

Bryan T. Weinstein

<https://btweinstein.github.io/>

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Education

- **Harvard University** Cambridge, MA
PhD in Applied Physics Expected May 2018
 - Working Thesis Title: *Microbial Evolutionary Dynamics and Transport*
 - Applied stochastic, random-walk methods (spatial stochastic differential equations) to model the evolutionary dynamics of growing microbial colonies
 - Utilized fluid and solid mechanics to simulate microbial colony morphology
- **Harvard University** Cambridge, MA
PhD Secondary Field: Computational Science and Engineering (CSE) Expected May 2018
 - Completed advanced applied math and scientific computing courses
 - Learned state-of-the-art computational methods used in scientific research and data science
 - **Capstone:** Developed an OpenCL powered Lattice Boltzmann fluid mechanics simulation utilizing OpenGL for real-time visualization.
- **Harvard University** Cambridge, MA
S.M. in Applied Physics November 2014
 - Completed 12 courses: 4 physics core courses, 4 CSE courses, and 4 soft-matter/biophysics electives
 - GPA: 3.95/4.00
- **Case Western Reserve University** Cleveland, OH
Bachelor of Science in Engineering, Engineering Physics May 2012
 - GPA: 4.00/4.00, Summa Cum Laude, Valedictorian
 - Engineering Concentration: Aerospace Engineering
 - Senior Project: Simulating Interactions between Confined Spins and Ferromagnetic Vortices

Certifications

- **Engineer in Training (EIT)** Ohio
Active September 2012
 - Successfully passed Fundamentals of Engineering Exam, the first step towards becoming a licensed Professional Engineer (PE)

Analytical and Experimental Skills

- **Analytical**
 - Deep understanding of transport in all forms (mass, momentum, energy/heat) and ability to simulate it using standard finite volume CFD techniques or Lattice Boltzmann techniques
 - Ability to mesh and simulate fluid flows and reaction-diffusion problems using standard open-source tools such as OpenFOAM, gmsh, and Salome or custom-built tools such as my GPU-powered Lattice-Boltzmann simulation
 - Experience simulating multiphase flows using Lattice Boltzmann
 - Expert knowledge of Applied Mathematics, especially stochastic modeling involving the Master equation, the Fokker-Planck equation (PDEs), and (spatial) stochastic differential equations
 - Ability to efficiently create and calibrate physical models to experiment through core physics training

- **Experimental**

- Experienced at designing and conducting biological and soft matter experiments involving complex fluids; 4 years of research in a molecular biology laboratory
- Experienced at using rheometers to determine the rheology of fluids
- Significant experience using microscopy to image microbes

Computational Skills

- Developed over 30 GitHub repositories and wrote hundreds of Jupyter/IPython notebooks to create scientific simulations and analyze experimental data during my PhD (see my website above)
- Over 8 years of experience optimizing programs to run on multiple processors, graphics processing units (GPUs), and supercomputers
- Expert at using Jupyter/IPython Notebooks to explore, visualize, and analyze large tabular datasets and large collections of images
- Experienced at applying stochastic techniques to model and solve high-dimensional problems
- **Languages for General Scientific Computing:**
 - Python, Cython, OpenCL, CUDA, C, C++, Java, Mathematica, Matlab
- **Selected Python Packages and Tools:**
 - IPython/Jupyter Notebook, matplotlib, seaborn, numpy, scipy, pandas, scikit-image, pymc3, cython, cython.gsl, PyOpenCL, PyCuda
- **Fluid and Solid Mechanics Simulations:**
 - Lattice Boltzmann Method (custom-built code), OpenFOAM, SALOME, gmsh
- **Image Analysis Tools**
 - Python, OpenCL, ImageJ/Fiji

Fellowships and Awards

- **Institute for Applied Computational Science Scholarship** Cambridge, MA
Graduate Student September 2016 - September 2017
 - Wrote proposal and won a \$25,000 student scholarship from Harvard's Institute for Applied Computational Science (IACS)
 - Used funds to further develop my IACS capstone: an OpenCL-powered Lattice Boltzmann fluid mechanics simulator utilizing OpenGL for real-time visualization
- **Department of Energy Office of Science Graduate Fellowship** Washington, D.C.
Graduate Student September 2012 - September 2015
 - Wrote proposal to win a competitive fellowship that supports students pursuing training in areas relevant to Department of Energy (DOE). Selected out of 1,300 applicants; 50 fellowships awarded
 - Attended yearly conferences at National Laboratories; presented posters on my active research, networked with other DOE fellows and government officials
- **Harvard University Pierce Fellow** Cambridge, MA
Graduate Student September 2012 - September 2015
 - Won fellowship awarded to the highest caliber PhD students accepted into Harvard's School of Engineering and Applied Sciences (SEAS). Selected out of 150 students; 8 fellowships awarded

Publications

- [1] Bryan T. Weinstein, Maxim O. Lavrentovich, et al. “Genetic Drift and Selection in Many-Allele Range Expansions”. Submitted. 2017. URL: <http://biorxiv.org/content/early/2017/06/07/145631>.

Professional Organizations

- Tau Beta Pi Engineering Honor Society
- American Physical Society