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
  - *PhD Secondary Field: Computational Science and Engineering*
    * Completed four advanced applied math and scientific computing courses
    * Learned state-of-the-art computational methods used in scientific research
  - GPA: 3.96/4.00

  S.M. in Applied Physics   *Expected May 2014*
  - Completed 10 courses

- **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; 50 fellowships awarded
  - Attended yearly conferences at National Laboratories; presented posters on my active research, 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; 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 experimental biology techniques (trained in Dr. Andrew Murray's Lab)
  - Captured images via fluorescent microscopy; utilized Python and ImageJ extensively for analysis
  - Devised algorithms to analyze and visualize large sets of biological data

    – Developed simulations of range expansions in Python and C++

- **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 tissue culture techniques and grew multiple tumor cell lines
  - Imaged tumors using standard microscopy techniques; used ImageJ to determine their sizes
  - Created high-content-screening pipeline to quantify hundreds of images using an OMERO server

- **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 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
  - Developed 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
  - Identified 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** <div align="right">Cleveland, OH</div>
  Case Western Reserve University <div align="right">*5/2010*</div>
    - Awarded to sophomores with the best academic record at the end of three semesters in the Case School of Engineering.

- **Provost's Scholarship** <div align="right">Cleveland, OH</div>
  Case Western Reserve University <div align="right">*8/2008*</div>
    - Received when entering Case Western Reserve University based on high-school accomplishments (was high school valedictorian of class of 598 students).

Specialized Skills

- **Computational**
    - Secondary Field in Computational Science and Engineering (PhD minor)
        * 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*:
        * Languages for Scientific Computing:
            · Python, C++, CUDA, Matlab, Mathematica, Java
        * Image Analysis Tools:
            · ImageJ, Python, OpenCV, OMERO
        * Other Selected Languages & Programs :
            · Netlogo, Axiovision, Origin, Igor, Bash, LaTeX, Windows Powershell, Wordpress, HTML, CSS
    - *Hardware*:
        * Build customized computers for scientific applications

- **Analytical**
    - Expert knowledge of Applied Mathematics, especially partial differential equations
    - Deep understanding of state-of-the-art equilibrium and nonequilibrium statistical physics methods
    - Expert knowledge of utilizing Mathematica to solve complex physical problems
    - Advanced knowledge of Bayesian inference in data analysis

- **Laboratory**
    - Biology:
        * Wet-lab experience
        * 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

Certifications

- **Engineer in Training (EIT)** <div align="right">Ohio</div>
  Active <div align="right">*September 2012*</div>
    - 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*: Current 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*: Current 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