Scott R. Kaschner

Contact Information

Department of Mathematics
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Education

Indiana University Purdue University Indianapolis, Indianapolis, IN USA

Ph.D., Mathematics, May 2013

- Thesis Topic: *Super-stable Manifolds in Rational Mappings of* $\mathbb{CP}^n$
- Adviser: Professor Roland Roeder

The University of Akron, Akron, OH USA

M.S., Theoretical Mathematics, May 2008

- Thesis Topic: *Bifurcation with a Two-Dimensional Kernel*
- Adviser: Professor J. Pat Wilber

B.S., Theoretical Mathematics, May 2003

- Minor in Psychology

Academic Appointments

The University of Arizona, Tucson, AZ USA

Teaching Postdoc, Department of Mathematics **August 2013 to present**

Publications

Kaschner, S.R., and Roeder, R. *Superstable manifolds of invariant circles and co-dimension 1 Bottcher functions. Ergodic Theory and Dynamical Systems.* September 2013.

Submitted for Publication

Kaschner, S.R., Perez, R.A., and Roeder, R. *Rational Maps of* $\mathbb{CP}^2$ *with No Invariant Foliation. International Mathematics Research Notices.* Submitted August 2013.

Conference Presentation/ Organization

Spheres, Planes, and Topography Pains
Mathematics Educator's Appreciation Day Conference, Tucson, AZ January 25, 2014.

Organizer, Special Session on Complex Dynamics
2014 Joint Mathematics Meeting, Baltimore, Maryland January 15–18, 2014.

Rational Map of $\mathbb{CP}^2$ with No Invariant Foliation
Midwest Dynamical Systems Conference, Poster Session, Champaign/Urbana, IL November 1–3, 2013.

Regularity of Superstable Manifolds
The 47th Spring Topology and Dynamics Conference, New Britain, Connecticut March 23–25, 2013.

Regularity of Superstable Manifolds
2013 Joint Mathematics Meeting, San Diego, California January 9–12, 2013.

Dynamical Systems in the 6th Grade Science Classroom
2013 Joint Mathematics Meeting, San Diego, California January 9–12, 2013.

Superstable Manifolds of Invariant Circles
Midwest Dynamical Systems Conference, Poster Session, South Bend, IN October 26–28, 2012.

The Logistic Map and Chaos
MAA Mathfest, Madison, WI August 1–4, 2012.

Non-analyticity of the Low Temp. Stable Manifold for the Migdal-Kadanoff Renormalization
Interactions Between Continuous and Discrete Holomorphic Dynamical Systems, Banff International Research Station, Alberta, Canada July 9–13, 2012.

Non-analyticity of the Low Temp. Stable Manifold for the Migdal-Kadanoff Renormalization
Workshop in Holomorphic Dynamics, Roskilde, Denmark October 1–3, 2011.

The Mandelbrot Set and Connectivity
MAA Mathfest, Lexington, KY September 12–15, 2011.

Teaching Experience

University of Arizona, Tucson, AZ USA

Teaching Postdoc **August 2013 to present**

- Math 215: Introduction to Linear Algebra
- Math 355: Analysis of Ordinary Differential Equations
- Math 120R: Calculus Preparation
- Math 122B: First Semester Calculus
- Math 196L: Supplemental Instruction for Precalculus

Crispus Attucks Medical Magnet High School, Indianapolis, IN USA

GK-12 Fellow **January 2013 to June 2013**

- GK-12 NSF Program
  - Worked with teacher in two AP Calculus courses

Westlane Middle School, Indianapolis, IN USA

GK-12 Fellow **August 2012 to January 2013**

- GK-12 NSF Program
  - Worked with teacher in five sections of 6th grade general science
  - Incorporated dynamical systems research into curriculum while meeting state standards for 6^{th} grade science
  - Facilitate focus on relationship between math and other STEM fields

Indiana University Purdue University Indianapolis, Indianapolis, IN USA

Instructor **September 2009 to August 2013**

- Math 231: Calculus for Life Sciences, Summer 2011
- Math M118: Finite Mathematics, Spring 2011 and Spring 2010
- Math M119: Calculus with Business Application, Fall 2010
- Math 171: Multidimensional Mathematics, Summer 2010, Summer 2013

Grader **September 2009 to August 2010**

- Math 533 Abstract Algebra.
  - Graded tests and weekly homework assignments, and wrote solution keys
  - Provided extensive feedback and proof-writing suggestions
- Math 534 Linear Algebra.
- Math 511 Linear Algebra.

University of Akron, Akron, OH USA

Instructor **September 2007 to May 2008**

- College Algebra, Fall 2007
- Intermediate Algebra, Spring 2008

Seminar Presentations

The University of Arizona

Analysis, Application, and Dynamics Seminar

- Examples of Rational Maps of $\mathbb{CP}^2$ with Equal Degrees and No Invariant Foliation, 2/4/14

Undergraduate Brown Bag Seminar

- Crash Course in Dynamics of One Complex Variable, 9/26/13

MSDWT Allisonville Elementary School

- Research Mathematics, Graduate School, and Dynamical Systems, 3/15/13

Butler University

- Co-dimension 1 Böttcher Functions, 2/27/13, 3/6/13, 3/27/13

University of Illinois at Chicago

- Superstable Manifolds of Invariant Circles, 4/1/13

Syracuse University

- Non-analytic Superstable Manifolds of Invariant Circles, 11/2/12

University of Illinois at Urbana-Champaign

- Super-stable Manifolds of Invariant Circles, 10/15/12

Indiana University Purdue University Indianapolis

Graduate Seminar

- The Mandelbrot Set and Local Connectivity, 9/2/11
- Green Function and Fatou Set in $\mathbb{CP}^k$, 2/11/11
- Poincare Duality, Homology, and Cohomology, 10/15/10
- Ruled Surfaces, 2/19/10
- The Bolyai-Gerwien Theorem, 10/30/09
- Cauchy's Theorem for Convex Polyhedra, 4/10/09

