

## LAURA G. DE MARCO

Department of Mathematics  
Northwestern University  
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Evanston, IL 60208-2730  
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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

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*Updated September 2017*

## 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

Distinguished Undergraduate Lecture, Michigan State University, October 2017  
Colloquium, Michigan State University, October 2017  
Distinguished Lecture, Kansas State University, February 2018  
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  
Sue Geller Undergraduate Lecture, Texas A&M University, Spring 2019

### RECENT (since 2012 only)

Mordell Lecture, University of Cambridge, England, 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  
 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  
Colloquium Committee, 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, 2016–2018  
AMS Committee on Publications, 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 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. On the postcritical set of a rational map, with S. Koch and C. McMullen.  
Preprint, 20 pages.
30. Variation of canonical height and equidistribution, with N. M. Mavraki.  
Submitted for publication, 32 pages.
29. Rationality of dynamical canonical height, with D. Ghioca.  
Submitted for publication, 33 pages.
28. 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*, 25 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.