Bryan T. Weinstein

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Education

- **Harvard University** — Cambridge, MA
  PhD in Applied Physics — *Expected May 2018*
  - Advisors:
    - David R. Nelson: Professor of Physics and Applied Physics; Solomon Professor of Biophysics
    - Andrew W. Murray: Herschel Smith Professor of Molecular Genetics, Professor of Molecular and Cellular Biology, Director of FAS Center for Systems Biology
  - GPA: 3.96/4.00
- **Harvard University** — Cambridge, MA
  Secondary Field in Computational Science and Engineering — *Expected May 2018*
  - Took four advanced applied math and scientific computing courses
  - Learned how to use state-of-the-art computational methods in scientific research
  - Defended work in front of committee
- **Harvard University** — Cambridge, MA
  S.M. in Applied Physics — *Expected May 2014*
- **Case Western Reserve University** — Cleveland, OH
  Bachelor of Science in Engineering, Engineering Physics — *May 2012*
  - GPA: 4.00/4.00 (Summa Cum Laude)
  - Engineering Concentration: Aerospace Engineering
  - Senior Project: Simulating Interactions between Confined Spins and Ferromagnetic Vortices

Fellowships

- **Department of Energy Office of Science Graduate Fellowship** — Washington, D.C.
  Graduate Student — *September 2012 - September 2014*
  - Wrote proposal to win competitive fellowship supporting students pursuing training in areas relevant to Department of Energy (DOE)
  - Selected out of 1,300 applicants; only 50 fellowships awarded
  - Attended yearly conferences at National Laboratories; networked with other fellows and government officials
- **Harvard University Pierce Fellow** — Cambridge, MA
  Graduate Student — *September 2012 - September 2014*
  - 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; only 8 fellowships awarded

Graduate Research

- **Harvard University** — Cambridge, MA
  David R. Nelson & Andrew Murray: Physics, Molecular and Cellular Biology — *Sept 2013 - Present*
  - Combined nonequilibrium statistical mechanics and experimental molecular biology to quantify the evolutionary dynamics of microbial range expansions
  - Learned how to perform biological experiments in Dr. Andrew Murray's lab
  - Captured images via fluorescent microscopy; utilized Python and ImageJ extensively for analysis

- Analyzed and visualized extremely large sets of biological data
- Created simulations in Python and C++ to model range expansions

- **Harvard University** Cambridge, MA
  Phillipe Cluzel: Applied Physics, Molecular and Cellular Biology *Jan 2013 - Sept 2013*
  - Extended previous model to predict how spherical tumors respond to pairwise combinations of drugs
  - Learned how to use a tissue culture room and grew multiple tumor cell lines
  - Imaged tumors using standard microscopy techniques; used ImageJ to determine their sizes
  - Installed and maintained an OMERO image analysis server to help store and quantify images

- **Harvard University** Cambridge, MA
  Joanna Aizenberg: Materials Science, Chemistry, Chemical Biology *Sept 2012 - Jan 2013*
  - Studied the mechanism by which water droplets coordinate their motions and form patterns on biomimetic hydrophobic surfaces
  - Tracked motion of hundreds of randomly moving and merging droplets using ImageJ
  - Created simulation in C++ to model droplet motion and compared it with experimental results

Undergraduate Research

- **Rochester Institute of Technology** Rochester, NY
  George Thurston: Physics *May 2010 - August 2012*
  - Studied liquid crystal mixtures in the eye related to cataracts
  - Created computer simulations and animations with Mathematica
  - Demonstrated how liquid crystal composition affects the refractive index of the eye
  - Validated simulations with experimental data
  - Prepared results for scientific publication

- **Case Western Reserve University** Cleveland, OH
  Jesse Berezovsky: Physics *Aug 2010 - May 2012*
  - Examined control of optically active nanocrystal quantum dots (QDs) at room temperature using microscopic ferromagnet magnetization dynamics
  - Studied novel combinations of QDs and microscopic ferromagnets using the "Object Oriented Micro-Magnetic Framework" developed by National Institute of Standards and Technology
  - Analyzed data from simulations with Matlab and other Linux-based tools
  - Created custom animations to visualize simulations
  - Uncovered ferromagnet-spin interactions relevant to room-temperature quantum computing

