Mark Comerford

Curriculum Vitae

Citizenship

United States (naturalized), Ireland.

Education

2001 **Ph.D. in Mathematics**, *Yale University*, New Haven, Connecticut.

1994 **M.Sc. in Mathematical Science**, *University College Dublin*, Dublin, Ireland, First Class Honours.

1994 **Erasmus Student Exchange**, *Universität Dortmund*, Dortmund, Germany.

1992 **B.Sc. in Mathematical Physics**, *University College Dublin*, Dublin, Ireland, First Class Honours.

Doctoral Dissertation

Title *Properties of Julia Sets for Arbitrary Sequences of Polynomials with l_∞-Bounded Coefficients*

Supervisor Professor Peter W. Jones

Employment

2012–Present **Associate Professor of Mathematics**, *University of Rhode Island*, Kingston, Rhode Island.

2006–2012 **Assistant Professor of Mathematics**, *University of Rhode Island*, Kingston, Rhode Island.

2003-2006 **Research Instructor**, *International University Bremen*, Bremen, Germany.

2003 **Postdoctoral Researcher**, *Institut Henri Poincaré*, Paris, France.

2002-2003 **Visiting Assistant Professor**, *University of California Riverside*, Riverside, California.

2001 **Postdoctoral Researcher**, *Institut Mittag-Leffler*, Stockholm, Sweden.

Publications

- **Infinitely many grand orbits, a counterexample to Sullivan's non-wandering theorem for random iteration**, *Michigan Math. Journal*, 51 no 1, 47-57, 2003.

- **Conjugacy and counterexample in random iteration**, *Pacific Journal of Mathematics*, 211 no 1, 69-80, 2003.

- **A survey of results in random iteration**, *Proceedings of Symposia in Pure Mathematics*, American Mathematical Society, 2004.

- **Hyperbolic non-autonomous Julia sets**, *Ergodic Theory and Dynamical Systems*, 26, 353-377, 2006.

- **Holomorphic motions of hyperbolic non-autonomous Julia sets**, *Complex Variables and Elliptic Equations*, 53 no 1, 1-22, 2008.

- **Non-autonomous Julia sets with escaping critical points**, *Journal of Difference Equations and Applications*, 17, no. 12, 1813-1826, 2011.
  DOI: 10.1080/10236198.2010.491514

- **Short separating geodesics for multiply connected domains**, *Central European Journal of Mathematics*, 9(5), 984-996, 2012, **DOI:** 10.2478/s11533-011-0065-4.

- **A straightening theorem for non-autonomous iteration**, *Communications on Applied Nonlinear Analysis*, 19(2), 2012.

- **Preservation of External Rays in non-Autonomous Iteration**, with Todd Woodard, *Journal of Difference Equations and Applications*, 19(4), 585-604, 2013.
  DOI: 10.1080/10236198.2012.662966

- **The Carathéodory topology for multiply connected domains I**, *Central European Journal of Mathematics*, 11(2), 322-340, 2013.
  DOI: 10.2478/s11533-012-0136-1

- **Non-autonomous Julia sets with measurable invariant line fields**, *Discrete and Continuous Dynamical Systems*, 33(2), 629-642, 2013.
  DOI: 10.3934/dcds.2013.33.629

- **The Carathéodory topology for multiply connected domains II**, *Central European Journal of Mathematics*, 33(2), 721-741, 2013.
  DOI: 10.2478/s11533-012-0136-1

- **Orbit Portraits in Non-autonomous Iteration**, with Todd Woodard, *Discrete and Continuous Dynamical Systems*, 12(8), 2253-2277, 2019.
  DOI: 10.3934/dcdss.2019144

- **Hereditarily non Uniformly Perfect non-Autonomous Julia Sets**, with Rich Stankewitz and Hiroki Sumi, *Discrete and Continuous Dynamical Systems*, 40(1), 33-46, 2020, **DOI:**10.3934/dcds.2020002.

- **Uniformly Perfect and Hereditarily non Uniformly Perfect Analytic and Conformal non-Autonomous Attractor Sets**, with Kurt Falk, Rich Stankewitz and Hiroki Sumi, *Discrete and Continuous Dynamical Systems*, *to appear*.

- **On Possible Limit Functions on a Fatou Component in non-Autonomous Iteration**, with Christopher Staniszewski, *in submission*.

- **Thick-thin non-Autonomous Julia sets**, with Rich Stankewitz and Hiroki Sumi, *in preparation*.
- **Mandelbrot sets for fixed template iterations**, with Anca Rădulescu and Kieran Cavanagh, *in preparation*.
- **Non-autonomous iteration and entire functions**, with Christopher Staniszewski, *in preparation*.

