

LAURA G. DE MARCO

Department of Mathematics
Northwestern University
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EDUCATION

Harvard University, Cambridge, MA
Ph.D. in Mathematics, June 2002
Thesis advisor: Curtis T. McMullen
University of California, Berkeley, CA
M.A. in Mathematics, 1998
University of Virginia, Charlottesville, VA
B.A. in Mathematics and Physics, 1996

EMPLOYMENT

Professor, Northwestern University, September 2014 – present
Professor, University of Illinois at Chicago, August 2012 – August 2014
Associate Professor, University of Illinois at Chicago, August 2009 – August 2012
Assistant Professor, University of Illinois at Chicago, August 2007 – August 2009
Assistant Professor, University of Chicago, September 2005 – August 2007
L. E. Dickson Instructor, University of Chicago, September 2002 – August 2005

PRIMARY RESEARCH INTERESTS

Dynamical systems, Complex analysis, Arithmetic geometry. I am mainly focused on the dynamics of rational maps $f : \mathbb{P}^1(\mathbb{C}) \rightarrow \mathbb{P}^1(\mathbb{C})$ and their moduli spaces, studied with a combination of complex-analytic and algebraic techniques.

GRANTS and AWARDS

Invited Speaker, International Congress of Mathematicians, 2018
Satter Prize, American Mathematical Society, 2017
PI, NSF Research Grant, 2016–2019
Simons Foundation Fellowship, 2015–2016; Visiting Professor, University of Michigan (Fall 2015), Visiting Professor, Stony Brook University (Spring 2016)
PI, NSF Research Grant, 2013–2016
Kreeger Wolf Distinguished Visiting Professor, Northwestern University, 2013–2014
Fellow of the American Mathematical Society, 2012
NSF Career Award, 2008–2013
Sloan Foundation Research Fellowship, 2008–2010
UIC WISEST Start-up Grant, 2007–2011
PI, NSF Research Grant, 2006–2009
NSF Postdoctoral Fellowship, University of Chicago, 2003–2006

Grants awarded for conferences and research programs

Simons Symposium Series in Mathematics, Simons Foundation, 2019–2023
BIRS Oaxaca workshop, Banff International Research Station, 2017

AIM SQuaRE program, American Institute of Mathematics, 2016–2019
PI, Midwest Dynamical Systems Conference Grant, NSF, 2016–2018
Co-PI, GROW 2017: Strengthening the Mathematical Workforce, a conference for undergraduate women in mathematics, NSF, 2017
Co-PI, GROW: Strengthening the Mathematical Workforce, a conference for undergraduate women in mathematics, NSF, 2016
Co-PI, NSF Research & Training Grant at Northwestern, 2015–2020
Co-PI, NSF Research & Training Grant at UIC, 2013–2014

INVITED LECTURES

UPCOMING

Dynamics Seminar, University of Maryland, October 2018
Number Theory Seminar, University of Maryland, October 2018
Plenary Lecture, Canadian Mathematical Society, Vancouver, December 2018
Analysis and Geometry of Random Shapes, IPAM, Los Angeles, January 2019
Yorrmak Distinguished Lecture, Stanford University, February 2019
Sue Geller Undergraduate Lecture, Texas A&M University, April 2019
Analytic Low-Dimensional Dynamics, honoring Lyubich, Fields Institute, May 2019
Hedrick Lecture Series, MAA MathFest, August 2019
Colloquium Lecture, University of Rochester, September 2019
Myhill Lecture Series, University of Buffalo, September 2019
Grosswald Lecture Series, Temple University, September 2019

RECENT (since 2013 only)

