

Sarah C. Koch

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Employment

University of Michigan	Associate Professor	2016 – present
University of Michigan	Assistant Professor	2013 – 2016
Harvard University	Benjamin Peirce Assistant Professor	2010 – 2013
Harvard University	NSF Mathematical Sciences Research Postdoctoral Fellow	2009 – 2011
University of Warwick	NSF Mathematical Sciences Research Postdoctoral Fellow	2008 – 2009

Education

PhD	Cornell University, Mathematics Advisor: John H. Hubbard	2002 – 2008
PhD	Université de Provence, Mathematics Advisor: John H. Hubbard	2006 – 2007
MS	Cornell University, Mathematics	2002 – 2005
BS	Rensselaer Polytechnic Institute, Mathematics graduated summa cum laude	1997 – 2001

Research Interests

Complex dynamics (in one and several variables), Teichmüller theory

Papers

- * *On a theorem of Arfeux and Kiwi*
with X. Buff, J. H. Hubbard
In preparation, 2018.
- * *Braiding Cantor Julia sets and the topology of the shift locus*
with J. Bavard, D. Calegari, Y. M. He, A. Walker
In preparation, 2018.
- * *Irreducibility and postcritically finite unicritical polynomials*
with X. Buff and A. Epstein
Preprint, 2018.
- * *On the postcritical set of a rational map*
with L. DeMarco, C. McMullen
Submitted, 2017.
- * *Eigenvalues of the Thurston operator*
with X. Buff, A. Epstein
Submitted, 2017.
- * *On balanced planar graphs, following W. Thurston*
with Tan Lei
Submitted to the Thurston Memorial Conference Proceedings, 2015.
- * *Origami, affine maps, and complex dynamics*
with W. Floyd, G. Kelsey, R. Lodge, W. Parry, K. Pilgrim, E. Saenz
Arnold Mathematical Journal, Vol. 3, 2017.
- * *A disconnected deformation space of rational maps*
with E. Hironaka
Journal of Modern Dynamics, Vol. 11, 2017.

- * *Roots, Schottky Semigroups, and a proof of Bandt's conjecture*
with D. Calegari, A. Walker
Ergodic Theory Dynamical Systems, Vol. 37, 2017.
- * *Computing dynamical degrees of rational maps on moduli space*
with R. Roeder
Ergodic Theory and Dynamical Systems, Vol. 36, 2016.
- * *Pullback invariants of Thurston maps*
with K. Pilgrim, N. Selinger
Transactions of the American Mathematical Society, 368, No. 7, 2016.
- * *An analytic construction of the Deligne-Mumford compactification of the moduli space of curves*
with J. H. Hubbard
Journal of Differential Geometry, Vol. 98 No. 2, 2014.
- * *Teichmüller theory and critically finite endomorphisms*
Advances in Mathematics, Vol. 248, 2013.
- * *Böttcher coordinates*
with X. Buff, A. Epstein
Indiana University Mathematics Journal, Vol. 61 No. 5, 2012.
- * *Twisted matings and equipotential gluings*
with X. Buff, A. Epstein
Annales de la faculté des sciences de Toulouse, Sér. 6 Vol. 21 No. S5, 2012.
- * *Questions about polynomial matings*
with X. Buff, A. Epstein, D. Meyer, K. Pilgrim, M. Rees, Tan Lei
Annales de la Faculté des Sciences de Toulouse, Sér. 6 Vol. 21 No. S5, 2012.
- * *On a theorem of Kas and Schlessinger*
with O. Antolín-Camarena
Quasiconformal Mappings, Riemann Surfaces, and Teichmüller Spaces.
Contemporary Mathematics, 575. American Mathematical Society, 2012.
- * *Iterated monodromy of a two-dimensional map* with J. Belk
In the tradition of Ahlfors-Bers V.
Contemporary Mathematics, 510. American Mathematical Society, 2010.
- * *SaddleDrop: a tool for studying dynamics in \mathbb{C}^2*
Ramanujan Mathematical Society, Lecture Notes Series, Vol. 10, 2010.
- * *On Thurston's Pullback Map*
with X. Buff, A. Epstein, K. Pilgrim
Complex Dynamics, Families and Friends, AK Peters, 2009.

