

Curriculum Vitae of Ewain Gwynne

University of Cambridge
Department of Mathematics and Mathematical Statistics

Employment

- Herchel Smith postdoctoral fellow** (starting Aug. 2018)
Department of Pure Mathematics and Mathematical Statistics, University of Cambridge. Three year appointment.
- Trinity College, Cambridge junior research fellow** Jul. 2018—Present
Four year appointment.
- Microsoft Research theory group intern, Redmond WA** Jun. 2015—Aug. 2015
Mentored by Sébastien Bubeck and David Wilson.

Education

- Ph.D., Mathematics** 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

Articles published or accepted for publication

1. **Chordal SLE₆ explorations of a quantum disk** (with Jason Miller). *Electronic Journal of Probability*, to appear. arxiv:1701.05172
2. **Convergence of the free Boltzmann quadrangulation with simple boundary to the Brownian disk** (with Jason Miller). *Annales de l'Institut Henri Poincaré*, to appear. arxiv:1701.05173
3. **Scaling limit of the uniform infinite half-plane quadrangulation in the Gromov-Hausdorff-Prokhorov-uniform topology** (with Jason Miller). *Electronic Journal of Probability*, 2017. arxiv:1608.00954
4. **A distance exponent for Liouville quantum gravity** (with Nina Holden and Xin Sun). *Probability Theory and Related Fields*, to appear. arxiv:1606.01214
5. **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). *Communications in Mathematical Physics*, 2018. arxiv:1603.09722
6. **Brownian motion correlation in the Peanosphere for $\kappa > 8$** (with Nina Holden, Jason Miller, and Xin Sun). *Annales de l'Institut Henri Poincaré*, 2017. arxiv:1510.04687
7. **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*, 2017. arxiv:1505.03375
8. **Scaling limits for the critical Fortuin-Kasteleyn model on a random planar map I: cone times** (with Cheng Mao and Xin Sun). *Annales de l'Institut Henri Poincaré*, to appear. arxiv:1502.00546

9. **Almost sure multifractal spectrum of SLE** (with Jason Miller and Xin Sun). *Duke Mathematical Journal*, to appear. arxiv:1412.8764

Articles posted to the arXiv

10. **Harmonic functions on mated-CRT maps** (with Jason Miller and Scott Sheffield). 2018. arXiv:1807.07511
11. **An invariance principle for ergodic scale-free random environments** (with Jason Miller and Scott Sheffield). 2018. arXiv:1807.07515
12. **Anomalous diffusion of random walk on random planar maps** (with Tom Hutchcroft). *ArXiv e-prints*, 2018. arXiv:1807.01512
13. **The fractal dimension of Liouville quantum gravity: universality, monotonicity, and bounds** (with Jian Ding). 2018. arXiv:1807.01072
14. **Connectivity properties of the adjacency graph of SLE_κ bubbles for $\kappa \in (4, 8)$** (with Josh Pfeffer). 2018. arxiv:1803.04923
15. **Random walk on random planar maps: spectral dimension, resistance, and displacement** (with Jason Miller). 2017. arxiv:1711.00836
16. **A mating-of-trees approach for graph distances in random planar maps** (with Nina Holden and Xin Sun). 2017. arxiv:1711.00723
17. **The Tutte embedding of the mated-CRT map converges to Liouville quantum gravity** (with Jason Miller and Scott Sheffield). 2017. arxiv:1705.11161
18. **Convergence of percolation on uniform quadrangulations with boundary to SLE_6 on $\sqrt{8/3}$ -Liouville quantum gravity** (with Jason Miller). 2017. arxiv:1701.05175
19. **Characterizations of SLE_κ for $\kappa \in (4, 8)$ on Liouville quantum gravity** (with Jason Miller). 2017. arxiv:1701.05174
20. **Convergence of the self-avoiding walk on random quadrangulations to $SLE_{8/3}$ on $\sqrt{8/3}$ -Liouville quantum gravity** (with Jason Miller). 2016. arxiv:1608.00956
21. **Metric gluing of Brownian and $\sqrt{8/3}$ -Liouville quantum gravity surfaces** (with Jason Miller). 2016. arxiv:1608.00955
22. **Dimension transformation formula for conformal maps into the complement of an SLE curve** (with Nina Holden and Jason Miller). 2016. arxiv:1603.05161
23. **Joint scaling limit of a bipolar-oriented triangulation and its dual in the peanosphere sense** (with Nina Holden and Xin Sun). 2016. arxiv:1603.01194
24. **An almost sure KPZ relation for SLE and Brownian motion** (with Nina Holden and Jason Miller). 2015. arxiv:1512.01223
25. **Scaling limits for the critical Fortuin-Kasteleyn model on a random planar map III: finite volume case** (with Xin Sun). 2015. arxiv:1510.06346
26. **Asymptotic behavior of the Eden model with positively homogeneous edge weights** (with Sébastien Bubeck). 2015. arxiv:1508.05140