Dynamical Systems Session, International Congress of Mathematicians, Brazil, 2018
Dynamics, Topology, and Numbers Conference, Max Planck Inst, Bonn, Germany, 2018
Number Theory Days, Conference, University of Basel, Switzerland, 2018
Plenary Lecture, British Mathematics Colloquium, Scotland, 2018
Probability, Analysis, and Dynamics Conference, Bristol, England, 2018
Colloquium, Queen's University, Canada, 2018
Dynamical Systems Seminar, University of Toronto, Canada, 2018
Harry E. Valentine Lecture, Kansas State University, 2018
Dynamical Systems Seminar, University of Chicago, 2018
Mordell Lecture, University of Cambridge, England, 2017
Distinguished Undergraduate Lecture, Michigan State University, 2017
Colloquium, Michigan State University, 2017
Lecture series, Families of algebraic dynamical systems, Rennes, France, 2017
Plenary Lecture, Journées Arithmétiques, Caen, France, 2017
Special lecture, Summer Northwestern Analysis Program, 2017
Plenary Lecture, MAA of Illinois, 100th Anniversary Conference, 2017
Geometry and Dynamics Seminar, Harvard University, 2017
Chicago Action Now, Dynamics Seminar, 2017
Heights and Applications to Unlikely Intersections, Fields Institute, Canada, 2017
Colloquium, Ohio State University, 2016
Colloquium, University of Waterloo, Canada, 2016
Five College Number Theory Seminar, Amherst College, 2016
Undergraduate Colloquium, Amherst College, 2016
Number Theory Seminar, Princeton University, 2016
Mini-course Lectures, Stony Brook University, 2016
Special Session in Complex Dynamics, AMS Meeting, Stony Brook University, 2016

Colloquium, Columbia University, 2016
Colloquium, Yale University, 2016
Colloquium, Stony Brook University, 2016
Colloquium, Rutgers University, 2016
Number Theory Seminar, CUNY Graduate Center, 2016
Dynamics Seminar, Stony Brook University, 2016
RTG Workshop in Arithmetic Dynamics, University of Michigan, 2015
Complex Dynamics and Geometry Seminar, University of Michigan, 2015
GROW: A program for undergraduate women in mathematics, Northwestern, 2015
Non-Archimedean Analytic Geometry Conference, French Polynesia, 2015
Arithmetic 2015, Conference in honor of J. Silverman, Brown University, 2015
Invited Address, EquaDiff 2015, France, 2015
Geometries in Action, conference in honor of E. Ghys, France, 2015
Non-Archimedean Geometry Conference, Univ. of Michigan, 2015
IMS XXV: Low-Dimensional Dynamics, Stony Brook, 2015
Colloquium, Argonne National Laboratory, Physics Division, 2015
Mini-course Lectures, KAWA Workshop, Pisa, Italy, 2015
Plenary Lecture, Midwest Women in Mathematics Symposium, Chicago, 2015
Seminar, Harvard University, 2015
Dynamics and Geometry Colloquium, Penn State, 2015
Topology, Arithmetic, and Dynamics Seminar, George Mason University, 2015
Tech Topology Conference, Georgia Tech, Atlanta, 2014
Number Theory Seminar, University of Wisconsin, Madison, 2014
Mini-course Lectures, Workshop in Holomorphic Dynamics, Denmark, 2014
Plenary Lecture, International Congress of Women Mathematicians, Korea, 2014
Dynamical Systems Seminar, University of Toronto, Canada, 2014
2nd ERC Research Period in Diophantine Geometry, Cetraro, Italy, 2014
Keynote Lecture, US State Department, Banquet for Math Olympiad winners, 2014
Chelluri Public Lecture, Cornell University, 2014
Dynamical Systems Seminar, Cornell University, 2014
Bloomington Geometry Workshop, Indiana University, 2014
Colloquium, Zhejiang University, China, 2014
Public Lecture, Kreeger Wolf Foundation, Northwestern University, 2014
AMS Special Session, Joint Math Meetings, Baltimore, 2014
Colloquium, UCLA, 2013
Midwest Dynamical Systems Conference, UIUC, 2013
Colloquium, Brown University, 2013
Seminar lecture, Institut Henri Poincaré, Paris, France, 2013
Seminar lecture, École Polytechnique, Paris, France, 2013
Colloquium, University of Illinois Urbana-Champaign, 2013
Colloquium, University of Chicago, 2013
Keynote Speaker, QED Symposium, Chicago, lecture for students in grades 5–12, 2013
Applied and Computational Math Seminar, University of Wisconsin, Milwaukee, 2013
Dynamics Seminar, University of Chicago, 2013
Geometry Seminar, University of Utah, 2013
AMS Invited Address, Joint Mathematics Meeting, 2013

