Perry W.M. Ellis

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EDUCATION

PhD, Physics, Georgia Institute of Technology, Atlanta, GA 2011 – 2018

MSc, Physics, Georgia Institute of Technology, Atlanta, GA 2011 – 2012

BSc, Physics, Harvey Mudd College, Claremont, CA 2007 – 2011

WORK EXPERIENCE

Independent Consultant, Cambridge, MA 2019 – Present

- Provide technical consulting for microfluidic workflows and design throughout the product lifecycle
- Worked with clients from initial hardware setup, chip design, and knowledge transfer to design-for-manufacturing and part testing
- Primary focus in clinical diagnostics

Postdoctoral Research Fellow, Harvard University, Cambridge, MA 2018 – Present

- Identify impactful ideas and conduct research at the interface of microfluidics and biology
- Communicate scientific findings and problems to a diverse, interdisciplinary audience through both written (peer-reviewed publications, grants) and oral (poster presentations, conference talks, group meetings) media
- Mentor graduate students and manage team research projects to fulfill grant aims
- Use drop microfluidics for high-throughput deep mutational scanning of enzymes
- Built a full system (hardware, software, microfluidics, relevant biology) to screen mixed bacterial samples for cytotoxic phenotypes
- Investigated the role of droplet size on assay time and efficiency in digital-droplet LAMP assays
- Explored using droplet microfluidics as a point-of-care screen for SARS-CoV-2
- Explored using droplet microfluidics to create more homogeneous organoid systems from human embryonic stem cells

PhD Student, Georgia Institute of Technology, Atlanta, GA 2011 – 2018

- Performed experiments, analyzed data, wrote, and defended dissertation entitled, "Nematic materials in curved spaces"
- Used toroidal droplets to confine active and passive liquid crystals to understand how ordered materials interact with topological and geometrical constraints
- Implemented techniques from machine vision literature to interpret and analyze experimental data
- Developed a new experimental measurement techniques to analyze liquid crystal systems
- Mentored undergraduate students through long-term research projects resulting in peer-reviewed publications
- Graded tests and homework, gave lectures, held office hours, and developed laboratory modules for undergraduate and graduate courses

Graduate Teaching Assistant, Scripps College, Claremont, CA 2011

- Graded tests and homework, tutored students, and assisted with lectures for a post-baccalaureate physics course.

LEADERSHIP

- Coordinate and oversee "lab job" responsibilities for a lab of over 50 people 2019 – present
- Squishy Physics weekly seminar organizer 2019 – 2021
- New England Complex Fluids conference soundbite organizer 2018 – 2021
- FLAMEL program graduate student advisory board member 2015 – 2017

HONORS AND AWARDS

- Sigma Xi Research Award - Best PhD Thesis, Georgia Institute of Technology 2019
- FLAMEL Doctoral Fellowship, Georgia Institute of Technology 2015 – 2017
- Member, Gamma Beta Phi, Georgia Institute of Technology Chapter 2012 – 2014
- National Merit Scholar 2007 – 2011
- Harvey Mudd Merit Scholarship 2007 – 2011
- Harvey Mudd College Dean's List Spring 2008, 2009, 2011; Fall 2009, 2010

SELECTED PUBLICATIONS

P.W. Ellis, J. Nambisan, A. Fernández-Nieves, *Coherence-enhanced diffusion filtering applied to partially-ordered fluids*, Molecular Physics. **118**, e1725167 (2020)

P.W. Ellis, K. Nayani, J.P. McInerney, D.Z. Rocklin, M. Srinivasarao, E.A. Matsumoto, A. Fernández-Nieves, *Curvature-induced twist in homeotropic nematics*, PRL. **121**, 247803 (2018)

P.W. Ellis, S. Huang, S. Klaneček, J. Vallamkondu, E. Dannemiller, M. Vernon, Y.W. Chang, P.M. Goldbart, A. Fernández-Nieves, *Defect transitions in nematic liquid crystal capillary bridges*, PRE. **97**, 040701(R) (2018)

P.W. Ellis, D.J.G. Pearce, Y.W. Chang, G. Goldsztein, L. Giomi, A. Fernández-Nieves, *Curvature-induced defect unbinding and dynamics in active nematic toroids*, Nat. Phys. **14**, 85 (2018)

Full publication history found through my ORCID:0000-0002-3402-1964 .

SELECTED PRESENTATIONS

Better organoids through homogeneity. **P.W. Ellis**, G. Anand, Y.I. Yaman, D.A. Weitz, S. Ramanathan. ISCCR 2020 Annual Meeting, Virtual Conference, June 23, 2020. Poster Presentation

Active nematics on a toroid: exploring the interactions between order, curvature, and activity. **P.W. Ellis**, J. Nambisan, A. Fernandez-Nieves. Physics Colloquium, University of Massachusetts—Boston, November 1, 2019. Oral Presentation

Active nematics on the surface of a toroid. **P.W. Ellis**, A. Fernandez-Nieves. Squishy Physics Seminar, Harvard University, October 10, 2019. Oral Presentation

TECHNICAL SKILLS

General Experimental Skills: Optical microscopy (use and system development); Soft lithography (use and process development); Mammalian cell culture; Bacterial cell culture, 3D printing
Microfluidics: Chip design, fabrication, and optimization (dropmaking, sorting, picoinjection, merging); External hardware/software design and implementation (dropmaking, sorting, picoinjection); Workflow design and optimization
Biochemical Assays: Immunostaining; RT-qPCR; RT-qLAMP and RT-ddLAMP (use and assay development); protein purification
General Software Skills: Python, MATLAB, LabVIEW, LaTeX, Microsoft Office Suite, AutoCAD (2D drafting), Fusion 360 (3D modeling), Linux, Git, Adobe Illustrator, Inkscape

ACADEMIC SERVICE

- Ad-hoc journal reviewer for:
  - Physical Review Letters
  - Physical Review E
  - Journal of Molecular Liquids
- President's undergraduate research awards reviewer 2013–2018