Awards and Honors

- * *AMS-MAA Invited Address*, Joint Mathematics Meetings, Baltimore, Maryland, January 2019
- * *Associate Professor Support Fund*, 2018–2020, awarded by the College of Literature, Science, and the Arts at the University of Michigan, Spring 2018
- * *AWM Mentorship and Advocacy Award*, awarded by the American Women in Mathematics Graduate Student Chapter, University of Michigan, Spring 2018
- * *Class of 1923 Memorial Teaching Award*, 2016
- * *National Science Foundation CAREER Grant DMS-1452392*, 2015–2020
- * *National Science Foundation Conference Grant DMS-1500750*, for *Dynamical developments: a conference in complex dynamics and Teichmüller theory*, Jacobs University, Aug 17–21, 2015
- * *National Science Foundation Research Grant DMS-1422335*, 2013–2016, extended until 2017
- * *Sloan Research Fellowship*, 2013–2015, extended until 2017
- * *American Institute of Mathematics SQuaRE participant*; Summer 2013–Summer 2015
- * *American Mathematical Society Travel Grant*, Spring 2013
- * *Harvard University Certificate of Teaching Excellence*, 2012, 2013
- * *National Science Foundation Mathematical Sciences Research Postdoctoral Fellowship*, 2008–2011
- * *Top three finalist, American Institute of Mathematics Five-year Fellowship*, 2008

- * *Robert John Battig Prize in Mathematics*, 2006
Awarded by the Cornell Mathematics Department for excellence in research.
- * *National Physical Science Consortium Graduate Research Fellowship*, 2001–2007
- * *Bell Labs Graduate Research Fellowship*, 2001–2005
Award was declined.
- * *National Science Foundation Graduate Research Fellowship*, 2001–2004
Award was declined.

Invited Conference Lectures since 2013

- * *AMS-MAA Invited Address*, Joint Mathematics Meetings, Baltimore, Maryland, January 2019
- * *Complex Dynamics Workshop*, Université Paul Sabatier, Toulouse, France, May 2018.
- * *Arithmetic Dynamics Special Session*, AMS Meeting; Northeastern University, Boston, Massachusetts, April 2018.
- * *Keynote Speaker: 2017 Midwestern Workshop on Asymptotic Analysis*, Indiana University Purdue University Indianapolis; Indianapolis, Indiana, October 2017.
- * *13th William Rowan Hamilton Geometry and Topology Workshop*, Hamilton Mathematics Institute, Dublin, Ireland, August 2017.
- * *Arithmetic Dynamics Special Session*, Mathematical Congress of the Americas; Montreal, Canada, July 2017.
- * *Algebraic Dynamics*, Rennes, France, June 2017.
- * *Carolina Dynamics Symposium*, University of North Carolina; Charlotte, North Carolina, April 2017.
- * *AMS Invited Lecture*, AMS Meeting, Indiana University; Bloomington, Indiana, April 2017.
- * *Celebrating 100 years of the Benjamin Peirce Program*, Harvard University; Cambridge, Massachusetts, June 2016.
- * *Mexican-American Workshop in Holomorphic Dynamics*, Cancun, Mexico, June 2016.
- * *Fractal Geometry, Hyperbolic Dynamics and Thermodynamical Formalism*, ICERM; Providence, Rhode Island, March 2016.
- * *Arithmetic Dynamics*, AMS Special Session, Joint Meetings of the AMS and the MAA; Seattle, Washington, Jan 2016.
- * *Wasatch topology conference*, University of Utah; Salt Lake City, Utah, Dec 2015.
- * *Midwest Topology Seminar*, University of Chicago; Chicago, Illinois, May 2015.
- * *13th Annual Bloomington Geometry Workshop*, Indiana University; Bloomington, Indiana, April 2015.
- * *Ahlfors-Bers Colloquium VI*, Plenary Lecture, Yale University; New Haven, Connecticut, Oct 2014.
- * *Holomorphic Dynamics in One and Several Variables*, Kolon Hotel; Gyeongju, Korea, Aug 2014.
- * *Dynamics and Moduli Spaces*, senior lecture, GEAR Junior Retreat, University of Michigan; Ann Arbor, Michigan, May 2014.
- * *Sixth Iberoamerican Congress on Geometry*, Plenary Lecture, CUNY; New York, New York, May 2014.
- * *Complex Dynamics*, AMS Special Session, Joint Meetings of the AMS and the MAA; Baltimore, Maryland, Jan 2014.
- * *Mathematical Congress of the Americas*, Guanajuato, Mexico, August 2013.
- * *Complex Dynamics and Arithmetic Geometry Conference*, University of Illinois at Chicago; Chicago, Illinois, June 2013.

