

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

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

2013 – present	Assistant Professor, Department of Mathematics, University of Michigan
2010 – 2013	Benjamin Pierce Assistant Professor (non-tenure track), Department of Mathematics, Harvard University
2009 – 2011	National Science Foundation Mathematical Sciences Research Post-doctoral Fellow, Department of Mathematics, Harvard University
2008 – 2009	National Science Foundation Mathematical Sciences Research Post-doctoral Fellow, Department of Mathematics, University of Warwick

Summary of Evaluation:

Teaching – Professor Koch is a dedicated and highly capable teacher and communicator of mathematics. Student evaluations of her classroom teaching at all levels is superb. Her dedication is apparent from her willingness to take on challenging teaching assignments that are critical for the success of the undergraduate and graduate programs in the Department of Mathematics. Her capability is apparent from her willingness to experiment with non-traditional teaching styles such as inquiry-based learning. Professor Koch also engages with students outside the classroom through her management of the Undergraduate Math Club and her participation in outreach programs for high school students.

Research – Professor Koch has emerged as a rising star in the analysis of complex dynamical systems. Her spectacularly original constructions of post-critically finite maps and her new insights into the structure of moduli spaces have given her national and international visibility. She has had considerable success in garnering awards and external funding. In particular, she has a three-year individual grant from the National Science Foundation, as well as a five-year National Science Foundation CAREER award and a Sloan Fellowship, all since arriving at Michigan in 2013. She also has an extraordinarily long record of invited talks, including seventeen department colloquia over the course of the past three years. This level of activity is extremely unusual in mathematics and a sign of her growing visibility as a researcher and her abilities as a communicator.

Recent and Significant Publications:

“Roots, Schottky semigroups, and a proof of Bandt’s conjecture,” in Ergodic Theory and Dynamical Systems, with D. Calegari and A. Walker, to appear.

“Pullback invariants of Thurston maps,” in Transactions of the American Mathematical Society, with K. Pilgrim and N. Selinger, to appear.

“An analytic construction of the Deligne-Mumford compactification of the moduli space of curves,” with J. Hubbard, *Journal of Differential Geometry*, 98, 2014, pp. 261–313.

“Teichmüller theory and critically finite endomorphisms,” *Advances in Mathematics*, 248, 2013, pp. 573–617.

Service – Professor Koch has done a substantial amount of service work both in the Department of Mathematics and to the wider community. She served on the departmental Undergraduate Scholarships and Awards Committee, co-wrote the qualifying graduate-level exams in Geometry/Topology, acted as a co-director of the Undergraduate Math Club, and is currently serving on the Executive Committee. Externally, she has been extraordinarily active in organizing conferences at the local, national, and international levels – at least five in the past three years.

External Reviewers:

Reviewer (A)

“She has the qualities that shape great mathematicians: a huge appetite of learning new results, an ability of conveying her ideas during the wonderful talks she gives and a capacity of gathering mathematicians around the emerging subjects she detects.”

Reviewer (B)

“...I am impressed with Koch’s mathematics, and I am impressed with Koch as a mathematician. One thing stands out to me: her research program is evidence of true inventiveness and breadth, as she explores many distinct aspects of 1-dimensional dynamics. I feel that her input has inspired many researchers to begin exploring the questions she has posed (and more senior researchers to return to the subject). She has become a leader in this area, internationally recognized. ...Koch is an outstanding citizen and organizer and educator.”

Reviewer (C)

“In case you haven’t noticed this already, she is one of the upcoming ‘superstars’ in the field of complex dynamics. You should give her tenure as soon as possible, as I know that other institutions would be very interested in having her in their math department. ... There was no question whatsoever that she was at the top of our list...”

Reviewer (D)

“...one cannot overstate what a bundle of positive mathematical energy Sarah is. She is outgoing, engaging, encouraging, and curious about everything. She adds life to any meeting or seminar she’s a part of.”

Reviewer (E)

“...I would like to emphasize two remarkable points on her work. The first is that she has been working on an original line of research which is nonetheless closely related to well-studied fields.

One part of her work has been to understand very specific examples as thoroughly as possible; another aspect has been to work out a general theory structuring her findings. These two aspects show that she has a balanced approach to research: theoretical and computational as well. The second point is that this line of research is connected to many different fields: in this respect, her work aims to comprise all these aspects which go from complex dynamics of one and several variables to algebraic geometry, group theory and programming. Her work sheds light on them in return as well.”

Reviewer (F)

“She excels in all the criteria: Her research program has developed well beyond her thesis work into several different areas where she has made real contributions. She has excellent intuition and is very strong and broad technically. She works well with others and has a group of collaborators that complement her strengths. She is an excellent expositor and an...enthusiastic teacher. She has a strong sense of community and an awareness that young people, and young women in particular need mentoring.”

Reviewer (G)

“Koch is clearly one of the leading mathematicians in an exciting and active research area, and I am confident that the University of Michigan would greatly benefit from her permanent presence as a researcher, teacher and colleague.”

Reviewer (H)

“I am very happy to recommend promotion and tenure for Sarah Koch. In the seven years since her PhD, she has been amazingly active and productive... She is an excellent communicator: I have always enjoyed her talks, and learned something from them. She is surely good in working with students.”

Summary of Recommendation:

Professor Koch has become a leading figure in complex dynamics as well as a gifted communicator of mathematics at all levels. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Assistant Professor Sarah C. Koch be promoted to the rank of associate professor of mathematics, with tenure, College of Literature, Science, and the Arts.



Andrew D. Martin, Dean
Professor of Political Science and Statistics
College of Literature, Science, and the Arts

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