STUDENT AND POSTDOC SUPERVISION

GRADUATE STUDENTS

Holly Krieger, PhD 2013

Paul Reschke, PhD 2013

Hexi Ye, PhD 2013

Cara Mullen, PhD 2017

Nicole Looper, PhD 2018

Current PhD students: Khashayar Filom, Signe Jensen, Shuyi Weng

Louie Angelo Lee, MA 2016

Corinna Wendisch, MA 2016

POSTDOCS

Chong Gyu Lee, 2010–2012

Xiaoguang Wang, Spring 2013

Jan-Li Lin, 2014-2016

Sara Lapan, 2013-2016

Current postdocs: Eric Chang, Daniel Cuzzocreo, Kenneth Jacobs, Myrto Mavraki

UNDERGRADUATE RESEARCH PROJECTS

Yuxi Han, Summer 2017

Shikhar Shah, Summer 2013, Fall 2013

Kelsey DiPietro, Rupa Mirmara, Shikhar Shah, Spring 2013

Kelsey DiPietro, Summer Hasan, Fall 2012

Aaron Schiff, Summers 2008, 2009, 2010

Andrew Duffy, Archit Joshipura, Fall 2007

TEACHING

NORTHWESTERN

MENU (Honors) Multivariable Calculus, Winter 2018

MENU (Honors) Linear Algebra, Fall 2016

Linear Algebra, Winter 2015

Multivariable Calculus, Winter 2019

Chaotic Dynamical Systems, for undergraduates, Fall 2013, Fall 2014, Fall 2018

Graduate Complex Analysis, Spring 2015

Graduate Dynamical Systems and Special Topics, Winter 2014, Spring 2014, Spring 2017, Spring 2018

UNIVERSITY OF ILLINOIS AT CHICAGO

Graduate Complex Analysis, 2009, 2013

Higher Geometry for Teachers (Masters program), 2010, 2012

Complex Manifolds, 2011

Calculus 1, 2010, 2011

Advanced Topics in Analysis: Complex Dynamics, 2010

Introduction to Proofs, 2008

Calculus 3, 2007

UNIVERSITY OF CHICAGO

Honors Calculus, 2003, 2005, 2006, 2007

Undergraduate Complex Analysis, 2002, 2005

Undergraduate Analysis in \mathbb{R}^n , 2005

Learning seminar in Harmonic Analysis and PDEs, 2003

Fractals and Dimension, Summer REU course, 2006

HARVARD

Complex Dynamics, Summer Tutorial, 2001

Calculus, 1999, 2000

Awarded Certificates of Distinction in Teaching, 2000, 2001

RECENT SERVICE AND ACTIVITIES

EDITORIAL POSITIONS

Editorial Board, Journal of the American Mathematical Society (JAMS), 2018–present

Editorial Board, Journal of Modern Dynamics, 2014–present

Editorial Board, AMS Journal of Conformal Geometry and Dynamics, 2013–present

FOR THE GENERAL MATHEMATICAL COMMUNITY (since 2013 only)

External Reviewer, Duke University Mathematics Department, April 2018

AMS Editorial Boards Committee, elected position, 2016–2019

Committee Chair, 2017

AWM Executive Committee, elected position, 2016–2018

External Examiner, PhD thesis of Sébastien Biebler, Univ. Paris Est, July 2018

AMS Committee on Publications, 2017

External Examiner, Habilitation of Gabriel Vigny, Univ. Picardie Jules Verne, Dec 2017

External Examiner, PhD thesis of Jonguk Yang, University of Toronto, August 2017

AWM/AMS Selection Committee for Noether Lecture, 2014–2017

Committee Chair, 2015–2016

AMS Central Section Program Committee, 2014–2016

Committee Chair, Jan.2015–Dec.2016

External Reviewer for NSF site visit, Committee Chair, Institute for Advanced Study, Princeton, NJ, October 2016

External Examiner, PhD thesis of Joseph Adams, Stony Brook University, May 2016

External Reviewer, Notre Dame Mathematics Department, November 2014

External Examiner, PhD thesis of Matthieu Arfeux, Université de Toulouse, November 2013

Grant/proposal reviews for the NSF (U.S.A.), BSF (US-Israel), ISF (Israel), NSERC (Canada), FONDECYT (Chile), DFG (Germany).