Colloquium and Seminar Lectures since 2013

- Department Colloquium*, University of Washington, Seattle, Washington, October 2018.
- Department Colloquium*, Georgia Tech, Atlanta, Georgia, June 2018.
- Department Colloquium*, University of Michigan-Dearborn, Dearborn, Michigan, March 2018.
- Dynamics Seminar*, University of Toronto, Toronto, Ontario, February 2018.
- Freedman Colloquium*, Boston University, Boston, Massachusetts, March 2017.
- Department Colloquium*, Brown University, Providence, Rhode Island, March 2017.
- Geometric Topology Seminar*, Columbia University, New York, New York, April 2016.
- Department Colloquium*, Florida State University, Tallahassee, Florida, Nov 2015.
- Topology Seminar*, Florida State University, Tallahassee, Florida, Nov 2015.

Geometry Seminar, Brown University, Providence, Rhode Island, April 2015.
Geometric Group Theory Seminar, Tufts University, Medford, Massachusetts, April 2015.
Department Colloquium, University of Notre Dame, South Bend, Indiana, March 2015.
Department Colloquium, University of Tennessee, Knoxville, Tennessee, Jan 2015.
Dynamics Seminar, Northwestern University; Chicago, Illinois, Nov 2014.
Dynamics Seminar, Cornell University; Ithaca, New York, Sept 2014.
Special Lecture, ICERM, Providence, Rhode Island, July 2014.
Dynamics Seminar, University of Chicago; Chicago, Illinois, June 2014.
Dynamics Seminar, Boston University; Boston, Massachusetts, April 2014.
SUMS Colloquium, Brown University; Providence, Rhode Island, April 2014.
MASS Colloquium, Penn State University; State College, Pennsylvania, Nov 2013.
Dynamics and Geometry Seminar, Penn State University; State College, Pennsylvania, Nov 2013.
Dynamics Seminar, SUNY Stony Brook; Stony Brook, New York, Oct 2013.
Complex Analysis Seminar, CUNY; New York, New York, Oct 2013.
Dynamics Seminar, Cornell University; Ithaca, New York, Oct 2013.
Complex Analysis and Dynamics Seminar, University of Michigan; Ann Arbor, Michigan, Sept 2013.
Department Colloquium, Rensselaer Polytechnic Institute; Troy, New York, April 2013.
Dynamics Seminar, SUNY Stony Brook; Stony Brook, New York, April 2013.
Department Colloquium, University of Southern California; Los Angeles, California, March 2013.
Special Dynamics and Geometry Seminar, Harvard University; Cambridge, Massachusetts, March 2013.
Department Colloquium, Rutgers University; Newark, New Jersey, Feb 2013.
Department Colloquium, University of Michigan; Ann Arbor, Michigan, Jan 2013.
Department Colloquium, Williams College; Williamstown, Massachusetts, Jan 2013.
Department Colloquium, Indiana University; Bloomington, Indiana, Jan 2013.
Department Colloquium, Ohio State University; Columbus, Ohio, Jan 2013.

