(a forest of uniform spanning trees)

Samuel S. **Watson**

Mathematician · Data Science Educator

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Education

Massachusetts Institute of Technology — *Cambridge, Massachusetts*

PhD Mathematics — *Sep 2010 - Jan 2015*

- MIT Presidential Fellowship · National Science Foundation Graduate Research Fellowship

Cambridge University — *Cambridge, United Kingdom*

MMath (Part III of the Tripos) — *Sep 2009 - Jun 2010*

- Gates Cambridge Scholarship · Trinity College · Distinction

University of Mississippi — *Oxford, Mississippi*

MS Mathematics · BS Mathematics and Physics · BA Classics — *Aug 2004 - May 2009*

- Sally McDonnell Barksdale Honors Scholarship · Taylor Medal

Mississippi School for Mathematics and Science — *Columbus, Mississippi*

High School Diploma — *Aug 2002 - May 2004*

Experience

Brown University Data Science Initiative — *Providence, Rhode Island*

Director of Graduate Studies — *Jun 2017 - PRESENT*

- Serve as director of Brown University's Master's Program in Data Science

Brown University Department of Mathematics — *Providence, Rhode Island*

Tamarkin Assistant Professor — *Jul 2015 - PRESENT*

- Teach undergraduate courses in probability, integral calculus, multivariable calculus, and linear algebra

Institute for Computational and Experimental Research in Mathematics — *Providence, Rhode Island*

Postdoctoral Researcher — *Jan 2015 - May 2015*

- Conducted research in semester program on *Phase transitions and emergent properties*

Art of Problem Solving — *San Diego, California*

Instructor and Content Developer — *Aug 2009 - 2017*

- Taught online courses
- Worked with a team to develop content for online math learning tools

Phase Capital LP — *Boston, Massachusetts*

Analyst Intern — *Jan 2014, Jun 2015*

- Built research infrastructure and analyzed portfolio allocation strategies at an asset management firm

Microsoft Research — *Redmond, Washington*

Research Intern — *Jun 2013 - Aug 2013*

- Conducted research in theoretical probability in the Theory Group at MSR

Research and Publications

Limit shapes for the asymmetric five vertex model

Joint work in progress with Jan de Gier and Richard Kenyon — *2018*

- Limit shapes and variational principles for a monotone non-intersecting lattice paths model

A conformally invariant metric on CLE(4)

Joint work in progress with Scott Sheffield and Hao Wu — *2018*

- Construction of a random metric space on a fractal family of loops using a topographical coupling with a random surface

The level loops of the Gaussian free field

Joint work in progress with Scott Sheffield and Hao Wu *2018*

- Construction of all the level curves of a canonical random surface

Schnyder Woods, SLE(16), and Liouville Quantum Gravity

Joint work with Yiting Li and Xin Sun *2017*

- A convergence relationship between a classical discrete structure central to graph drawing and a canonical random surface in physics

Fractional Gaussian fields: a survey

Joint work with Asad Lodhia, Scott Sheffield, and Xin Sun *2014*

- A survey of a general class of Gaussian fields which includes white noise, Brownian motion, and other important Gaussian fields as special cases. *Probability Surveys* 13 (2016): 1-56.

Seasonal life history adaptation in two species of Drosophila

Joint work with Emily L. Behrman, Katherine R. O'Brien, M. Shane Heschel, and Paul S. Schmidt *2014*

- A mathematical model to analyze seasonal population dynamics in wild flies. *Journal of evolutionary biology* 28.9 (2015): 1691-1704

The extremes of the conformal loop ensemble

Joint work with Jason Miller and David Wilson *2013*

- A computation of the size of the set of points surrounded by a given density of random fractal loops, for a canonical family of loop models. *Annals of Probability* 44.2 (2016): 1013-1052.

The conformal loop ensemble nesting field

Joint work with Jason Miller and David Wilson *2013*

- Construction of a limiting random surface for height functions describing a canonical family of random fractal loops. *Probability Theory and Related Fields* 163.3-4 (2015): 769-801.

Rate of convergence in Cardy's formula

Joint work with Dana Mendelson and Asaf Nachmias *2012*

- A bound for the rate of convergence of crossing probabilites for monochromatic paths in a large honeycomb grid with randomly colored cells. *Communications in Mathematical Physics* 329.1 (2014): 29-56

Honors & Awards

2018	**Teaching with Technology Award,** Brown University	*Providence, RI*
2009	**Gates Cambridge Scholarship**	*Cambridge, UK*
2009	**NSF Graduate Research Fellowship**	*Cambridge, MA*
2006	**Barry M. Goldwater Scholarship**	*Oxford, MS*

Service

2015-2018	**Mathematics Instructor,** MIT Office of Minority Education, *Interphase* summer program	*Cambridge, MA*
2016-2018	**Co-organizer,** Discrete Math Seminar	*Providence, RI*
2016-2017	**Co-organizer,** Horizons Seminar	*Providence, RI*
2014-2015	**Co-organizer,** MIT Integration Bee	*Cambridge, MA*
2011-2013	**Mentor,** MIT Directed Reading Program	*Cambridge, MA*
2011-2012	**Assistant Instructor,** Joy of Mathematics after-school enrichment	*Cambridge, MA*
2010	**Volunteer Teaching Assistant,** STIMULUS community service programme	*Cambridge, UK*
2009	**Mississippi State Coach,** National Mathcounts	*Orlando, FL*
2001-2014	**Mathcounts Coach,** North Delta, Heritage Academy, Oxford Middle, Academy of the Pacific Rim	*USA*
2006-2008	**Problem Writer,** University of Mississippi High School Mathematics Contest	*Oxford, MS*

Miscellaneous

Julia package developer	Wrote and maintain *AsyPlots, PlanarMaps, ConformalMaps, VertexModels, FractionalGaussianFields*
Digital book author	Wrote course textbook *Multivariable Calculus: an introduction*, with interactive 3D graphics
Quora Top Writer 2018	Recognized for answering questions about mathematics and other topics on popular website