

# RANDOM GROWTH MODELS, PHASE SEPARATION AND HAMILTONI–JACOBI PDE

Summer Graduate School, University of California–Berkeley  
June 15 to 26, 2026

## PREREQUISITES

The prerequisites for the summer school are a class in real analysis at the introductory graduate level, including the construction of Lebesgue measure, the Lebesgue integral and the Radon–Nikodym theorem, and point-set topology including compactness and continuity. This material corresponds to the first three chapters in

- [1] G. B. FOLLAND, *Real analysis: modern techniques and their applications*, 2nd ed., Pure and Applied Mathematics (New York), Wiley, New York, NY, 1999, ISBN 0-471-31716-0. [Errata to printings 1–5](#). [Errata to printings 6+](#). [MR](#) [Zbl](#)

In addition, students should have some familiarity with probability at an advanced undergraduate level: random variables, expectations, convergence of random variables, the law of large numbers, the central limit theorem and discrete-time martingales. This material is covered in the first nine chapters of

- [2] J. B. WALSH, *Knowing the odds: an introduction to probability*, Graduate Studies in Mathematics **139**, American Mathematical Society, Providence, RI, 2012, ISBN 978-0-8218-8532-1. [MR](#) [Zbl](#)

Students should have taken a class that covers a significant span of this material, and may further prepare by reading such texts as Walsh’s.

The school does not require formal prerequisites in partial differential equations. In practice, it may be helpful to prepare by reading about Hamilton–Jacobi PDE and conservation laws in Sections 3.3 and 3.4 of

- [3] L. C. EVANS, *Partial differential equations*, 2nd ed., Graduate Studies in Mathematics **19**, American Mathematical Society, Providence, RI, 2010, Third printing of 2nd edition, 2022. ISBN 978-0-8218-4974-3. [MR](#) [Zbl](#)

## REFERENCES

- [4] P. MÖRTERS and Y. PERES, *Brownian motion*, Cambridge Series in Statistical and Probabilistic Mathematics **30**, Cambridge University Press, Cambridge, England, 2010, ISBN 978-0-521-76018-8 ([alternate link](#)). [MR](#) [Zbl](#)

This is a well written authoritative presentation of Brownian motion, which plays a basic role in the theory being harnessed at the summer school on the continuous side.

- [5] D. ROMIK, *The surprising mathematics of longest increasing subsequences*, Institute of Mathematical Statistics Textbooks 4, Cambridge University Press, New York, NY, 2015, ISBN 978-1-107-42882-9; 978-1-107-07583-2 ([alternate link](#)). [MR](#) [Zbl](#)

This is a well written account of the overall topic of last passage percolation and related themes.

- [6] H. MCKEAN, *Probability: the classical limit theorems*, Cambridge University Press, Cambridge, England, 2014, ISBN 978-1-107-62827-4; 978-1-107-05321-2. [MR](#) [Zbl](#)

This text is full of interesting calculations and perspectives and is recommended on that basis, rather than because a particular aspect is needed: it would be edifying to dip into.