Mathematical Outreach and Education Presentations since 2013

- * *Keynote Speaker*; Topology Students Workshop; Georgia Institute of Technology, Atlanta, Georgia, June 2018.
- * *Invited Speaker*; AMS Graduate Student Chapter; Central Michigan University, Mount Pleasant, Michigan, November 2017.
- * *Invited Speaker and Panelist*; Graduate Research Opportunities for Women (GROW); Northwestern University, Evanston, Illinois, October 2017.
- * *Plenary speaker*; Young Mathematicians Conference; Ohio State University, Columbus, Ohio, August 2017.
- * *Invited speaker*; invited to speak in the Guest Lecture Series at Eastern Michigan University; Ypsilanti, Michigan, November 2016.
- * *UMS at UIC Plenary Speaker*; invited to speak at the Undergraduate Mathematics Symposium at University of Illinois at Chicago, Chicago, Illinois, October 2016.
- * *Keynote Speaker*, Capstone Event, March 2016. Invited to deliver the keynote address at the Science Capstone which invites hundreds of girls in grades 4-6 to the University of Michigan to participate in science activities. This is run by the FEMMES Organization at the University of Michigan.
- * *Invited speaker*; European Campus of Excellence Program for undergraduate students; Jacobs University, Bremen, Germany, July 2015.
- * *MathByte speaker*; invited to record short math clip for the ICERM webpage, ICERM, Providence, Rhode Island, April 2015.
- * *Main speaker* at *Who Wants to be a Mathematician?* An event for high school students, University of Michigan, Ann Arbor, Michigan, March 2015.
- * *Junior Colloquium Speaker*; talk for undergraduates, University of Tennessee, Knoxville, Tennessee, Jan 2015.
- * *Invited speaker*; invited to give a special lecture to the REU students at ICERM, Providence, Rhode Island, July 2014.

- * *SUMS Colloquium Speaker*; invited to speak at the SUMS Program, at Brown University, Providence, Rhode Island, April 2014.
- * *MASS Colloquium Speaker*; invited to speak at the MASS Program, at Penn State University, State College, Pennsylvania, November 2013.
- * *Instructor: Research Experience for Undergraduates*; invited to teach a minicourse in Complex Dynamics at ICERM, Providence, Rhode Island, July 2012 and July 2013.

Teaching Experience

- * *Instructor; University of Michigan, Fall 2018*
Math 295, Honors Mathematics I
- * *Instructor; University of Michigan, Winter 2018*
Math 636, The topology and dynamics of rational maps
- * *Instructor; University of Michigan, Winter 2016, Winter 2019*
Math 296, Honors Mathematics II
- * *Instructor; University of Michigan, Fall 2015*
Math 591, General and Differential Topology
- * *Instructor; University of Michigan, Fall 2014, Fall 2017, Fall 2018*
Math 312, Applied Modern Algebra
- * *Instructor; University of Michigan, Winter 2014*
Math 636, Riemann Surfaces and Complex Dynamics
- * *Instructor; University of Michigan, Fall 2013, Fall 2014, Fall 2017*
Math 490, Introduction to Topology
- * *Instructor; Harvard University, Fall 2012 & Spring 2013*
Math 23a & Math 23b, Linear Algebra and Real Analysis
- * *Instructor; Harvard University, Fall 2011 & Spring 2012*
Math 25a & Math 25b, Honors Linear Algebra and Real Analysis
- * *Instructor; Harvard University, Spring 2011*
Math 296, Complex Dynamics and Fractal Groups
- * *Instructor; Harvard University, Fall 2010*
Math 130, Classical Geometries
- * *Instructor; Harvard University, Fall 2009*
Math 121, Linear Algebra and Applications
- * *Instructor; Cornell University, Fall 2007*
Math 111, Calculus I

Conferences Organized

- * Organizer of the *Illustrating dynamics and probability workshop*; Illustrating Mathematics Semester; ICERM, Providence, Rhode Island, Fall 2019.
- * Organizer of the *Graduate Research Opportunities for Women Conference (GROW)*; University of Michigan, Ann Arbor, Michigan, October 2018.
- * Organizer of the *The topology and dynamics of rational maps*, a companion workshop to Math 636; University of Michigan, Ann Arbor, Michigan, April 2018.
- * Organizer of *Rational maps and braids: an informal gathering*; Harvard University, Cambridge, Massachusetts, August 2017.
- * Organizer of the *Small arithmetic dynamics workshop*; University of Michigan, Ann Arbor, Michigan, May 2017.
- * Organizer of the *Mentoring Workshop on Graduate Advising*; University of Michigan, Ann Arbor, Michigan, May 2017.
- * Organizer of the *Discrete Structures in Conformal Dynamics and Geometry Special Session*; Indiana University, Bloomington, Indiana, April 2017.
- * Organizer, *Public Lecture Series*, University of Michigan, Fall 2016–present.
- * Organizer of the *Workshop in Arithmetic Dynamics*; University of Michigan, Ann Arbor, Michigan, December 2015.