Awards

1991   Fr. Ciaran Ryan Prize in Mathematical Physics
1991   Fourth Year Scholarship in Mathematical Physics

Fellowships

2001   Post-Doctoral Fellowship at the Institut Mittag-Leffler, Stockholm, Sweden
2003   Post-Doctoral Fellowship at the Institut Henri Poincaré, Paris, France

Research Areas

Non-Autnomous Iteration

The study of properties of Julia sets arising from compositions of arbitrarily chosen polynomials. Analysis of the relationship between dynamics and the geometry of the Fatou set including hyperbolic and semi-hyperbolic behaviour. Counterexamples to well-known theorems from classical complex dynamics such as Sullivan's non-Wandering theorem and the classification of periodic Fatou components. Study of the geometry of certain Julia sets for unbounded sequences which satisfy thinness properties such as being hereditarily non-uniformly perfect. Estimates on the Hausdorff dimension of such examples.

Complex Analysis

Closed hyperbolic geodesics in hyperbolic plane domains, in particular the problem of finding a shortest possible geodesic which separates the complement of the domain in a prescribed way. Using such geodesics to examine the behaviour of finitely connected pointed domains with respect to limits taken in the Carathéodory topology for pointed domains.

Graduate Advising

From 2008 until his graduation in 2012 I served as PhD advisor to Todd Woodard at the Mathematics Department at the University of Rhode Island.

From 2014 until 2018, I served as PhD advisor to Christopher Staniszewski at the Mathematics Department at the University of Rhode Island.

Presentations

- July 2022, AIMS Conference, Rome, Italy, *invited talk (postponed from June 2020 in Atlanta, Georgia due to COVID-19)*

- July 2019, Research on the Theory of Random Dynamical Systems and Fractal Geometry, Kyoto University, Kyoto, Japan, *invited talk*

- October 2018, Northeastern Analysis Meeting, New Paltz, New York, *invited talk*
- July 2018, AIMS Conference, Taipei, Taiwan, *invited talk*
- May 2018, State University of New York at New Paltz, New Paltz, New York, *invited talk*
- September 2017, AMS Regional Meeting, Denton Texas, *invited talk*
- November 2016, State University of New York at New Paltz, New Paltz, New York, *invited talk*
- October 2016, Workshop on Holomorphic Dynamics, Geometry of Julia Sets in One or More Complex Variables, Søminestationen in Holbæk, University of Roskilde, Denmark, *invited talk*
- September 2016, Université de Strasbourg, Strasbourg, France, *invited talk*
- September 2016, Université Paul Sabatier, Toulouse, France, *invited talk*
- August 2016, European Conference on Iteration Theory 2016, Innsbruck, Austria, *invited talk*
- July 2016, AIMS Conference, Orlando, Florida, *invited talk*
- April 2015, State University of New York at Stony Brook, Stony Brook, New York, *invited talk*
- August 2013, Progress on Difference Equations 2013, Białystok, Poland
- April 2013, AMS Central Sectional Meeting, Ames, Iowa, *invited talk*
- May 2012, Progress on Difference Equations 2012, Richmond, Virginia
- June 2011, University College Dublin, Dublin, Ireland
- May 2011, Progress on Difference Equations 2011, Dublin, Ireland
- April 2011, AMS Regional Meeting, Worcester, Massachusetts
- March 2009, Université Laval, Quebec City, Canada
- July 2005, University College Dublin, Dublin, Ireland
- November 2004, Christian-Albrechts Universität Kiel, Kiel, Germany
- September 2003, Institut Henri Poincaré, Paris, France
- July 2003, University of Warwick, Coventry, England
- November 2002, L.A. Dynamics seminar, University of Southern California, Los Angeles, California
- October 2002, University of California Riverside, Riverside, California
- February 2002, University of California Riverside, Riverside, California
- February 2002, Claremont Mc Kenna College, Ontario, California
- December 2001, Universitet Uppsala, Uppsala, Sweden
- November 2001, Universität Dortmund, Dortmund Germany
- October 2001, Institut Mittag-Leffler, Stockholm, Sweden
- June 2000, Ph.D. Euroconference on Complex Dynamics and Complex Analysis, Barcelona
- June 1999, Euro99, Maynooth, Ireland

Reviewing

- 2018, Journal of Complex Networks
- 2017, Chaos
- 2016, Discrete and Continuous Dynamical Systems
- 2016, RACSAM - Revista de la Real Academia de Ciencias Exactas, Físcas y Naturales. Serie A. Matemáticas
- 2012, Central European Journal of Mathematics
- 2007, Ergodic Theory and Dynamical Systems
- 2006, Applied Mathematics Letters

Languages

- English, Mothertongue
- German, Fluent
- French, Fluent
- Italian
- Swedish
- Gaelic

Computer Languages

- C
- Java
- Mathematica
- Maple
- HTML