

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

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, Midwest Dynamical Systems Conference Grant, NSF, 2016–2018
Co-PI, GROW: Strengthening the Mathematical Workforce, Conference grant, NSF, 2016–2017
Co-PI, NSF Research & Training Grant in Analysis, 2015–2020
Proposal selected for a BIRS Oaxaca program, Organizer, 2017
Proposal selected for an AIM SQuaRE program, 2016–2018
PI, NSF Research Grant, 2013–2016
Kreeger Wolf Distinguished Visiting Professor, Northwestern University, 2013–2014
Co-PI, NSF Research & Training Grant, 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

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.

INVITED LECTURES

UPCOMING

Mordell Lecture, University of Cambridge, England, June 2017
Lecture series, Families of algebraic dynamical systems, Rennes, France, June 2017
Plenary Lecture, Journées Arithmétiques, Caen, France, July 2017
Special lecture, Summer Northwestern Analysis Program, July 2017
Lecture series, CIMPA School, Lima, Peru, September 2017
Probability, Analysis, and Dynamics Conference, Bristol, England, April 2018
Plenary Lecture, British Mathematics Colloquium, Scotland, June 2018
Dynamical Systems Session, International Congress of Mathematicians, August 2018

RECENT (since 2012 only)

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
Workshop in Non-Archimedean Dynamics, University of Michigan, 2012
Colloquium, Harvard University, 2012
Colloquium, Northwestern University, 2012
ERC Research Period in Diophantine Geometry, Pisa, Italy, 2012
Dynamical Systems Seminar, Kyoto University, 2012
Algebraic Dynamics Conference, UC Berkeley, 2012
Dynamical Systems Seminar, Boston University, 2012
Complex and p -adic Dynamics Workshop, ICERM, Providence, RI, 2012

STUDENT AND POSTDOC SUPERVISION

GRADUATE STUDENTS

Holly Krieger, PhD 2013
Paul Reschke, PhD 2013
Hexi Ye, PhD 2013
Cara Mullen, PhD 2017
Louie Angelo Lee, MA 2016
Corinna Wendisch, MA 2016
Current PhD students: Khashayar Filom, Signe Jensen, Nicole Looper, Shuyi Weng

POSTDOCS

Chong Gyu Lee, postdoc, 2010–2012
Xiaoguang Wang, postdoc, Spring 2013
Jan-Li Lin, postdoc, 2014–2016
Sara Lapan, postdoc, 2013–2016
Current postdocs: Daniel Cuzzocreo, Kenneth Jacobs

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) Linear Algebra, Math 290-1, Fall 2016

Graduate Complex Analysis, Math 410-3, Spring 2015

Linear Algebra, Math 240, Winter 2015

Chaotic Dynamical Systems, for undergraduates, Math 354, Fall 2013, Fall 2014

Graduate Dynamical Systems, Math 430, Winter 2014, Spring 2014, Spring 2017

UNIVERSITY OF ILLINOIS AT CHICAGO

Graduate Complex Analysis, Math 535, 2009, 2013

Higher Geometry for Teachers, MTHT 510, 2010, 2012

Complex Manifolds 1, Math 554, 2011

Calculus 1, Math 180, 2010, 2011

Advanced Topics in Analysis: Complex Dynamics, Math 546, 2010

Introduction to Advanced Mathematics, Math 215, 2008

Calculus 3, Math 210, 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

NORTHWESTERN MATHEMATICS DEPARTMENT (since 2014)

Organizer, Emphasis Year in Dynamical Systems, 2017–2018

Tenure-track Hiring Committee, Chair, 2016–2017

Teaching-track Hiring Committee, Chair, 2016–2017

Special Lectures Committee, 2014–2015, 2015–2016

Boas Assistant Professor Hiring Committee, 2014–2015

Budget Committee, 2015

Graduate Student Seminar, February 2015

Colloquium for Prospective Graduate Students, March 2015

GENERAL MATHEMATICAL COMMUNITY (since 2010 only)

Editorial Board, Journal of Modern Dynamics, 2014–present

Editorial Board, AMS Journal of Conformal Geometry and Dynamics, 2013–present
 AMS Editorial Boards Committee, elected position, 2016–2019
 Committee Chair, 2017
 AWM Executive Committee, elected position, 2016–2020
 AMS Committee on Publications, 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 review: NSF (U.S.) 2012, 2014, 2015; BSF (US-Israel) 2015; NSERC (Canada) 2010, 2013; FONDECYT (Chile) 2011, 2015; DFG (Germany) 2012, 2013, 2014, 2015
 External Examiner, PhD thesis of Artem Dudko, University of Toronto, July 2012
 Book review in CMS Notes (Canada), 2012
 AMS Employment Services Advisory Board, 2009–2011
 Member, American Mathematical Society (AMS), Assoc. for Women in Mathematics (AWM)
 Journal referee reports
 Reviewer for Mathematical Reviews

CONFERENCE ORGANIZATION (since 2010 only)

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
 Organizer, Semester in Complex and Arithmetic Dynamics, ICERM, Spring 2012
 Main Organizer, Workshop on Dynamical Moduli Spaces, ICERM, April 2012
 Organizer, Trends in Dynamics, Northwestern University, April 2011
 Organizer, Special session, AMS meeting, Notre Dame, November 2010
 Main organizer, Algebraic and Complex Dynamics Workshop, UIC, May 2010

PUBLICATIONS and PREPRINTS

31. Postcritical configurations in \mathbb{P}^1 , with S. Koch and C. McMullen.
Preprint, 19 pages.
30. Variation of canonical height and equidistribution, with N. M. Mavraki.
Submitted for publication, 32 pages.

29. Bounded height in families of dynamical systems, with D. Ghioca, H. Krieger, K.D. Nguyen, T.J. Tucker, and H. Ye. Submitted for publication, 25 pages.
28. Rationality of dynamical canonical height, with D. Ghioca.
Submitted for publication, 33 pages.
27. Convex shapes and harmonic caps, with K. Lindsey.
To appear, *Arnold Math. J.*, Special volume in honor of the 25th anniversary of the Institute for Mathematical Sciences, Stony Brook University. 21 pages.
26. The classification of polynomial basins of infinity, with K. Pilgrim.
To appear, *Ann. Sci. École Norm. Sup.*, 79 pages.
25. KAWA Lecture Notes: Dynamical moduli spaces and elliptic curves.
To appear, *Ann. Fac. Sci. Toulouse Math.*, 22 pages.
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.