- * Organizer of the conference *Dynamical Developments: a conference in Complex Dynamics and Teichmüller theory*; Jacobs University Bremen, Germany, August 2015.
- * Organizer of the *Midwest Dynamical Systems Meeting*, University of Michigan, Ann Arbor, Michigan, November 2014.
- * Organizer of the *Complex Dynamics Special Session*, Sixth Iberoamerican Congress on Geometry, CUNY; New York, New York, May 2014.
- * Organizer of the *Postcritically Finite Rational Maps Workshop*, American Institute of Mathematics, Palo Alto, California, March 2014.
- * Organizer of the *AMS Mathematics Research Community in Complex Dynamics*; Snowbird, Utah, June 2013.
- * Organizer of the very first *PechaKucha: Mathematics 20 × 20*; Harvard University, March 2013.
- * Organizer of the conference *Moduli Spaces Associated to Dynamical Systems*; ICERM, April 2012.
- * Organizer of the conference *Trends in Complex Dynamics*; Clay Math Institute, May 2011.

Service: Mathematics Community

- * *Member, Editorial Board, Journal of Fractal Geometry*, Jan 2018–present.
- * *Chair, AMS Central Section Program Committee*, Feb 2018– Jan 2020.
- * *Member, AMS Committee on Committees*, Feb 2017– Jan 2019.
- * *Reviewer, AMS Simons Travel Grants Committee*, 2015–2018.
- * *National Science Foundation panelist*, Spring 2010, Spring 2011, Spring 2014, Spring 2016, Spring 2018.
- * *Referee* for countably many journals.

Service: University of Michigan

- * *Member; Goldwater Nomination Selection Committee*, Fall 2016– present.
- * *Member; Math Department Executive Committee*; 2015–2016, 2017–2019.
- * *Member; Launch Committee for new faculty*; 2018–2019.
- * *Member; REU Committee*; 2017–2018.
- * *Faculty Advisor* to the student-run organization FEMMES: Females Excelling More in Math, Engineering, and the Sciences, Winter 2016–present.
- * *Faculty Mentor* for LoG(M); together with J. Powell, mentored three undergraduates in the semester-long project *Exploring the Combinatorics of the Mandelbrot set*; University of Michigan, Fall 2017.
- * *Faculty Advisor* for the Undergraduate Math Club, 2013–2014, Fall 2016.

Math Circles: University of Michigan

- * *Activity leader* for Wayne County Math Teachers' Circle; met with local math teachers to work on collaborative problem solving and discuss teaching and learning, Fall 2016, Winter 2018.
- * *Wolverine Pathways Activity Leader*; regularly running math circle sessions on Saturdays for middle school and high school students, Fall 2016, Fall 2017.
- * *Activity leader* for Michigan Math Circle; Winter 2016, Winter 2018, Fall 2018.
- * *Michigan Math Circle Organizer*; organizing weekly math circles for high school and middle school students, Winter 2016.

Postdocs mentored

Matthieu Astorg, University of Michigan, 2015–2016
Jonguk Yang, University of Michigan, 2018–2019
Becca Winarski, University of Michigan, 2018–2021

Graduate students mentored

Rohini Ramadas, co-advised with D. Speyer; (Sumner B. Myers Prize winner),
University of Michigan, PhD 2017.
Jasmine Powell, University of Michigan

Yonatan Shelah, University of Michigan
Alex Kapiamba, University of Michigan

Graduate PhD thesis committees

Samantha Pinella, University of Michigan
Robert Walker, University of Michigan
Gene Kopp, University of Michigan, PhD 2017
David Renardy, University of Michigan, PhD 2016
Brandon Seward, University of Michigan, PhD 2015
Holly Krieger, University of Illinois at Chicago, PhD 2013
Paul Reschke, University of Illinois at Chicago, PhD 2013
Giulio Tiozzo, Harvard University, PhD 2013

Undergraduate theses advised

Benjamin Dozier, Harvard University, 2011–2012
Adrian Sanborn; (Hoopes Prize winner), Harvard University, 2010–2011
Harrison Pugh, Harvard University, 2009–2010