

Milind Hegde

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Employment

- October 2025 – Nanyang Technological University, Singapore.
Nanyang Assistant Professor (tenure-track).
- Spring 2022 – Columbia University, New York, NY.
August 2025 Joseph F. Ritt Assistant Professor (Spring 2022). Postdoctoral Research Scientist (Summer 2022–August 2025).
- Fall 2021 Mathematical Sciences Research Institute, Berkeley, CA.
Gamelin Endowed Postdoctoral Fellow at the programme *Universality and Integrability in Random Matrix Theory and Interacting Particle Systems*.

Education

- 2016 – 2021 Ph.D., Mathematics, *University of California, Berkeley*.
Advised by Alan Hammond & Shirshendu Ganguly.
- 2012 – 2016 Bachelor of Science, *Indian Institute of Science*, Bangalore. Major in Mathematics.

Research Interests

Probability theory, specifically stochastic growth models and Kardar-Parisi-Zhang universality, with a focus on Gibbsian line ensembles, last passage percolation, and integrable or exactly solvable models.

Grants & Honors

- Nanyang Assistant Professorship and research support grant, 2025 – 2030, Nanyang Technological University.
- NSF Award DMS-2348156, 2024 – 2025, National Science Foundation (*cut short due to move to Singapore*).
- US Junior Oberwolfach Fellow, October 2024, Mixing Times in the Kardar-Parisi-Zhang Universality Class.
- Friedman Memorial Prize in Applied Mathematics, 2020, UC Berkeley Mathematics Department.
- Richman Fellowship, 2019 – 2020 academic year, UC Berkeley Mathematics Department.

Publications

1. *The lower tail of q -pushTASEP*.
With Ivan Corwin. *Comm. Math. Phys.*, 405, no. 3, 64 (2024).
2. *Brownian structure in the KPZ fixed point*.
With Jacob Calvert and Alan Hammond. *Astérisque*, vol. 441 (2023).
3. *Local and global comparisons of the Airy difference profile to Brownian local time*.
With Shirshendu Ganguly. *Ann. Inst. H. Poincaré Probab. Statist.*, 59, no. 3, 1342–1374 (2023).
4. *Optimal tail exponents in general last passage percolation via bootstrapping & geodesic geometry*.
With Shirshendu Ganguly. *Probab. Theory Relat. Fields*, 186, no. 1–2, 221–284 (2023).
5. *Exceptional times when the KPZ fixed point violates Johansson's conjecture on maximizer uniqueness*.
With Ivan Corwin, Alan Hammond, and Konstantin Matetski. *Electron. J. Probab.*, 28, no. 11, 1–81 (2023).

6. *Interlacing and scaling exponents for the geodesic watermelon in last passage percolation.*
With Riddhipratim Basu, Shirshendu Ganguly, and Alan Hammond. *Comm. Math. Phys.*, 393, no. 3, 1241–1309 (2022).
7. *Lower Deviations in β -ensembles and Law of Iterated Logarithm in Last Passage Percolation.*
With Riddhipratim Basu, Shirshendu Ganguly, and Manjunath Krishnapur. *Israel J. Math.*, 242, no. 1, 291–324 (2021).
8. *Critical point for infinite cycles in a random loop model on trees.*
With Alan Hammond. *Ann. Appl. Probab.*, 29, no. 4, 2067–2088 (2019).

Preprints

9. *van den Berg–Kesten–type correlation inequalities for disjoint polymers in the KPZ universality class.*
With Shirshendu Ganguly and Lingfu Zhang. *arXiv:2512.17823*.
10. *Scaling limit and tail bounds for a random walk model of SOS level lines.*
With Yujin H. Kim and Christian Serio. *arXiv:2502.10384*.
11. *KPZ fixed point convergence of the ASEP and stochastic six-vertex models.*
With Amol Aggarwal and Ivan Corwin. *arXiv:2412.18117*.
12. *Large deviation principle for the stationary measures of open asymmetric simple exclusion processes.*
With Zongrui Yang. *arXiv:2412.12026*.
13. *Scaling limit of the colored ASEP and stochastic six-vertex models.*
With Amol Aggarwal and Ivan Corwin. *arXiv:2403.01341*.
14. *Brownian bridge limit of path measures in the upper tail of KPZ models.*
With Shirshendu Ganguly and Lingfu Zhang. *arXiv:2311.12009*.
15. *Sharp upper tail behavior of line ensembles via the tangent method.*
With Shirshendu Ganguly. *arXiv:2208.08922*.

Expository Writing

16. *Fractal structure in the directed landscape.*
With Shirshendu Ganguly. *Probability and Stochastic Processes: A Volume in Honour of Rajeeva L. Karandikar*, 129–147 (2024).

Invited Talks

- National University of Singapore Probability Seminar; October 2025.
- Analysis and Probability Research Group Seminar, Indian Institute of Science, Bangalore; September 2025.
- Nanyang Technological University, Singapore, Mathematics Colloquium; May 2025.
- All roads to the KPZ universality class; American Institute of Mathematics, Pasadena; March 2025.
- University of British Columbia Mathematics Colloquium; January 2025.
- Indiana University Mathematics Colloquium; December 2024.
- Mixing Times in the Kardar-Parisi-Zhang Universality Class, Oberwolfach; November 2024.
- North Carolina State University Mathematics Colloquium; November 2024.
- Harvard Probability Seminar; October 2024.
- Los Angeles Probability Forum; October 2024.
- University of Washington, Seattle Probability Seminar; October 2024.
- University of British Columbia Probability Seminar; October 2024.
- Analysis and Probability Research Group Seminar, Indian Institute of Science, Bangalore; May 2024.

