

# Bryan T. Weinstein

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

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## Work Experience

- **MITRE** Bedford, MA  
*Lead Modeling & Simulation Engineer* April 2021 - Present  
*Senior Modeling & Simulation Engineer* August 2018 - April 2021
  - Ate chicken

## Education

- **Harvard University** Cambridge, MA  
*PhD in Applied Physics* Expected May 2018
  - Working Thesis Title: *Microbial Evolutionary Dynamics and Transport*
  - Designed experiments to study microbial colony growth on the surface of complex fluids and materials; applied stochastic, random-walk methods to model colony evolutionary dynamics
  - 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

## 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

## Analytical and Experimental Skills

- **Analytical**
  - Ability to efficiently create and calibrate mathematical models to data through core physics training
  - Expert knowledge of Applied Mathematics, especially stochastic modeling involving the Master equation, the Fokker-Planck equation (PDEs), and (spatial) stochastic differential equations
- **Experimental**
  - Adept at designing and conducting biological and soft matter experiments involving complex fluids and materials; four years of research in a molecular biology laboratory
  - Expertise in use of rheometers to quantify fluid rheology, microscopy to image microbial colonies, and computational tools to analyze images

## 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

## 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)

## Publications

- [1] Bryan T. Weinstein, Maxim O. Lavrentovich, et al. "Genetic Drift and Selection in Many-Allele Range Expansions." In: *PLOS Computational Biology* 13.12 (Dec. 2017). Article chosen for journal cover photo, e1005866. DOI: 10.1371/journal.pcbi.1005866. URL: <http://dx.plos.org/10.1371/journal.pcbi.1005866>.
- [2] B. T. Weinstein, S. Atis, et al. "Microbial Range Expansions on Liquid Substrates." In: *Physical Review X* 9.2 (June 2019). Equal first co-author. DOI: 10.1103/physrevx.9.021058. URL: <https://doi.org/10.1103/PhysRevX.9.021058>.
- [3] Severine Atis, Bryan T. Weinstein, et al. *Rocket yeast*. Video. Milton van Dyke Award as part of the DFD Gallery of Fluid Motion. Nov. 2021. DOI: 10.1103/physrevfluids.6.110507. URL: <https://doi.org/10.1103/PhysRevFluids.6.110507>.

## Professional Organizations

- Tau Beta Pi Engineering Honor Society
- American Physical Society