

Curriculum Vitae of Ewain Gwynne

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Education

- Ph.D., Mathematics (expected)** Sep. 2013—(Jun. 2018)
Massachusetts Institute of Technology
Adviser: Scott Sheffield
- B.A., Mathematics & Mathematical Methods in the Social Sciences** Sep. 2009—Jun. 2013
Northwestern University
Honors in Mathematics, Summa Cum Laude (G.P.A. 4.0/4.0)

Research interests

Probability theory, especially statistical mechanics, Schramm-Loewner evolution, random planar maps, Liouville quantum gravity, and Brownian surfaces.

Articles

- 1. Random walk on random planar maps: spectral dimension, resistance, and displacement** (with Jason Miller). *ArXiv e-prints*, 2017. arxiv:1711.00836
- 2. A mating-of-trees approach for graph distances in random planar maps** (with Nina Holden and Xin Sun). *ArXiv e-prints*, 2017. arxiv:1711.00723
- 3. The Tutte embedding of the mated-CRT map converges to Liouville quantum gravity** (with Jason Miller and Scott Sheffield). *ArXiv e-prints*, 2017. arxiv:1705.11161
- 4. Convergence of percolation on uniform quadrangulations with boundary to SLE_6 on $\sqrt{8/3}$ -Liouville quantum gravity** (with Jason Miller). *ArXiv e-prints*, 2017. arxiv:1701.05175
- 5. Characterizations of SLE_κ for $\kappa \in (4, 8)$ on Liouville quantum gravity** (with Jason Miller). *ArXiv e-prints*, 2017. arxiv:1701.05174
- 6. Convergence of the free Boltzmann quadrangulation with simple boundary to the Brownian disk** (with Jason Miller). *ArXiv e-prints*, 2017. arxiv:1701.05173
- 7. Chordal SLE_6 explorations of a quantum disk** (with Jason Miller). *ArXiv e-prints*, 2017. arxiv:1701.05172
- 8. Convergence of the self-avoiding walk on random quadrangulations to $\text{SLE}_{8/3}$ on $\sqrt{8/3}$ -Liouville quantum gravity** (with Jason Miller). *ArXiv e-prints*, 2016. arxiv:1608.00956
- 9. Metric gluing of Brownian and $\sqrt{8/3}$ -Liouville quantum gravity surfaces** (with Jason Miller). *ArXiv e-prints*, 2016. arxiv:1608.00955
- 10. Scaling limit of the uniform infinite half-plane quadrangulation in the Gromov-Hausdorff-Prokhorov-uniform topology** (with Jason Miller). *Electronic Journal of Probability*, volume 22 (2017), paper no. 84. arxiv:1608.00954
- 11. A distance exponent for Liouville quantum gravity** (with Nina Holden and Xin Sun). *ArXiv e-prints*, 2016. arxiv:1606.01214
- 12. Active spanning trees with bending energy on planar maps and SLE-decorated Liouville quantum gravity for $\kappa > 8$** (with Adrien Kassel, Jason Miller, and David Wilson). *ArXiv e-prints*, 2016. arxiv:1603.09722
- 13. Dimension transformation formula for conformal maps into the complement of an SLE curve** (with Nina Holden and Jason Miller). *ArXiv e-prints*, 2016. arxiv:1603.05161

14. **Joint scaling limit of a bipolar-oriented triangulation and its dual in the peanosphere sense** (with Nina Holden and Xin Sun). *ArXiv e-prints*, 2016. arxiv:1603.01194
15. **An almost sure KPZ relation for SLE and Brownian motion** (with Nina Holden and Jason Miller). *ArXiv e-prints*, 2015. arxiv:1512.01223
16. **Scaling limits for the critical Fortuin-Kasteleyn model on a random planar map III: finite volume case** (with Xin Sun). *ArXiv e-prints*, 2015. arxiv:1510.06346
17. **Brownian motion correlation in the Peanosphere for $\kappa > 8$** (with Nina Holden, Jason Miller, and Xin Sun). *Annales de l'Institut Henri Poincaré*, to appear. arxiv:1510.04687
18. **Asymptotic behavior of the Eden model with positively homogeneous edge weights** (with Sébastien Bubeck). *ArXiv e-prints*, 2015. arxiv:1508.05140
19. **Scaling limits for the critical Fortuin-Kasteleyn model on a random planar map II: local estimates and empty reduced word exponent** (with Xin Sun). *Electronic Journal of Probability*, volume 22 (2017), paper no. 45. arxiv:1505.03375
20. **Scaling limits for the critical Fortuin-Kasteleyn model on a random planar map I: cone times** (with Cheng Mao and Xin Sun). *ArXiv e-prints*, 2015. arxiv:1502.00546
21. **Almost sure multifractal spectrum of SLE** (with Jason Miller and Xin Sun). *Duke Mathematical Journal*, to appear. arxiv:1412.8764

