

# 2017 Ruth Lyttle Satter Prize



Laura DeMarco

Laura DeMarco was awarded the 2017 Ruth Lyttle Satter Prize in Mathematics at the 123rd Annual Meeting of the AMS in Atlanta, Georgia, in January 2017.

### Citation

The 2017 Ruth Lyttle Satter Prize in Mathematics is awarded to Laura DeMarco of Northwestern University for her fundamental contributions to complex dynamics, potential theory,

and the emerging field of arithmetic dynamics.

In her early work, DeMarco introduced the bifurcation current to study the stable locus in moduli spaces of rational maps, and she constructed a dynamically natural compactification of the moduli spaces with tools from algebraic geometry, potential theory, and geometric topology. Both ideas were groundbreaking, opening new directions of research in complex dynamics. In recent joint work with M. Baker, she formulated a far-reaching conjecture about arithmetically special points in these moduli spaces, analogous to (and containing overlap with) the André–Oort and related conjectures in arithmetic geometry. They proved cases of the conjecture with methods involving a remarkable confluence of ideas from complex dynamics and disparate fields such as logic, number theory, and analysis on Berkovich spaces. With K. Pilgrim, she has constructed new invariants of polynomial maps in terms of metric trees and additional planar topological information. This led to two striking results, one on the algorithmic enumeration of cusps for certain curves in the space of cubic polynomials, addressing a problem first formulated and studied by J. Milnor, and the other a generalization of the well-known theorem that the Mandelbrot set is connected. Finally, in her most recent work, she has established direct connections between the theory of bifurcations in complex dynamics and the study of rational points on elliptic curves.

### Biographical Sketch

Laura DeMarco is a professor at Northwestern University. She earned her PhD in 2002 from Harvard, where she studied with Curtis McMullen. Her undergraduate degree is in mathematics and physics from the University of Virginia, and she obtained an MA at the University of California Berkeley. DeMarco held an NSF Postdoctoral Fellowship and Dickson Instructorship at the University of Chicago. She became an assistant professor at the University of Chicago

before moving to (and subsequently being tenured and promoted to professor at) the University of Illinois at Chicago. While there, DeMarco received the NSF CAREER Award and a Sloan Fellowship. She also became a Fellow of the American Mathematical Society. During the academic year 2013–2014, DeMarco was the Kreeger–Wolf Distinguished Visiting Professor in the mathematics department at Northwestern University. She moved to Northwestern in 2014. Laura DeMarco was awarded a Simons Fellowship in 2015.

### About the Prize

The Satter Prize is awarded every two years to recognize an outstanding contribution to mathematics research by a woman in the previous six years. Established in 1990 with funds donated by Joan S. Birman, the prize honors the memory of Birman's sister, Ruth Lyttle Satter. Satter earned a bachelor's degree in mathematics and then joined the research staff at AT&T Bell Laboratories during World War II. After raising a family, she received a PhD in botany at the age of forty-three from the University of Connecticut at Storrs, where she later became a faculty member. Her research on the biological clocks in plants earned her recognition in the United States and abroad. Birman requested that the prize be established to honor her sister's commitment to research and to encourage women in science. The prize carries a cash award of US\$5,000.

The Satter Prize is awarded by the AMS Council acting on the recommendation of a selection committee. For the 2017 prize, the following individuals served as members of the selection committee:

- Estelle L. Basor
- Georgia Benkart
- Benson Farb (Chair)

The complete list of recipients of the Satter Prize follows:

- 1991 Dusa McDuff
- 1993 Lai-Sang Young
- 1995 Sun-Yung Alice Chang
- 1997 Ingrid Daubechies
- 2001 Bernadette Perrin-Riou, Karen E. Smith, Sijue Wu
- 2003 Abigail Thompson
- 2005 Svetlana Jitomirskaya
- 2007 Claire Voisin
- 2009 Laure Saint-Raymond
- 2011 Amie Wilkinson
- 2013 Maryam Mirzakhani
- 2015 Hee Oh
- 2017 Laura DeMarco

—AMS Satter Prize Committee

### Photo Credit

Photo of Laura DeMarco courtesy of Marc Harris.