

Alec Drobac, Ph.D.

I am a science communicator and analyst with over a decade of physics education, research and pedagogy experience and a broad set of technical and communication skills. I am interested in supporting the scientific enterprise through communication, education, analysis, and collaboration.

Strengths and Skills

- **Strategic communication**, both verbal and written, for technical and general audiences
- **Project management**
- **Scientific and technical analysis**; synthesis and translation of technical material
- Comfort with **independent and collaborative work**
- **Interpersonal skills**; teamwork and networking
- **Relationship management**, including stakeholder engagement and event planning
- **Software and programming languages**: Microsoft Office Suite, SharePoint; Linux, Python, C++, Mathematica

Education

- Tufts University** Medford, MA
 Ph.D. in Physics (August 2022)
 Thesis: *Measurement of Associated Z Boson and Heavy-Quark Jet Production in pp Collisions at $\sqrt{s} = 13$ TeV*
 M.S. in Physics (January 2018)
- Middlebury College** Middlebury, VT
 B.A. in Physics (May 2016)

Professional Experience

- U.S. National Science Foundation (NSF)** Alexandria, VA
AAAS Science and Technology Policy Fellow (September 2023 - August 2025)
 - Member of Government Affairs team within the Office of Legislative and Public Affairs
 - Develops strategic & scientific communications, including fact sheets and award announcements
 - Engages in stakeholder relationship management with policymakers and committee staff: plans and executes events, organizes briefings, and provides prompt and professional correspondence
 - Works closely with NSF Director and members of the senior leadership team: prepares leadership team members for Congressional testimony, provides updates on authorization and appropriation processes
 - Project management across multiple teams and subject areas, including, artificial intelligence, quantum information science, biotechnology, and education and workforce development
- Department of Physics, Skidmore College** Saratoga Springs, NY
Visiting Assistant Professor (September 2022 - May 2023)
 - Taught 5- to 20-person courses of major and non-major students
 - Incorporated several modalities of learning: lecture, group work, laboratory experimentation
 - Collaborated with faculty to develop new assignments and activities centering physics in everyday life
- Department of Occupational Therapy, Tufts University** Medford, MA
Kinesiology Guest Lecturer (5 times)
 - Introduced basic physics, terminology, and applications of torque and levers to physical therapy students
 - Provided examples of therapy treatment plans developed using physics principles
- Beauchemin Research Group, Tufts University** Medford, MA
Research Assistant (Summer 2017 - July 2022)
 - Member of ATLAS experimental collaboration at CERN's Large Hadron Collider.
 - Performed precision measurement (experiment and analysis) of Z boson + heavy flavor jets events
 - Developed novel computational unfolding technique, preserving correlations between signal regions
 - Collaboratively created streamlined production framework for muon trigger scale factors
 - Technical exposure to/experience in: computational data science; machine learning; quantum information; data analysis and presentation

Apt Tutoring, Test Prep & College Counseling

Remote

Academic and Test Preparation Tutor (Spring 2021)

- Tutored Medford-area high school students in introductory physics and algebra courses
- Assisted students in completing assignments, preparing for tests, and improving study techniques

Department of Physics and Astronomy, Tufts University

Medford, MA

Instructor, General Physics II (Summer 2019)

- Five student condensed summer course on electromagnetism
- Utilized “flipped classroom” approach, including pre-lecture assignments, clicker questions, and small group projects and demos, to maximize student agency and engagement with the material

Co-Instructor, General Physics II (Fall 2018)

- 80-student course on electromagnetism
- Extensively used clicker questions to facilitate peer instruction and classroom inquiry on physics
- Collaboratively co-instructed with Prof. Timothy Atherton. Jointly designed lectures and materials

Graduate Teaching Assistant (11 semesters over Fall 2016 – Spring 2021)

- Led laboratory classes and recitations for introductory physics students
- Promoted student inquiry and physics thinking while setting expectations of inclusion and respect
- Provided written and oral feedback to students and assisted in evaluation of students’ progress
- Initiated and led redesign of laboratories to facilitate the development of experimental reasoning

Graduate Institute for Teaching (GIFT), Tufts University

Medford, MA

GIFT Fellow (Summer 2018)

- Accepted into competitive program for graduate students interested in teaching
- Participated in a series of summer workshops and teaching trials

NASA Goddard Space Flight Center

Greenbelt, MD

Science Writer (Summer 2015)

- Temporary staff writer for *Earthzine*, IEEE OES publication on Earth sciences
- Researched and wrote articles for scientific audience. Interviewed relevant professionals
- Topics included: water metering technology; L-band sensing satellites; open-source geospatial software

Volunteer Work

Tufts University

Medford, MA

Graduate Assistant Union Steward (Fall 2018 – Spring 2021)

- Elected as union representative for graduate students, addressed questions and potential grievances
- Previously, participated in negotiating 1st union contract
- Ran events for new graduate students describing the purpose and scope of the union

Honors and Awards

Honos Civicus Society Inductee (2022)

“...recognizes graduating students who engaged in meaningful service and leadership activities” while at Tufts
Tufts University Jonathan M. Tisch College of Civic Life

John F. Burlingame Graduate Fellowship in Physics (2021-2022)

Recognizes outstanding achievement by graduate students in physics
Tufts University Physics and Astronomy Department

Award for Outstanding Contributions to Undergraduate Education (2020)

Tufts University Graduate School of Arts and Sciences

Tufts University 3-Minute Thesis Competition - 1st Prize (April 2019)

Tufts University Graduate School of Arts and Sciences

Publications

All publications below are hyperlinked on my website: alecdrobac.com/publications

ATLAS Collaboration

Measurement of Associated Z Boson and Heavy-Quark Jet Production in pp Collisions at $\sqrt{s} = 13$ TeV (2022)
Doctoral thesis

Performance of the ATLAS muon triggers in Run 2 (2018)

Contributed production and studies of dimuon scale factors

****ATLAS publications list the entire collaboration as authors; I include this paper because I directly contributed text and plots****

Design and Performance of the ATLAS Muon Trigger System (2022)

Poster presented at the Large Hadron Collider Physics (LHCP) 2022 Conference

Proceedings written following LHCP 2022

The ATLAS Muon Trigger Design and Performance (2020)

Poster presented at the Large Hadron Collider Physics (LHCP) 2020 Conference

Proceedings written following LHCP 2020

Earthzine

OSGeo: Mapping the World of Open Source Geospatial Software (2015 (all))

A description of OSGeo's push to provide geospatial software for public collaboration

From Space to Earth with John Mather

A conversation with the Nobel Laureate about COBE and his excitement for its spiritual successor, the James Webb Space Telescope

Untouched Oceans Provide Context for Earth's Uniqueness

Understanding the need to study the oceans, on Earth and on other planets

Meters Matter: How Water Metering Promotes Conservation and Technological Development

Examining the importance of water metering as a means to contend with increasingly frequent droughts

Big Data Flows: Water, Outsourcing, and the Flood of Data

Exploring the intersection of big data and utilities

Climate Change Tightening its Grip on Bumblebee Habitat

My first publication, reporting on climate change's effects on bumblebee habitable ranges