Jacob Richey

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I am a postdoctoral fellow at the Rényi Institute in Budapest. My research field is combinatorial probability, including current projects related to: stochastic particle systems, shifts of finite type, and mixing times for markov chains.

Employment

(2023-) Postdoctoral fellow, Alfréd Rényi Institute of Mathematics (Budapest, Hungary).
Faculty advisors: Gábor Pete, Balázs Ráth

(2020-2023) Postdoctoral fellow, University of British Columbia (Vancouver, Canada).
Faculty advisors: Omer Angel, Gordon Slade.

Education

(2014-2020) PhD Mathematics, University of Washington.
Advisor: Christopher Hoffman

(2010-2014) B.A. Mathematics and Chinese Language, Dartmouth College.
Thesis advisor: Peter Winkler.

Publications

1. *Shifts of Finite Type Obtained by Forbidding a Single Pattern*. Nishant Chandgotia, Brian Marcus, Jacob Richey, Chengyu Wu. (In preparation)
2. *Word length, bias, and symmetry in Penney's ante*. Matthew Drexel*, April Ju*, Peter Peng*, and Jacob Richey. (*Undergraduate. In preparation)
3. *Random walks on regular trees cannot be slowed down* Omer Angel, Jacob Richey, Yinon Spinka, Amir Yehudayoff. (Published in the Electronic Journal of Probability, 2024)
4. *Diffusion-limited annihilating-coalescing systems*. Sungwon Ahn, Matt Junge, Hanbaek Lyu, Lily Reeves, Jacob Richey, David Sivakoff. (Submitted to the Electronic Journal of Probability, 2023)
5. *Active phase for the Stochastic Sandpile on $\mathbb{Z}$* Chris Hoffman, Yiping Hu, Jacob Richey, Douglas Rizzolo. (Submitted to Communications on Pure and Applied Mathematics, 2023)
6. *Intersections of random sets.* Jacob Richey, Amites Sarkar. (Published in the Journal of Applied Probability, 2022)
7. *Active phase for activated random walk on $\mathbb{Z}$.* Chris Hoffman, Jacob Richey, Leonardo Rolla. (Accepted in Communications in Mathematical Physics, 2022)

8. *Rumor source detection with multiple observations under adaptive diffusion protocols.* Miklos Z. Racz, Jacob Richey. (Published in IEEE Transactions on Network Science and Engineering, 2021)

9. *Activated random walk on a cycle*. Riddhipratim Basu, Shirshendu Ganguly, Chris Hoffman, Jacob Richey. (Published in Annales de l'Institut Henri Poincaré, 2019)

10. *A smooth transition from Wishart to GOE*. Miklos Racz, Jacob Richey. (Published in the Journal of Theoretical Probability, 2018)

11. *Counting clusters on a grid*. Jacob Richey. (Undergraduate honors thesis, Dartmouth College, 2014.)

Invited talks

Patterns, hitting times and entropy for shifts of finite type. Kutszem '24 (Renyi Institute); Rutgers combinatorics seminar '23; PIMS dynamics seminar '23 (UBC).

Finding the source of a random diffusion. (slides). Cornell probability seminar '23; CUNY probability seminar '23; Dartmouth colloquium '21; University of Victoria probability seminar '21.

Phase transition for activated random walk and the stochastic sandpile. (slides). Kutszem '23 (Renyi Institute); University of Delaware probability seminar '23; Cornell probability seminar '20; Random Structures and Algorithms '23; CRM Workshop '22 (Montreal); AMS Special Session on Stochastic Spatial Models, JMM '20 (Denver).

Rumor source detection with multiple observations under adaptive diffusion protocols. (slides). SIAM Workshop on Network Science '18 (Portland, OR); Dynasnet Workshop '23 (Lednice, Czech Republic).

Phase transition for parking with coalescence. Northwest Probability Seminar '22.

Teaching & Outreach

(Spring, 2024) Taught a 2-month long mini-course on topics in large deviations at the Renyi Institute, for graduate students, postdocs and faculty.

(September 2022) Volunteer at STEM Britannia science event. Vancouver, BC

(2020-2023) Lead instructor for multiple undergraduate courses in probability and calculus at University of British Columbia. Class sizes ranged from 50 to 120. I was often in charge of one or two TAs.

(2016-2021) Ran the second year course for UW Math Circle, a math outreach program for advanced middle and high school students. Designed, tested, and taught new interactive lessons and activities in game theory, group theory, geometry, probability, and number theory.

(2016-2020) Lead instructor for 10+ undergraduate courses in advanced multivariable calculus and linear algebra at University of Washington. Class sizes ranged from 30 to 50.

(Summer, 2015) Junior staff at Hampshire College Summer Studies in Mathematics. Led problem sessions, wrote and graded problem sets, and taught mini-courses. (Six days a week, 8 hours a day for 2 months.)

(2012-2014) Personal tutor for students in mathematics courses at Dartmouth College

Undergraduate mentoring

(2021-2023) Undergraduate Research Opportunities REX at UBC. Mentor for two undergraduate research groups, usually 3 or 4 students, over the course of a year, culminating in a poster session. One project recently led to a submitted publication. Topics: street light percolation, coin bias in Penney's ante.

(2015-2020) Washington Experimental Mathematics Lab (WXML). Co-led two undergraduate research projects, usually 3 or 4 students, over the course of a year or more, culminating in a poster presentation. Topics: statistics for random walks, randomness of the discrete logarithm.

(Summer, 2015) University of Washington Inverse Problems REU. Gave a lecture at the REU colloquium, and advised an undergraduate student research project that resulted in a publication (link).

Organizing & Service

(2021-2023) Organizer, UBC probability seminar. Selected and coordinated speaker visits (some zoom), and maintained the seminar website (link).

(2023-) Reviewer for MR reviews

Peer reviewer for: *Journal of the London Mathematical Society*, *Electronic Journal of Probability*, *Stochastic Models*

Conferences/visits

Saint-Flour Probability Summer School, July 2024. Saint-Flour, France

Random Structures and Algorithms, June 2023. Pittsburgh, PA

Northwest Probability Seminar, October 2022. Seattle, WA

CRM Workshop on Interacting Particle Systems and Hydrodynamic Limits, March 2022. Montreal, CA

Permutations and Probability (BIRS), September 2021. Banff, Canada

JMM 2020. Denver, CO

AMS MRC on Stochastic Spatial Models, Summer 2019. Providence, RI

Virginia Integrable Probability Summer School 2019. UVA, Charlottesville, VA

Visitor at NYU Shanghai, May 2019. Sponsor: Leonardo Rolla. Shanghai, China

Northwestern Probability Summer School, 2018. Northwestern University, Evanston, IL

Recent trends in Continuous and Discrete Probability, 2018. Georgia Tech, Atlanta, GA

Awards

Gerald B. Folland Fellowship (2019)

Other

Resident of New York City

Languages: Python, Mathematica, Matlab, LaTeX, Mandarin Chinese

Last updated: August 20, 2024