Undergraduate papers

22. **On Beckner's Inequality for Gaussian Measures** (with Elton Hsu). *Elemente der Mathematik*, 2015.
23. **Functional Inequalities for Gaussian and Log-Concave Probability Measures**. Undergraduate Thesis, advised by Elton Hsu. *Northwestern University Undergraduate Research Journal*, 2013.
24. **On a Quaternionic Analogue of the Cross Ratio** (with Matvei Libine). *Advances in Applied Clifford Algebras*, 2012. arxiv:1112.0612
25. **The Poisson Integral Formula and Representations of $SU(1,1)$** . *Rose-Hulman Undergraduate Math Journal*, 2011.

Teaching and departmental service

1. **MIT Teaching Assistant** 2016-2017
I taught recitations for 18.03 (ordinary differential equations) in Spring 2016 and for 18.022 (multivariable calculus) in Fall 2016. I was a grader for 18.615 (intro to stochastic processes) in Spring 2017.
2. **Integration Bee co-organizer** 2014-2017
I was a co-organizer for the MIT integration bee, an event where undergraduate students compete to evaluate integrals and win prizes, in 2014, 2016, and 2017. I also contributed integrals in 2014, 2015, 2016, and 2017.
3. **Mentor for directed Reading Program** 2014, 2017
I mentored an MIT undergraduate student studying probability during MIT's Independent Activities Period (the month of January).
4. **Northwestern University undergraduate teaching assistant** 2011-2013
I taught discussion sections for four sections of integral calculus, one section of single variable differential calculus, and one section of multivariable differential calculus.
5. **Tutor.com online math tutor** 2010-2013

Employment and professional service

1. **Microsoft Research theory group intern, Redmond WA** Summer 2015
Mentored by Sébastien Bubeck and David Wilson.
2. **Reviewer for academic journals**
Annales de l'Institut Henri Poincaré, Proceedings of the London Mathematical Society.

Talks

1. Random Geometry followup workshop at the Isaac Newton Institute. (July 2018)
2. IMS Annual meeting on probability and statistics in Vilnius, Lithuania. (July 2018)
3. University of Pennsylvania probability seminar. (Feb. 2018)
4. Tel Aviv University probability seminar. (Dec. 2017)
5. Oberwolfach seminar: *Scaling limits of random planar maps and Liouville quantum gravity*. Oct. 2017
6. Zurich graduate student probability seminar. Oct. 2017
7. Zurich probability seminar. Oct. 2017
8. Princeton University topics in probability seminar. Sep. 2017
9. *Stochastic Analysis: Geometry of Random Processes* workshop at Oberwolfach. May 2017
10. Brown university discrete math seminar. Apr. 2017
11. AMS sectional meeting at Indiana University. Apr. 2017
12. *SLE, GFF, and LQG in NYC* workshop at Columbia University. Mar. 2017
13. Cornell probability seminar. Feb. 2017
14. *Recent developments in SLE* conference at the Institut Mittag-Leffler. Jun. 2016
15. MIT probability seminar. Feb. 2016
16. University of Chicago probability seminar. Jan. 2016
17. Michigan State University probability seminar. Nov. 2015
18. Northwestern University analysis seminar. Oct. 2015
19. Microsoft Research, Redmond, WA. Aug. 2015
20. *Conformally invariant scaling limits* conference at the Isaac Newton Institute. Jan. 2015
21. MIT Pure Math graduate seminar. Nov. 2014
22. MIT Pure Math graduate seminar. Feb. 2014

Awards

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| 1. MIT Presidential Fellowship | 2013 |
| 2. National Defense Science and Engineering Graduate Fellowship (NDSEG) | 2013 |
| 3. Putnam Exam Honorable Mention (ranked 49th) | 2013 |
| 4. Robert R. Welland Prize for Achievement in Mathematics by a Northwestern University Senior | 2013 |
| 5. Phi Beta Kappa Prize | 2013 |
| 6. Fletcher Undergraduate Research Prize | 2012 |
| 7. Oliver Marcy Scholarship | 2012 |
| 8. Barry M. Goldwater Scholarship | 2012 |
| 9. Northwestern Summer Undergraduate Research Grant | 2012 |