- **Princeton Plasma Physics Laboratory** Princeton, NJ
  Harry Mynick: Theory and Computation Department *May 2011 - Aug 2011*
  - Participated in "Science Undergraduate Laboratory Internship" through Department of Energy
  - Designed graphical front end for previously developed Mathematica program that calculated important plasma physics quantities
  - Utilized state-of-the-art computer cluster for scientific computing
  - Distributed redesigned program to plasma physicists for broad usage

- **Case Western Reserve University** Cleveland, OH
  Corbin Covault: Physics *Sep 2009 - May 2010*
  - Identified faulty equipment at the Pierre Auger Cosmic Ray Observatory by analyzing data collected by 1600 Cherenkov surface detectors
  - Created programs to monitor detector performance in real time
  - Used findings to design improved surface detectors being built at "Northern Auger Site" in Colorado

- **Case Western Reserve University** Cleveland, OH
  Mark Gridley: SAGES department *Jan 2009 - Aug 2009*

- Designed a psychology study examining cross-modal perception of music
- Administered study to over 50 participants and analyzed results
- Co-authored a paper that was subsequently published in a peer-reviewed journal

Publications & Presentations

[1] B. Weinstein, J. Aizenberg, P. Cluzel, and D. Nelson. On emergent macroscopic behaviors imparted by microscopic rules. In *DOE SCGF Fellows Annual Meeting 2013*, SLAC National Accelerator Laboratory, Lawrence Berkeley National Laboratory, July 2013. DOE SCGF. Poster Presentation.

[2] B. Weinstein and J. Berezovsky. Simulating Magnetization Dynamics of Ferromagnetic Vortices. Technical report, Case Western Reserve University Department of Physics, Cleveland, May 2012.

[3] B. Weinstein and J. Liu. A graphical interface for the plasma apprentice: Easier access to plasma physics knowledge. In *Princeton Plasma Physics Laboratory's Annual End-of-Summer Poster Session*, Princeton, NJ, August 2011. Princeton Plasma Physics Laboratory. Poster Presentation.

[4] B. Weinstein, J. Liu, H. Mynick, and E. Feibush. A graphical interface for the Plasma Apprentice: Easier access to plasma physics knowledge. *Journal of Undergraduate Research*, 11, 2011.

[5] Bryan T. Weinstein and Mark C. Gridley. Visual Perception of Music. *Psychology Journal*, 7(3), 2010.

Undergraduate Awards

- **Case Alumni Association Prize** Cleveland, OH
  Case Western Reserve University *5/2012*
  - Awarded to the graduating senior with the best academic record in the Case Western School of Engineering.
- **Elmer C. Stewart Memorial Award** Cleveland, OH
  Case Western Reserve University *5/2012*
  - Awarded to an outstanding senior in Physics who has demonstrated achievement in the applications of physics.
- **B.S. Chandrasekhar Prize** Cleveland, OH
  Case Western Reserve University *5/2011*
  - Received for demonstrating superior performance in physics.
- **Rochester Engineering Society Scholarship** Rochester, NY
  Rochester Engineering Society *5/2011*
  - Merit-based award recognizing outstanding engineering, engineering technology, science, or technology students from the Rochester area.
- **Outstanding Junior Award** Cleveland, OH
  Case Western Reserve University *5/2011*
  - Awarded to juniors with the best academic record at the end of five semesters in the Case School of Engineering.
- **National Edward O'Connor Scholarship** Cleveland, OH
  Aerospace States Association *8/2010*
  - Awarded to enterprising and innovative students planning to pursue career in Aerospace Engineering; only two scholarships given in the nation.
- **Case Alumni Scholarship** Cleveland, OH
  Case Western Reserve University *5/2010*
  - Competitive award given to undergraduates pursuing degree related to applied science.

