

Jared Callaham

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Education

BS, University of Massachusetts (Jan 2017) Amherst, MA

- Physics major (Current GPA 3.70 overall, 3.87 major)
- Coursework in classical mechanics, electricity & magnetism, quantum mechanics, statistical physics, general relativity, particle physics, computational and mathematical methods, differential equations, linear algebra, statistics, and laboratory work.
- Member of Commonwealth Honors College; will graduate with departmental honors, including writing and defending senior thesis on independent research.
- Received LeRoy F. Cook, Jr. departmental award

Research Experience

University of Massachusetts - Physics Amherst, MA

- Conducted original research in theoretical condensed matter physics for three semesters under the guidance of Dr. Jon Machta
- Adapted parallel Monte Carlo algorithm for use in simulations of polydisperse hard sphere systems and applied this to investigation of thermodynamic phase behavior at high densities.
- Plan to conclude investigation of a possible thermodynamic glass transition in spring 2017.

University of Washington – Biology Seattle, WA

- Studied neural encoding of sensory stimuli during a summer Research Experience for Undergraduates at the Center for Sensorimotor Neural Engineering
- Combined computational neuroscience, machine learning, and data science techniques to construct a model for insect flight control based on neurally encoded wing strain signals.
- Analyzed experimental electrophysiology data to study the biological strain sensors distributed on moth wings.

Publications and Meetings

- **J. Callaham** and J. Machta. *Population Annealing Simulations of Binary Hard Sphere Mixtures* (2017). Phys. Re. E **95**, 063315
- Oral presentation at APS March Meeting 2017
- T. Mohren, J. Callaham, S. Kinn, B. Brunton, and T. Daniel. *Sparse placement of neural inspired wing mechanosensors inform classification of insect inertial rotation* (in preparation for submission to J. Royal Soc. Interface)

Teaching Experience

Teaching Assistant - UMass Physics Dept

Grading assistant for Dr. Guy Blaylock for two semesters of distribution physics courses covering relativity, cosmology, and quantum mechanics. Evaluated and provided feedback on weekly writing assignments and problem sets designed to check for conceptual understanding. Graded writing for scientific content, pedagogy, organization, and quality of writing.

Long Term Substitute - Amherst Regional High School

Instructed ~75 students in physics and mechanical engineering courses. Led physics students in preparation for final exams and guided ME students through construction of final projects in the school shop.

Science Outreach Club - UMass

Traveled to area elementary and middle schools and performed shows designed to promote enthusiasm for science and educate students about topics such as states of matter, weather, or electricity. Worked with UMass lecture prep staff to develop demo experiments and audience-appropriate explanations of scientific content.

Work Experience

US Air Force (2010 - 2014)

TX, IL, Korea, FL

- Staff Sergeant, Aircraft Metals Technology Craftsman
- Designed, welded, heat treated, fabricated, and machined precision tools, components, and assemblies for F-22, F-16, A-10, and KC-135 aircraft
- Proven responsible leadership as shift supervisor; ensured quality of work and compliance with Hazmat, OSHA, and USAF industrial standards and regulations
- Certified TIG and MIG welder. Four years' experience with CAM software, conventional and CNC mills, lathes, and other metalworking tools and techniques
- US Government Secret security clearance active through 2020

Skills

- Programming - Coding simulations and data analysis scripts using MATLAB, Python, C++, and data visualization packages. Experience with OpenMP parallel processing and running simulations on UNIX high-performance computing clusters.
- Scientific communication - Writing reports and publications using LaTeX, preparing figures and graphics with vector graphics software, designing posters, and formal presentations of research results.
- Fabrication - Welding and machining a wide variety of mechanical components to blueprint specifications.

References

- Jonathan Machta – Professor, UMass Amherst Physics Department
(machta@physics.umass.edu)
- Guy Blaylock – Associate Professor, UMass Amherst Physics Department
(blaylock@physics.umass.edu)
- Thomas Daniel – Professor, University of Washington Biology Department
(danielt@u.washington.edu)