

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Literature, Science, and the Arts

Sarah C. Koch, associate professor of mathematics, with tenure, College of Literature Science, and the Arts, is recommended for promotion to professor of mathematics, with tenure, College of Literature, Science, and the Arts.

Academic Degrees:

Ph.D.	2008	Cornell University
Ph.D.	2007	Université de Provence
M.S.	2005	Cornell University
B.S.	2001	Rensselaer Polytechnic Institute

Professional Record:

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

Summary of Evaluation:

Teaching: Since her last promotion in 2016, Professor Koch has taught a wide variety of courses, ranging from the first-year honors mathematics sequence to an advanced graduate course on dynamics of rational maps. She is an extremely dedicated, talented teacher, and her teaching evaluations have been outstanding. In particular, on the “excellent instructor” question, her median ratings range from 4.89 to a perfect 5, and a majority of her classes gave her a 5. Professor Koch is currently mentoring two postdocs and advising three Ph.D. students and a master’s student. Previously, she co-advised another Ph.D. student and a post-doctoral scholar. She also mentored three undergraduate students in a research project. She serves as an unofficial mentor to many other students.

Research: Professor Koch has established a reputation as a leading international researcher in complex and algebraic dynamics, with additional significant contributions to Teichmüller theory and geometric group theory. Her work is viewed as highly creative and incorporates a wide spectrum of tools from various areas of mathematics to obtain often surprising answers to fundamental questions. Her accomplishments have been recognized through a number of awards, including a Sloan Research Fellowship and a National Science Foundation CAREER award. She is highly regarded in her field and very frequently invited to give prestigious talks.

Recent and Significant Publications:

DeMarco, L. Koch, S., and McMullen, C. (2020). On the postcritical set of a rational map. *Mathematische Annalen*, 377 (1-2). doi.org/10.1007/s00208-018-1732-6.

Floyd, W., Kelsey, G., Koch, S., Lodge, R., Parry, W., Pilgrim, K., Saenz, E. (2017). Origami, affine maps, and complex dynamics. *Arnold Mathematical Journal*, 3, 365-395.

Hironaka, E. and Koch, S. (2017). A disconnected deformation space of rational maps. *Journal of Modern Dynamics*, 11, 409-423.

Calegari, D., Koch, S., and Walker, A. (2017). Roots, Schottky semigroups, and a proof of Bandt's conjecture. *Ergodic Theory Dynamical Systems*, 37. [dx.doi.org/10.1017/etds.2016.17](https://doi.org/10.1017/etds.2016.17).

Service: Professor Koch does an extraordinary amount of educational outreach and has become widely recognized as an expert in that area. She started the Ypsilanti Math Corps at UM to work with middle-and high-school children. She has worked with the Michigan Math Circle, the Wayne County Math Teachers' Circle, and Wolverine Pathways, among other programs. For this and other work, she was honored by the university with a Harold R. Johnson Diversity Service Award. She was also named a 2019 Faculty SOS Fellow. She has fulfilled important and time-consuming roles in the Department of Mathematics' administration, including service on the Personnel Committee since 2019 and two terms on the department's Executive Committee. She has chaired the DEI Outreach K-12 Committee and served on the department's Climate Committee. Outside the University of Michigan, she serves on the editorial boards of three journals and has refereed papers for many more. She has served on several review panels for the National Science Foundation and on two major committees of the American Mathematical Society.

External Reviewers:

Reviewer (A): "Sarah Koch is an outstanding, internationally recognized mathematician ... A number of Koch's works stand out as exceptionally creative ... her research program is evidence of true inventiveness and breadth..."

Reviewer (B): "Sarah's early research created new bridges between single variable complex dynamics and its higher dimensional counterpart ... She is a leader [in her generation of] mathematicians working in complex dynamics."

Reviewer (C): "Her dedication to mathematics is total, and she puts her enthusiasm at the service of the entire mathematical community... Her families of examples changed dramatically our point of view, and gave a strong impetus to the study of these maps which continues to these days. She subsequently made a beautiful computation of the dynamical degrees of these maps ... She made an important crucial contribution proving the irreducibility of prefixed curves...also disproved a general belief on the connectedness of some Teichmüller spaces of rational maps."

Reviewer (D): "She has excellent intuition and is very strong and broad technically... In sum, in the last few years Sarah Koch has produced is [sic] a substantial body of work and will undoubtedly continue to do so."

Reviewer (E): “Koch is one of the leading mathematicians of her generation working in complex dynamics ... Koch also has an ambitious program of future research to study spaces of rational maps with a mixture of complex analysis, number theory, topology and algebraic geometry.”

Reviewer (F): “[Professor Koch] works on problems of wide interest ... And many of these results have lent shape and direction to the field ... Within this cohort, I think she is the [sic] among the top one or two strongest researchers in complex dynamics worldwide ... Her service contributions are extraordinary. She is the most energetic colleague I have ever known.”

Summary Recommendation:

Professor Koch is an internationally recognized expert in complex and algebraic dynamics, who is known for the breadth and creativity of her work and for her surprising results. She has also made great contributions to the mathematical community through her phenomenal outreach efforts to improve the mathematical environment for young people. Her outstanding classroom teaching and her generous mentoring of many students add to her impact. She is also a fantastic departmental citizen and has contributed substantially to the department’s administration. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Associate Professor Sarah C. Koch be promoted to the rank of professor of mathematics, with tenure, College of Literature, Science, and the Arts.



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Anne Curzan, Dean  
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