

EDUCATION **HARVARD UNIVERSITY** Cambridge, MA, USA

PhD in Molecular and Cellular Biology, March 2020

Secondary Field: Computational Science and Engineering.

Honors: Awarded a **Harvard Quantitative Biology Student Award** (2019); Awarded a **Graduate Society Term-time Research Fellowship** to allow outstanding GSAS students to focus their time on research (2018); Awarded a **James Mills Peirce Fellowship** (2014) for exceptional incoming graduate students; Awarded the **William Georgetti Scholarship** for exceptional students (August 2014 – June 2017); Two-time recipient of the **Bok Center Certificate of Distinction in Teaching** for Life Sciences 1A (2015) and for Systems Biology 200 (2016).

Activities: Writer, Science in the News; Researcher, Harvard Energy Journal Club; Chorister, Harvard Glee Club.

UNIVERSITY OF CAMBRIDGE

Cambridge, Cambridgeshire, UK

Master of Advanced Study in Theoretical Physics (MASt), June 2014

Honors: Awarded **Distinction** (*equivalent to magna cum laude*); Awarded a full-tuition **Gates-Cambridge Scholarship** from the Gates Cambridge Trust; Recipient of the **Bateman Scholars Prize** from Trinity Hall.

Thesis: The BEC-BCS Crossover, supervised by Prof. Ben Simons.

Activities: Volunteer, Cambridge Homeless Outreach Program; Chorister, Trinity Hall Chapel Choir; Rower, Trinity Hall Men's A squad.

VICTORIA UNIVERSITY OF WELLINGTON

Wellington, NZ

Bachelor of Science with Honors (BSc Hons), March 2013

Honors: Recipient of the **University Medal (Victoria University of Wellington Medal)** awarded to the **top graduating student in the faculty of science**. Awarded **First Class Honors** (*equivalent to magna cum laude*) in Physics.

Activities: Volunteer teaching with Laulotaha, a community programme for Tongan students; Co-founder of the VUW Science Society, a student representative group; Chorister, Wellington Youth Choir.

EXPERIENCE

April 2020- Present **ROJAS LAB, NEW YORK UNIVERSITY** New York, NY, USA

Postdoctoral Research Associate

I am currently excited to be working in the lab of Assistant Professor Enrique Rojas, researching the origin of cell density homeostasis in the gram positive bacterium *B. subtilis*, using a combination of stochastic modelling and experimental microbiology. This project employs skills that I developed during my PhD, such as developing and testing stochastic mathematical models of cellular processes, performing quantitative microscopy experiments in a microbial context, and employing quantitative image processing as a tool to greater understand cell physiology. At the same time, this project is extending me by prompting me to use different stochastic modelling frameworks, in addition to developing my knowledge and experience by working with a different experimental system.

Aug 2015- Jan 2020 **AMIR GROUP AND MURRAY LAB, HARVARD UNIVERSITY** Cambridge, MA, USA

PhD Candidate

Working with Assistant Professor Ariel Amir and Professor Andrew Murray, I researched the nature of size regulation in budding yeast through a combination of computational, theoretical and experimental approaches. This project resulted in two publications in internationally regarded journals, in addition to a theory-based project studying the growth rate of age-structured populations that is currently in its final stages of completion. Under the mentorship of Andrew and Ariel I developed greatly as a scientist, the practical implications of which included gaining experience mathematically modelling and simulating stochastic biological processes, developing custom image processing routines (available at my GitHub page listed above), analyzing biological data, and designing and performing experiments involving yeast genetic manipulations and quantitative live cell microscopy.

March 2017 **HARVARD GSAS SCIENCE POLICY GROUP** Washington, DC, USA

Delegate

During this visit to key U.S. governmental offices I gained an insight into the practical realities of working in science policy. Our visit included meetings at the White House Office of Science and Technology Policy, the Department of Homeland Security, the U.S. State Department and the National Academy of Sciences.

- Aug 2016-
Dec 2016 **SYSTEMS BIOLOGY 200, HARVARD UNIVERSITY** Cambridge, MA, USA
Teaching Fellow
 As a teaching fellow for this graduate survey course in systems biology under Prof. Jeremy Gunawardena, I helped select scientific literature for the teaching curriculum, ran small group discussion based sections, held office hours and assessed in-class presentations. For my performance in this role I received the Bok Center Certificate of Distinction in Teaching.
- Aug 2015-
Dec 2015 **LIFE SCIENCES 1A, HARVARD UNIVERSITY** Cambridge, MA, USA
Teaching Fellow
 As a teaching fellow for this 3 month introductory course in the biological sciences, my responsibilities including reviewing and assessing student comprehension of the course materials weekly and directing biweekly laboratory-based experiments for a group of 14. For my performance in this role I received the Bok Center Certificate of Distinction in Teaching.
- May 2015-
July 2015 **PHYSIOLOGY COURSE, MARINE BIOLOGICAL LABORATORY** Woods Hole, MA, USA
Student Participant
 The intensive and longstanding MBL physiology course provided me with rigorous training in experimental microbiology. My work focused on the application of diverse modern microscopy techniques to investigate projects on diverse biological systems, including tardigrades, ctenophores and the human oral microbiome. This course also exposed me to a wide variety of cellular biology subjects, through daily lectures delivered by over 40 respected researchers from around the world.
- Dec 2013-
May 2014 **PART III MATHEMATICS, UNIVERSITY OF CAMBRIDGE** Cambridge, Cambridgeshire, UK
Masters Student with Professor Ben Simons
 My Part III Essay (equivalent to a Master's thesis) was titled "The BEC-BCS crossover". For this project I was supervised by Professor Ben Simons. I reviewed the mathematical formulation of the BEC-BCS crossover, a phenomenon by which particles may have their quantum state tuned from the BCS state relevant to superconducting materials to the BEC state relevant to materials such as superfluids. For this project, and my performance in associated coursework, I was awarded the MAST degree with distinction.

PUBLICATIONS

- In review **Barber, F.**, Min, J., Murray, A. W., Amir, A. (2021) Modeling the impact of single-cell stochasticity and size control on the population growth rate in asymmetrically dividing cells. (In press at *PLOS Computational Biology*). DOI: 10.1101/2020.11.30.404012
- May 2020 **Barber, F.**, Amir, A., Murray, A. W. (2020). Cell size regulation in budding yeast does not depend on linear accumulation of Whi5. *Proceedings of the National Academy of Sciences*.
- October 2017 **Barber, F.**, Ho, P. Y., Murray, A., & Amir, A. (2017). Details Matter: noise and model structure set the relationship between cell size and cell cycle timing. *Frontiers in Cell and Developmental Biology*, 5, 92. Note: Also presented as a poster at ASCB | EMBO 2017 Meeting, 12/2/17-12/6/17, Philadelphia PA.
- April 2013 Tallon, J. L., **Barber, F.**, Storey, J. G., & Loram, J. W. (2013). Coexistence of the superconducting energy gap and pseudogap above and below the transition temperature of cuprate superconductors. *Physical Review B*, 87(14), 140508.

PUBLIC OUTREACH ARTICLES

- June 2019 **Barber, F.** (2019). Is it smoky in here? The importance of the clean air act in the 21st century. *Science In The News*.
- November 2017 **Barber, F.** (2017). The future of energy storage: a lost opportunity for the U.S.? (Dec. 6 2017). *Science In The News*.