Journal referee reports

Reviewer for Mathematical Reviews

Member, American Mathematical Society (AMS), Assoc. for Women in Mathematics (AWM)

CONFERENCE ORGANIZATION (since 2013 only)

Organizer, Simons Symposium Series in Arithmetic and Algebraic Dynamics, 2019–2023

Main Organizer, Complex and Arithmetic Dynamics workshop, May 2018

Organizer, Chicago Action Now Dynamics Day, May 2018

Scientific Committee, Iberoamerican Congress in Geometry, Spain, January 2018

Main Organizer, Midwest Dynamical Systems Conference, Northwestern, November 2017

Organizer, BIRS Oaxaca Workshop, November 2017

Organizer, GROW 2017, conference for undergraduate women in mathematics, October 2017

Organizer, GROW II, conference for undergraduate women in mathematics, October 2016

Organizer, Summit Meeting on Gender Imbalance, Northwestern, October 2016

Organizer, Bifurcations Mini-workshop, Ann Arbor, MI, November 2015

Organizer, GROW, conference for undergraduate women in mathematics, October 2015

Scientific Committee, Iberoamerican Congress in Geometry, CUNY, May 2014

Main Organizer, AMS Math Research Community, Snowbird, Utah, June 2013

Main Organizer, Conference in Holomorphic Dynamics at UIC, June 2013
Scientific Committee, Midwest Dynamical Systems Conference, 2013–2016
Organizer, AMS special session in Complex Dynamics, Joint Math Meetings, January 2013

NORTHWESTERN UNIVERSITY (since 2014)

Math Department: Postdoc Hiring Committee, 2014–2015, 2018–2019
Committee Chair, 2018–2019
Weinberg College: Tenure Committee, 2016–2017, 2018–2020
Math Department: Special Lectures Committee, 2014–2015, 2015–2016, 2018–2019
Math Department: Budget Committee, 2015, 2018
Math Department: Organizer, Emphasis Year in Dynamical Systems, 2017–2018
Math Department: Colloquium Committee, 2017–2018
Math Department: Tenure-track Hiring Committee
Committee Chair, 2016–2017
Math Department: Teaching-track Hiring Committee
Committee Chair, 2016–2017
Undergraduate: Math Club lecture, 2014, 2018
Women’s Center: Panel on Surviving and Thriving in Academia, 2015
Math Department: Graduate Student Seminar, 2015
Math Department: Colloquium for Prospective Graduate Students, 2015

PUBLICATIONS and PREPRINTS

33. Variation of canonical height and equidistribution, with N. M. Mavraki.
Submitted for publication, 32 pages.
32. Critical orbits and arithmetic equidistribution.
To appear, *Proceedings of the ICM 2018*, 19 pages.
31. On the postcritical set of a rational map, with S. Koch and C. McMullen.
To appear, *Math. Ann.*, 20 pages.
30. Rationality of dynamical canonical height, with D. Ghioca.
To appear, *Ergodic Theory Dynam. Systems*, 33 pages.
29. Bounded height in families of dynamical systems, with D. Ghioca, H. Krieger, K.D. Nguyen, T.J. Tucker, and H. Ye. To appear, *Int. Math. Res. Notices*, 30 pages.
28. Discontinuity of a degenerating escape rate, with Y. Okuyama.
Conform. Geom. Dyn. **22** (2018), 33–44.
27. Dynamical moduli spaces and elliptic curves (KAWA Lecture Notes).
Ann. Fac. Sci. Toulouse Math. **27** (2018), 389–420.
26. The classification of polynomial basins of infinity, with K. Pilgrim.
Ann. Sci. Éc. Norm. Supér. **50** (2017), 799–877.
25. Convex shapes and harmonic caps, with K. Lindsey.
Arnold Math. J. **3** (2017), 97–117.
24. Bifurcations, intersections, and heights.
Algebra & Number Theory. **10** (2016), 1031–1056.
23. Degenerations of complex dynamical systems II: Analytic and algebraic stability, with X. Faber, and an Appendix by J. Kiwi.
Math. Annalen. **365** (2016), 1669–1699.
22. Torsion points and the Lattès family, with X. Wang and H. Ye.
American J. of Math. **138** (2016), no. 3, 697–732.
21. Bifurcation measures and quadratic rational maps, with X. Wang and H. Ye.
Proc. of the London Math. Soc. **111** (2015), no. 1, 149–180.