Undergraduate papers

27. **On Beckner's Inequality for Gaussian Measures** (with Elton Hsu). *Elemente der Mathematik*, 2015.
28. **Functional Inequalities for Gaussian and Log-Concave Probability Measures**. Undergraduate Thesis, advised by Elton Hsu. *Northwestern University Undergraduate Research Journal*, 2013.
29. **On a Quaternionic Analogue of the Cross Ratio** (with Matvei Libine). *Advances in Applied Clifford Algebras*, 2012. arxiv:1112.0612
30. **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 each of Spring 2017 and Spring 2018.
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 2014-2018.
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

Professional service

1. **Reviewer for academic journals**
Annales de l'Institut Henri Poincaré, Proceedings of the London Mathematical Society, Communications in Mathematical Physics, Electronic Journal of Probability, etc.

Talks

1. Stochastic Processes and their Applications conference, Northwestern University. (July 2019)
2. Probability and quantum field theory: discrete models, CFT, SLE and constructive aspects conference, Porquerolle, France. (June 2019)
3. Random Geometry followup workshop at the Isaac Newton Institute. July 2018
4. IST Austria Summer School in Probability and Mathematical Physics. June 2018
5. University of Chicago proseminar in probability. Mar. 2018
6. Stony Brook University analysis seminar. Mar. 2018
7. Brown University graduate student conference. Feb. 2018
8. University of Pennsylvania probability seminar. Feb. 2018
9. Tel Aviv University probability seminar. Dec. 2017
10. Oberwolfach seminar: *Scaling limits of random planar maps and Liouville quantum gravity*. Oct. 2017
11. Zurich graduate student probability seminar. Oct. 2017
12. Zurich probability seminar. Oct. 2017
13. Princeton University topics in probability seminar. Sep. 2017
14. *Stochastic Analysis: Geometry of Random Processes* workshop at Oberwolfach. May 2017
15. Brown university discrete math seminar. Apr. 2017
16. AMS sectional meeting at Indiana University. Apr. 2017

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| 17. <i>SLE, GFF, and LQG in NYC</i> workshop at Columbia University. | Mar. 2017 |
| 18. Cornell probability seminar. | Feb. 2017 |
| 19. <i>Recent developments in SLE</i> conference at the Institut Mittag-Leffler. | Jun. 2016 |
| 20. MIT probability seminar. | Feb. 2016 |
| 21. University of Chicago probability seminar. | Jan. 2016 |
| 22. Michigan State University probability seminar. | Nov. 2015 |
| 23. Northwestern University analysis seminar. | Oct. 2015 |
| 24. Microsoft Research, Redmond, WA. | Aug. 2015 |
| 25. <i>Conformally invariant scaling limits</i> conference at the Isaac Newton Institute. | Jan. 2015 |
| 26. MIT Pure Math graduate seminar. | Nov. 2014 |
| 27. MIT Pure Math graduate seminar. | Feb. 2014 |

Awards

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| 1. Johnson Prize for a paper written by an MIT graduate student | 2018 |
| 2. NSF postdoctoral fellowship (declined) | 2018 |
| 3. MIT Presidential Fellowship | 2013 |
| 4. National Defense Science and Engineering Graduate Fellowship (NDSEG) | 2013 |
| 5. Putnam Exam Honorable Mention (ranked 49th) | 2013 |
| 6. Robert R. Welland Prize for Achievement in Mathematics by a Northwestern University Senior | 2013 |
| 7. Phi Beta Kappa Prize | 2013 |
| 8. Fletcher Undergraduate Research Prize | 2012 |
| 9. Oliver Marcy Scholarship | 2012 |
| 10. Barry M. Goldwater Scholarship | 2012 |
| 11. Northwestern Summer Undergraduate Research Grant | 2012 |