member of organizing committee:

- Special Session on Statistical and Geometrical Properties of Dynamical Systems, AMS Western Sectional Meeting, San Francisco State University, Oct. 27-28, 2018.
- Houston Summer School on Dynamical Systems, May 16-24, 2018 and May 2019.
- Fifth Annual Midwest Women in Mathematics, IUPUI, Feb. 25, 2017.
- Midwest Dynamical Systems Seminar, IUPUI, Nov. 4-6, 2016.
- Connections Between Complex Dynamics, Statistical Physics, and Limiting Spectra of Self-similar Group Actions, IUPUI, Aug. 15-19, 2016.
- Dynamics and Analysis Seminar, Wesleyan University, 2014-2015.

Committee:

- Graduate and Professional Student Federation Senator at UNC Chapel Hill, 2011-2012