Dynamical Systems Seminar

- Non-analytic Superstable Manifolds of Invariant Circles, 9/14/12, 10/12/12
- Analytic Superstable Manifolds of Invariant Circles, 8/31/12, 9/7/12
- Non-analyticity of Stable Manifolds for Lee Yang Maps, 9/12/11
- The Böttcher Function for Migdall-Kadanoff Renormalization, 9/5/11
- Regularity of Stable Manifolds for Polynomial Maps of $\mathbb{C}^2$, 5/5/11

Math and Teaching Seminar

- Discussion of Lockhart's Lament, 4/26/11

Awards

National Science Foundation

- GK-12 Fellowship, 2012–2013

U.S. Department of Education

- GAANN Fellowship, 2009–2012

Indiana University Purdue University Indianapolis

- Purdue School of Science Fellowship, 2008–2009
- Student Athlete Award, 2009 and 2011

Professional Experience/ Departmental Service

IUPUI School of Science Graduate Student Council, Indianapolis, IN USA

Council President **August 2012 to Present**

- Led and organized council as representatives to the university at large of the School of Science's graduate students.

Mathematics Department Representative **August 2010 to August 2012**

- Represent interests of graduate students in mathematics
- Advertise, process applications for, and award council-sponsored travel grants
- Write grants to fund graduate-related projects

Math Assistance Center, Indianapolis, IN USA

Peer Tutor **August 2009 to January 2010**

Northeast Ohio Center for Excellence in Mathematics and Science Teacher Education, Akron, OH USA

Graduate Assistant **August 2006 to August 2007**

- Assisted director in operation of the center
- Assisted in writing grant that funded the Summer STEM Academy in 2007
- Assisted in organizing and operating Summer STEM Academy
- Designed and maintained NEOCEx website.

Professional Organization Membership

American Mathematical Society: Member since 2008

Mathematical Association of America: Member since 2011

Pi Mu Epsilon: Member since 2007

Training and Professional Development

Research Workshops:

- American Institute of Mathematics Workshop on Postcritically Finite Maps in Complex and Arithmetic Dynamics, Palo Alto, CA, March 2014
- AMS Mathematics Research Community, Complex Dynamics Snowbird, UT, June 2013
- Advanced School and Workshop in Real and Complex Dynamics Abdus Salam International Centre for Theoretical Physics, Triest, Italy, June 2013
- Workshop on Holomorphic Dynamics Featuring Several Complex Variables Roskilde, Denmark, October 2011

Teaching Seminars:

- University of Arizona Mathematics Instruction Colloquium
- IUPUI Math and Teaching Seminar, Spring of 2010 and 2011

Instructor Training:

- IRB Training by the Collaborative Institutional Training Initiative, Fall of 2012
- IUPUI TA Instruction, Fall of 2009 and 2010
- University of Akron TA Instruction, Fall and Summer of 2006

References Available to Contact

Dr. Roland Roeder (e-mail: rroeder@math.iupui.edu; phone: 317-274-6924)

- Assistant Professor, Department of Mathematical Sciences, IUPUI
  402 N. Blackford St., LD 224Q Indianapolis, IN 46202-3267

⋆ *Dr. Roeder was my Ph.D. graduate adviser.*

Dr. Carl Cowen (e-mail: ccowen@math.iupui.edu; phone: 317-278-8846)

- Professor, Department of Mathematical Sciences, IUPUI
  402 N. Blackford St., LD 224P Indianapolis, IN 46202-3267

⋆ *Dr. Cowen led a teaching seminar I regularly attended*

Dr. Kathleen Marrs (e-mail: kmarrs@iupui.edu; phone: 317-278-4551)

- Associate Professor Department of Biology, IUPUI
- Associate Dean for Academic Affairs
- Director, Interdisciplinary Studies Program
- Director, Urban Cener for the Advancement of STEM Education (UCASE)
  402 N. Blackford St., SL 330 Indianapolis, IN 46202-3267

⋆ *Dr. Marrs, the PI for the GK-12 program, had a profound impact on my teaching.*

Dr. Pavel Bleher (e-mail: pbleher@math.iupui.edu; phone: 317-274-6925)

- Chancellor's Professor, Department of Mathematical Sciences, IUPUI
  402 N. Blackford St., LD 224M Indianapolis, IN 46202-3267

⋆ *Dr. Bleher is a member of my doctoral committee and has been a valuable interdisciplinary resource for me.*

Dr. Michal Misiurewicz (e-mail: mmisiurewicz@math.iupui.edu; phone: 317-274-8101)

- Professor, Department of Mathematical Sciences, IUPUI
  402 N. Blackford St., LD 224F Indianapolis, IN 46202-3267

⋆ *Dr. Misiurewicz is a member of my doctoral committee and has taught me a great deal about complex analysis and dynamical systems.*

Dr. J. Pat Wilber (e-mail: jw50@uakron.edu; phone: 330-972-6994)

- Associate Professor, Department of Mathematics, The University of Akron
  Department of Theoretical and Applied Mathematics, The University of Akron, Akron, Ohio 44325-4002

⋆ *Dr. Wilber was my Master's graduate advisor.*