20. Degenerations of complex dynamical systems, with X. Faber.
Forum of Math. Sigma. **2** (2014) e6, 36 pages.
19. Special curves and postcritically-finite polynomials, with M. Baker.
Forum of Math. Pi. **1** (2013) e3, 35 pages.
18. The geometry of the critically-periodic curves in the space of cubic polynomials, with A. Schiff. *Experimental Mathematics.* **22** (2013), no. 1, 99–111.
17. Combinatorics and topology of the shift locus.
In *Conformal Dynamics and Hyperbolic Geometry*, AMS Contemporary Math. Volume in honor of Linda Keen’s birthday, **573** (2012) 35–48.
16. Preperiodic points and unlikely intersections, with M. Baker.
Duke Math. J. **159** (2011) 1–29.
15. The conformal geometry of billiards.
Bulletin of the AMS. **48** (2011), no.1, 33–52.
14. Polynomial basins of infinity, with K. Pilgrim.
Geom. Funct. Anal. **21** (2011) 920–950.
13. Critical heights on the moduli space of polynomials, with K. Pilgrim.
Advances in Math. **226** (2011) 350–372.
12. Hausdorffization of polynomial twists, with K. Pilgrim.
Discrete Contin. Dyn. Sys. **29** (2011), no. 4, 1405–1417.
Special Issue: Trends and Developments in Dynamical Systems, Part III.
11. Enumerating the basins of infinity for cubic polynomials, with A. Schiff.
J. Difference Equ. Appl., Special Issue to honor Robert Devaney, **16** (2010) 451–461.
10. Axiom A polynomial skew products of \mathbf{C}^2 and their postcritical sets, with S. Lynch Hruska. *Ergodic Theory Dynam. Systems*, **28** (2008), 1729–1748.
Erratum, *Ergodic Theory Dynam. Systems*, **31** (2011), 631–636.
9. Trees and the dynamics of polynomials, with C. McMullen.
Ann. Sci. École Norm. Sup. **41** (2008) 337–383.
8. Finiteness for degenerate polynomials.
In *Holomorphic Dynamics and Renormalization: A Volume in Honour of J. Milnor’s 75th birthday*. Fields Institute Communications, AMS, **53** (2008) 89–104.
7. Transfinite diameter and the resultant, with R. Rumely.
J. Reine Angew. Math. **611** (2007) 145–161.
6. The moduli space of quadratic rational maps.
Journal of the AMS. **20** (2007) 321–355.
5. Iteration at the boundary of the space of rational maps.
Duke Math. J. **130** (2005) 169–197.
4. Dimension of pluriharmonic measure and polynomial endomorphisms of \mathbf{C}^n , with I. Binder.
International Math. Research Notices. **11** (2003) 613–625.
3. Dynamics of rational maps: Lyapunov exponents, bifurcations, and capacity.
Math. Annalen. **326** (2003) 43–73.
2. Dynamics of rational maps: A current on the bifurcation locus.
Math. Research Letters. **8** (2001) 57–66.
1. Stability of H , D , ^{14}N and ^{15}N atoms in solid ammonia above 100K, with A. Brill and D. Crabb. *Journal of Chemical Physics.* **108** (1998) 1423–1428.