

# Dapeng Zhan

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## Education

Ph.D. in Mathematics, California Institute of Technology, 2004  
Advisor: Nikolai Makarov  
Dissertation: Random Loewner Chains in Riemann Surfaces.

## Research Interests

Probability Theory, Complex Analysis, Statistical Mechanics, Schramm-Loewner Evolution (SLE)

## Academic Appointments

Associate Professor, Michigan State University, Department of Mathematics, July 2012- present  
Assistant Professor, Michigan State University, Department of Mathematics, July 2009–June 2012  
Gibbs Assistant Professor, Yale University, Department of Mathematics, July 2007–June 2009  
Morrey Assistant Professor, U.C. Berkeley, Department of Mathematics, July 2004–June 2007

## Awards and Grants

Simons Fellowship, 2016  
Salem Prize, 2012  
Alfred P. Sloan Research Fellowship, 2011-2015  
NSF CAREER Award (DMS-1056840), 2011 – 2018  
NSF Grant (DMS-09063733), 2009 – 2013  
Scott Russel Johnson Graduate Dissertation Prize in Mathematics, Caltech, 2004

## Publications

1. Stochastic Loewner evolution in doubly connected domains. *Probab. Theory Rel.*, 129(3):340-380, 2004.
2. Some properties of annulus SLE. *Electron. J. Probab.*, 11, Paper 41:1069-1093, 2006.
3. The scaling limits of planar LERW in finitely connected domains. *Ann. Probab.*, 36(2):467-529, 2008.
4. Reversibility of chordal SLE. *Ann. Probab.*, 36(4):1472-1494, 2008.
5. Duality of chordal SLE, *Invent. Math.*, 174(2):309-353, 2008.
6. Continuous LERW started from interior points. *Stoch. Proc. Appl.*, 120:1267-1316, 2010.

7. Reversibility of some chordal SLE( $\kappa$ ;  $\rho$ ) traces. *J. Stat. Phys.*, 139(6):1013-1032, 2010.
8. Duality of chordal SLE, II. *Ann. I. H. Poincaré-Pr.*, 46(3):740-759, 2010.
9. Loop-erasure of planar Brownian motion. *Commun. Math. Phys.*, 303(3):709-720, 2011.
10. Restriction properties of annulus SLE. *J. Stat. Phys.*, 146(5):1026-1058, 2012.
11. Reversibility of whole-plane SLE. *Probab. Theory Rel.*, 161(3):561-618, 2015.
12. Ergodicity of the tip of an SLE curve. *Probab. Theory Rel.*, 164(1):333-360, 2016.
13. (with Steffen Rohde) Backward SLE and the symmetry of the welding. *Probab. Theory Rel.*, 164(3):815-863, 2016.
14. (with Mohammad A. Rezaei) Higher moments of the natural parameterization for SLE curves. Accepted by *Ann. I. H. Poincaré-Pr.*

## Preprints

1. Decomposition of Schramm-Loewner evolution along its curve, arXiv:1509.05015.  
*In this paper, it is proved that if one samples a point on an SLE curve using natural parametrization, then he sees a two-sided radial SLE near that point; and if one samples a point on the SLE curve using capacity parametrization, then he sees an SLE( $\kappa$ , -8) curve near that point.*
2. (with Hao Wu) Boundary Arm Exponents for SLE, arXiv:1606.05998.  
*In this paper, we derive boundary arm exponents for SLE. Combining with the convergence of critical lattice models to SLE, these exponents would give the alternating half-plane arm exponents for the corresponding lattice models.*
3. (with Mohammad A. Rezaei) Green's function for chordal SLE curves, arXiv:1607.03840.  
*In this paper, we prove the existence of Green's function for chordal SLE for any finite number of points, i.e., the rescaled probability that a chordal SLE curve ( $\kappa < 8$ ) passes through given points in the domain (expressed in terms of a limit), and provide the convergence rates and up to constant sharp bounds for these Green's functions.*

## Invited Talks

- World Congress in Probability and Statistics. Fields Institute, Canada. July 11-15, 2016.
- Recent development in SLE. Institut Mittag-Leffler, Sweden. June 13-17, 2016.
- AMS Sectional Meeting at North Dakota State University. April 16-17, 2016
- Probability seminar. Department of Mathematics. Michigan State University. April 14, 2016.
- Everything is complex: a complex analysis conference. Saas-fee, Switzerland. March 6-11, 2016.
- Geometry of random walks and SLE: a birthday conference for Greg Lawler. University of Cambridge, UK. June 15-19, 2015.
- AMS Sectional Meeting at Michigan State University (two talks). March 14-15, 2015.
- A workshop on Schramm-Loewner evolution. TU Berlin, Germany. November 17-21, 2014.
- Probability seminar. Department of Mathematics. Michigan State University. November 14, 2013.
- Probability seminar. Department of Mathematics. University of Rochester. September 20, 2013.

