

Benjamin Holland Young

PhD Researcher in Probability, University of Bath

bjshy20@bath.ac.uk

linkedin.com/in/benhollandyoung | github.com/benhollandyoung

Research Interests

Probability theory, statistical mechanics, percolation, random graphs, critical phenomena, and discrete random structures. My current research concerns near-critical Bernoulli bond percolation on slabs, with a particular interest in critical exponents, scaling relations, Russo–Seymour–Welsh type theory, and the extent to which two-dimensional percolation methods extend to quasi-planar graphs. I am also interested in how different fields of mathematics connect to probability such as group theory and complex analysis.

Education

PhD in Probability, University of Bath

2025 – Present

- First-year PhD researcher in probability within the Statistical Applied Mathematics at Bath (SAMBa) Centre for Doctoral Training.
- Current research project: studying Bernoulli bond percolation on slabs, with the aim of obtaining bounds on critical exponents and understanding near-critical behaviour, supervised by Christoforos Panagiotis.
- First-year CDT training involved advanced courses in probability, statistics, numerical methods, mathematical modelling, and machine learning as well as collaborative research projects.

MMath Mathematics, First Class Honours, University of Bath

2020 – 2025

- MMath dissertation on spine techniques for branching processes, supervised by Cécile Mailler.
- Relevant courses include Probability with Martingales, Discrete Probability, Stochastic Processes and Finance, and Markov Processes.

Research Projects

Critical Exponents for Bond Percolation on Slabs

2025 – Present

- Investigating Bernoulli bond percolation on slabs.
- Studying whether two-dimensional techniques can be adapted to obtain quantitative information on critical and near-critical behaviour.
- Current interests include Russo–Seymour–Welsh theory on slabs, arm events, critical exponents, scaling relations, gluing arguments, and differential inequalities.

Random Graph Models for Plasmid Similarity Networks

2026

- First-year SAMBa CDT project on modelling plasmid similarity networks using random graph models rather than hard thresholding rules, supervised by Matthew Nunes.
- Used distance-based covariates derived from genomic sequence representations to construct and investigate community structure in random similarity networks.

Spine Techniques for Branching Processes

2024 – 2025

- MMath dissertation on spine techniques for branching processes investigating the occurrence of localised and non-localised behaviour.
- Included simulation work in Python and presentation of results to peers and academic staff.

Abelian Sandpile Model and Conformal Invariance

2023

- Summer research project implementing the Abelian sandpile model in Python using **NetworkX**, with a goal to investigate conformal invariance behaviour and the effect of Möbius transformations on toppling distributions. This project was supervised by Antal A. Járai.

Teaching and seminars

Casual Teaching Assistant, University of Bath

2025 – Present

- Delivered tutorials and supported first-year undergraduate students in probability and statistics.
- Marked problem sheets and R-based coursework, providing written feedback.

Student-Led Symposia, University of Bath

2025 – Present

- Helped organise a session on data visualisation with data visualisation expert Nicola Rennie.

Technical Skills

- **Programming:** Python, R, SQL, C++.
- **Python libraries:** NumPy, Pandas, PyTorch, Matplotlib, NetworkX, scikit-learn.

Additional Information

- Languages: English native, French C1, German B1.