- **Outstanding Sophomore Award** Cleveland, OH
  Case Western Reserve University *5/2010*
  - Awarded to sophomores with the best academic record at the end of three semesters in the Case School of Engineering.
- **Provost's Scholarship** Cleveland, OH
  Case Western Reserve University *8/2008*
  - Received when entering Case Western Reserve University based on high-school accomplishments, such as being the valedictorian of high-school class of 598 students.

Specialized Skills

- **Computational**
  - Secondary Field in Computational Science and Engineering program as part of PhD
    * Significant experience optimizing programs to run on multiple processors, graphics processing units, and supercomputers.
    * Expert at analyzing and visualizing "Big-Data"
    * Excellent at designing and running simulations to gain insight into complicated problems
    * Knowledge of stochastic methods to solve high-dimensional problems
  - *Software*:
    * Favorite Languages for Scientific Computing:
      · Python, C++, CUDA, Matlab, Mathematica, Java
    * Image Analysis Tools:
      · ImageJ, Python, OpenCV, OMERO
    * Additional Selected Programs :
      · Netlogo, Axiovision, Origin, Igor, Bash, LaTeX, Windows Powershell, Wordpress, HTML, CSS
  - *Hardware*:
    * Build customized computers for scientific applications
- **Laboratory**
  - Biology:
    * Basic wet-lab experience
    * Basic tissue culture room experience
  - Physics:
    * Signal analysis instrumentation
    * Spectroscopy, multi-channel analyzers, photomultiplier tubes
    * Ultra-high vacuum surface science
    * Ultrasonic methods to determine material properties
    * Experimental methods to analyze chaotic systems
- **Analytical**
  - Knowledge of state-of-the-art equilibrium and nonequilibrium statistical physics methods
  - Expert knowledge of Applied Mathematics, especially partial differential equations
  - Basic knowledge of using Bayesian inference in data analysis
  - Expertise utilizing Mathematica to solve complex physical problems

Certifications

- **Engineer in Training (EIT)** Ohio
  Active *September 2012*
  - Successfully passed Fundamentals of Engineering Exam

Professional Organizations

- Tau Beta Pi Engineering Honor Society

Graduate References

- **Dr. David Nelson** Professor of Physics, Applied Physics, Biophysics
  Harvard University
  - *Relationship*: Research Advisor
  - *Web Page*: `http://www.seas.harvard.edu/directory/nelson`
  - *Email*: nelson@seas.harvard.edu
  - *Phone*: (617) 495-8852
- **Dr. Andrew Murray** Professor of Molecular Genetics, Molecular Cellular Biology
  Harvard University
  - *Relationship*: Research Advisor
  - *Web Page*: `https://www.mcb.harvard.edu/mcb/faculty/profile/andrew-w-murray/`
  - *Email*: amurray@mcb.harvard.edu
  - *Phone*: (617) 496-1350

Undergraduate References

- **Dr. George Thurston** Professor of Physics
  Rochester Institute of Technology Department of Physics
  - *Relationship*: Previous Research Advisor
  - *Web Page*: `http://www.rit.edu/cos/george-thurston`
  - *Email*: georgemthurston@gmail.com
  - *Phone*: (585) 475-4549
- **Dr. Jesse Berezovsky** Assistant Professor of Physics
  Case Western Reserve University Department of Physics
  - *Relationship*: Previous Research Advisor
  - *Web Page*: `http://www.phys.cwru.edu/faculty/index.php?berezovsky`
  - *Email*: jab298@case.edu
  - *Phone*: (216) 368-4034
- **Dr. Walter Lambrecht** Professor of Physics
  Case Western Reserve University Department of Physics
  - *Relationship*: Undergraduate Academic Advisor
  - *Web Page*: `http://www.phys.cwru.edu/faculty/index.php?lambrecht`
  - *Email*: walter.lambrecht@case.edu
  - *Phone*: (216) 368-6120
- **Dr. Harry Mynick** Principal Research Physicist
  Princeton Plasma Physics Laboratory
  - *Relationship*: Previous Research Advisor
  - *Web Page*: `http://w3.pppl.gov/theory/mynick.html`
  - *Email*: hmynick@pppl.gov
  - *Phone*: (609) 243-2769