- Workshop IV: Quasiconformal Geometry and Elliptic PDEs. IPAM, Los Angeles. May 20-24, 2013.
- Colloquium. Department of Mathematics. University of Virginia. January 31, 2013.
- Tsinghua-Sanya International Mathematics Forum. Sanya, China. January 4-9, 2013.
- Seminar. Department of Mathematics. Nanjing University. Nanjing, China. December 29, 2012.
- Seminar. Mathematical Sciences Center of Tsinghua University. Beijing, China. December 18, 2012.
- Workshop on statistical mechanics and conformal invariance. MSRI, Berkeley. March 27, 2012.
- Analysis seminar. Department of Mathematics. Northeastern University. November 18, 2011.
- Colloquium. Department of Mathematics. Nankai University. May 9, 2011.
- Analysis seminar. Department of Mathematics. University of Washington. May 5, 2011.
- Sloan lecture. Department of Mathematics. Michigan State University. March 22, 2011.
- Probability seminar. Massachusetts Institute of Technology. March 7, 2011.
- Colloquium. Department of Statistics. Michigan State University. December 7, 2010.
- Analysis, PDE and Mathematical Physics seminar. Michigan State University. October 13, 2010.
- Probability seminar. Michigan State University. November 11, 2010.
- The 73rd annual meeting of the institute of Mathematical Statistics. Gothenburg, Sweden. August 9-13, 2010.
- Conference “Conformal maps from probability to physics”. Monte Verità, Ascona, Ticino, Switzerland. May 23-28, 2010.
- AMS Sectional Meeting Special Sessions. Albuquerque, NM. April 17-18, 2010.
- Probability seminar. University of Chicago. March 5, 2010.
- Analysis, PDE and Mathematical Physics seminar. Michigan State University. February 3, 2010.
- Oded Schramm Memorial Conference. Microsoft research, Seattle. August 30-31, 2009.
- Colloquium. University of Oregon. February 20, 2009.
- Colloquium. Michigan State University. February 13, 2009.
- Colloquium. Carnegie Mellon University. February 9, 2009.
- Colloquium. Georgia Institute of Technology. February 2, 2009.
- Colloquium. University of Colorado. January 30, 2009.
- Colloquium. University of California at Los Angeles. January 29, 2009.
- Analysis seminar. University of California at Los Angeles. January 28, 2009.
- Colloquium. Duke University. January 26, 2009.
- Colloquium. University of Minnesota. January 23, 2009.
- Colloquium. University of California at Irvine. January 5, 2009.
- Colloquium. Rice University. December 5, 2008.

Analysis and probability seminar. University of Connecticut. October 17, 2008.

Workshop on Stochastic Loewner Evolution and Scaling Limits. Centre de recherches mathématiques (CRM), Canada. August 4-9, 2008.

Analysis seminar. Yale University. April 7, 2008.

The Fifth Workshop on Markov Processes and Related Topics. Beijing Normal University, China. July 14-18, 2007.

Annual PCMI Summer Session: Research Program in Statistical Mechanics. Park City Mathematics Program (PCMI). July 1-21, 2007.

Colloquium. Kansas State University. January 26, 2007.

Probability seminar. UC Berkeley. April 28, 2006.

Seymour Sherman Lecture and Conference, Probability and Statistical Physics. Indiana University. April 21-23, 2006.

Probability seminar. Beijing University, China. May 30, 2005.

Probability seminar. UCLA. November 10, 2004.

Analysis seminar. Caltech. March, 2004.

## Teaching

Advising PhD student Rami Fakhry since SS16.

Mentoring undergraduate (exchange) student Mengyang Miao for research. Spring 2015.

Advising PhD student Benjamin Mackey since FS13.

Random Variables and Stochastic Processes (MTH 992-002). Fall 2016.

Honors Complex Analysis (MTH 428H). Fall 2016.

Complex Analysis I (MTH 829). Spring 2016. Graduate course.

Honors Complex Analysis (MTH 428H). Fall 2015.

Lectures on two-dimensional critical percolation. Fall 2015. Graduate course.

Analysis I (MTH 320). Spring 2015.

Complex Analysis I (MTH 829). Spring 2015.

Honors Complex Analysis (MTH 428H). Fall 2014.

Complex Analysis I (MTH 829). Spring 2014.

Honors Complex Analysis (MTH 428H). Fall 2013.

Complex Analysis I (MTH 829). Spring 2013.

Complex Analysis (MTH 425). Fall 2012.

Honors Complex Analysis (MTH 428H). Fall 2012.

Introduction of Stochastic Loewner Evolution (MTH 992). Fall 2011.

Analysis I (MTH 320). Spring 2011.

Ordinary Differential Equations (MTH 340). Fall 2010.

Analysis II (MTH 421). Fall 2010.

Ordinary Differential Equations (MTH 340) Spring 2010.

Calculus One (MTH 132) Fall 2009.

Probability and Stochastic Processes. Graduate course, Yale University. Spring 2008.

Introduction to Stochastic Loewner Evolution. Graduate course, Yale University. Fall 2008.

Calculus of One Variable, II. Undergraduate course, Yale University. Fall 2008.

Calculus of One Variable, I. Undergraduate course, Yale University. Fall 2007 and Spring 2008.

Introduction to Complex Analysis. Undergraduate course, UC Berkeley. Fall 2004 - Spring 2007.

Introduction to Analysis. Undergraduate course, UC Berkeley. Fall 2004 - Spring 2007.

## Academic Services

Two hiring committees in 2016-17.

Two hiring committees in 2015-16.

Hiring committee in 2014-15.

Organizing the probability seminar in FS13, SS14 and SS15.

Organizing a special session of the AMS sectional meeting held at MSU on March 14-15, 2015.

Dissertation Defense Committee for Nicholas Boros.

Comprehensive Committee for Alexander Reznikov, Benjamin Mackey, Tyler Bongers, and Rami Fakhry.

Qualifying Exam Committee for Aug and Dec13, Aug 14, Jan and Aug 15, Jan and Aug 16.

Postdoc mentor for Mohammad Rezaei from FS 13 to SS 16.

Mentoring an undergraduate student Mengyang Miao.

Referee for

*Ann. Math.*; *Probab. Theory Rel.*; *Internat. Math. Res. Notices*; *Lat. Am. J. Probab. Math. Stat.*; *Electron. J. Probab.*; *Indiana U. Math. J.*; *Commun. Math. Phys.*; *Ann. Probab.*; *T. Am. Math. Soc.*; *Ann. I. H. Poincare-Pr.*; *Israel J. Math.*; *Stoch. Proc. Appl.*