Bryan T. Weinstein

Active TS/SCI Clearance

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Work Experience

- **MITRE** Bedford, MA
  Lead Modeling & Simulation Engineer *April 2021 - Present*
  Senior Modeling & Simulation Engineer *August 2018 - April 2021*
  - Rapidly developed innovative solutions to whole-of-government national security problems utilizing modeling, simulation, engineering, data science, and prototyping skills acquired during Physics PhD and Computational Science minor
  - Presented results to senior government stakeholders across the DOD and MITRE executive leadership to deliver maximum impact
  - Mentored dozens of staff and led diverse small-to-large teams across classification levels to produce high quality and timely deliverables for government stakeholders
    * One of the first members of CUIC: Cross-Cutting Urgent Innovation Cell
  - Recognized as one of MITRE's most experienced AFSIM (popular GOTS M&S software) developers. Created MITRE's AFSIM user group six years ago that now has over 400 members; developed many widely used MITRE repositories
  - Led over 2 million dollars in IR&D funding over 4 years to build a next-gen C4 prototype that could be tested by real, simulated, or live data to accelerate deployment. Presented multiple times at MITRE Research and Technology (R&T) meetings for hundreds of government sponsors. Work continues under ACCEL C2 lab; asking for 8 million dollar investment in physical space from MITRE executive leadership.
  - Won many MITRE internal awards (5 spark, 1 catalyst, 3 trailblazer, and 1 breakthrough award)

Education

- **Harvard University** Cambridge, MA
  PhD in Applied Physics *May 2018*
  - Conducted experiments and developed probabilistic models & simulations to investigate microbial colonies' stochastic evolutionary dynamics on the surface of complex fluids and materials.

- **Harvard University** Cambridge, MA
  PhD Secondary Field: Computational Science and Engineering (CSE) *May 2018*
  - Learned state-of-the-art computational methods used in scientific research and data science; completed advanced applied math and scientific computing courses
  - **Capstone:** Developed an award-winning OpenCL (GPU) powered Lattice Boltzmann fluid mechanics simulation utilizing OpenGL for real-time visualization.

- **Harvard University** Cambridge, MA
  S.M. in Applied Physics *November 2014*
  - 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

Computational & Analytical Skills

- Over 12 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

- Expert at rapidly creating new M&S software tools to answer novel questions

- 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

- **Selected Government Software**
  - AFSIM, pymission, SBSS, C2S, milsymbol, *many* custom MITRE AFSIM/Python packages

- **Languages for General Scientific Computing:**
  - Python, Cython, OpenCL, CUDA, C, C++, Java, Mathematica, Matlab

- **Selected Python Packages and Tools:**
  - IPython/Jupyter Notebook, matplotlib, seaborn, colorcet, numpy, scipy, pandas, pandera, astrolib, scikit-image, pymc3 multiprocessing, cython, cython_gsl, mako, PyOpenCL, pyCUDA

- **Selected Software Development Tools:**
  - Docker, CI/CD, GitLab, git, Django, REST APIs, Flask, FastAPI, JIRA, Nexus Registry, VS Code, PyCharm, vim

- **Fluid and Solid Mechanics Simulations:**
  - Lattice Boltzmann Method (custom-built code), OpenFOAM, SALOME, gmsh

- **Image Analysis Tools**
  - Python, OpenCL, ImageJ/Fiji

Selected MITRE Awards

- **Trailblazer Award: Functional Architecture Deployment** December 2023
  - Recognized my tenacity over the last 5 years leading a large team to enable distributed experimentation at the classified level through a next-gen C4 prototype (Functional Architecture).

- **Catalyst Award: CDAO Data Integration Layer Prototype Demonstration** May 2023
  - Celebrated our team's ability to deliver a prototype of an API Gateway to the Chief Data and Artificial Intelligence Office (CDAO) in response to a quick-turn two week request

- **Trailblazer Award: Digital Twin JWICS deployment** May 2022
  - Recognized our accomplishment of linking our next-gen C4 prototype to a classified dashboard using a series of Open APIs, and demonstrated this capability during MITRE's Research and Technology (R&T) showcase to hundreds of government sponsors

- **Trailblazer Award: Self Forming Kill Chains Analysis** May 2021
  - Recognized the impact of our analysis showing the benefit of novel decision aids at the army tactical level in partnership with OUSD R&E, Army Futures Command, and MIT Lincoln Labs

- **Breakthrough Award: Chief's Challenge Prototype** July 2020
  - Recognized our team's work trying to rapidly produce an exemplar of what a JADC2 prototype could like for the Air Force Secretary of Defense under an extremely tight deadline

Graduate 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

- **TS/SCI Clearance**   MITRE
  Active   *October 2020*
- **Secret Clearance**   MITRE
  Active   *October 2019*
- **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-Allelle 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. DFD Gallery of Fluid Motion Milton van Dyke Award. Nov. 2021. DOI: 10.1103/physrevfluids.6.110507. URL: https://doi.org/10.1103/PhysRevFluids.6.110507.