- KPZ Meets KPZ workshop, Fields Institute, Toronto; March 2024.
- CRM-ISM Probability Seminar, Montreal; February 2024.
- Integrable Systems and Random Matrix Theory Seminar, University of Michigan; November 2023.
- Stochastic Processes and Applications 2023, Lisbon, Portugal; July 2023.
- Random growth models and KPZ universality; BIRS, Banff, Canada; May 2023.
- Columbia-Princeton Probability Day 2023; April 2023.
- MIT Probability Seminar; March 2023.
- University of Wisconsin, Madison Probability Seminar; February 2023.
- KTH Random Matrix Theory Seminar; October 2022.
- University of Maryland Probability Seminar; October 2022.
- University of Virginia Probability Seminar; April 2022.
- Temple University/University of Pennsylvania Probability Seminar; April 2022.
- University of Chicago Probability Seminar; April 2022.
- City University of New York Probability Seminar; April 2022.
- Probability in the City (Columbia-NYU Seminar); October 2021.
- University of Utah Stochastics Seminar; October 2021.
- Cornell Probability Seminar; April 2021.
- Stanford Probability Seminar; March 2021.
- Berkeley Probability Seminar; January 2021, August 2020, February 2019.
- Purdue Probability Seminar; September 2020.
- Junior Integrable Probability Seminar; July 2020.
- Open Online Probability School; June 2020.
- Bangalore Probability Seminar; January 2020, January 2019.

Contributed Talks

- One World Symposium, August 2020.

Conferences & Summer Schools Attended

- Emerging Synergies between Stochastic Analysis and Statistical Mechanics; BIRS, Banff; (October 2025)
- All roads to the KPZ universality class; American Institute of Mathematics, Pasadena; March 2025.
- Mixing Times in the Kardar-Parisi-Zhang Universality Class; Oberwolfach; November 2024.
- Universality & Integrability in KPZ; Columbia University; March 2024.
- KPZ Meets KPZ; Fields Institute, Toronto; March 2024.
- International Colloquium on randomness, geometry, and dynamics; TIFR, Mumbai; January 2024.
- The Asymmetric Simple Exclusion Process; Stony Brook; October 2023.
- Stochastic Processes and Applications; Lisbon, Portugal; July 2023.
- Simons Symposium on Solvable Lattice Models and Interacting Particle Systems; June 2023.
- Random growth models and KPZ universality; BIRS, Banff, Canada; May 2023.
- Topics in High Dimensional Probability; ICTS Bangalore; January 2023.
- Bernoulli-IMS One World Symposium; online; August 2020.
- Eighth Pacific Rim Conference in Mathematics; online; August 2020.
- Persi Diaconis' 75th Birthday Conference; Stanford University; February 2020.
- MSRI Summer School (Mathematics of Machine Learning); University of Washington; August 2019.
- Cornell Probability Summer School; June 2019.

- Seminar on Stochastic Processes; University of Utah; March 2019.
- Universality in Random Structures; ICTS Bangalore; January 2019.
- PCMI Summer School on Random Matrix Theory; Park City; June 2017.

Service

- Refereed for *Acta Mathematica*; *Annales de l'Institut Henri Poincaré*; *Annals of Probability*; *Astérisque*; *Communications in Mathematical Physics*; *Electronic Journal of Probability*; *International Mathematics Research Notices*; *Journal d'Analyse Mathématique*; *Journal of the American Mathematical Society*; *Mathematical Physics, Analysis and Geometry*; *Probability and Mathematical Physics*; *Probability Theory and Related Fields*; and *Selecta Mathematica*.
- Co-organized initiative to provide financial aid to undergraduates of the Indian Institute of Science to pay US PhD program application fees in 2019, 2020, 2021, 2022, and 2023.
- Served as a jury member for the UAA Academic Research Conference, 2023 (a Turkey-based program for high school students to write a research paper).

At Columbia University:

- Co-organized Probability seminar, Fall 2022 – Spring 2024.
- Co-organized Sonia Kovalevsky Day (math outreach program for young women in middle school), Fall 2023, and helped run the event in Fall 2024.
- Co-organized Probability and the City seminar (joint between Columbia and NYU), Spring 2022 (weekly), as well as Fall 2022, Spring 2023, Fall 2023, and Spring 2024 (now a twice semesterly event).
- Co-organized a KPZ probability workshop at Columbia, May 2023.
- Co-organized Columbia-Princeton Probability Day 2023.
- Co-organized Northeast Probability Seminar in 2021 and 2022.

At UC Berkeley:

- Organized the Probability Student Seminar, Fall 2018 – Spring 2021.
- Served in the math student diversity group, Spring 2017 – 2021.
- Assisted in organizing the *Eighth Pacific Rim Conference in Mathematics*, held online in August 2020, with local organizers Alan Hammond and Fraydoun Rezakhanlou.

Teaching & Mentoring

- Planned and taught two courses in “Monsoon Mathematics 2021”, an online summer camp for motivated high school students in India.

At Columbia University:

- Courses taught: Intro to Modern Analysis II (Fall 2022, Fall 2023, and Fall 2024), Honors Probability theory (Spring 2022).
- Mentored four undergraduate students (Stanley Jian, Charles Beck, Harrison Wang, Catherine Lyu) in the Columbia Math Department REU program (Summer 2022).
- Advised, with Ivan Corwin, the undergraduate senior thesis of Shiyang Shen (Fall 2022–Spring 2023).
- Mentored an undergraduate student, James Stephens, on independent research being supervised by Ivan Corwin (Summer 2024).

At UC Berkeley:

- Teaching assistant at for six courses: Concepts of Probability, Intro to PDE, Linear Algebra, Mathematical Methods of Optimization, Mathematics for Biologists (Parts A & B).
- Served as a mentor in the math department's Directed Reading Program for two semesters, meeting with an undergraduate student weekly as they studied an advanced topic.