

Molly McDonough

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EDUCATION:

Suffolk University, Boston, Massachusetts

College of Arts & Sciences, Honors Program

Bachelors of Science Candidate, Physics | Minor: Pure Mathematics

Dean's List: Fall 2017, Spring 2018, Fall 2019

Selected Coursework: Physical Chemistry I, Chemistry I & II, Calculus I & II, Multivariable Calculus, Modern Physics, Classical Mechanics, Electricity & Magnetism, Computer Science I & II, Quantum Mechanics I, Introduction to Advanced Math, Introduction to Electronic Devices, Advanced Laboratory

Planned Coursework: Mathematical Methods in Physics, Linear Algebra & Differential Equations, Principles of Nanoscience & Nanotechnology, Undergraduate Research in Physics

Anticipated Graduation: January 2021

Admitted: Spring 2018

Cumulative GPA: 3.54/4.0

RESEARCH EXPERTISE:

Laboratory Skills:

- Atomic Force Microscopy
- X-Ray Diffraction and Refraction
- In Situ and Ex Situ Ellipsometry
- Computational Modeling for LADAR Systems
- MOKE
- Raman Spectroscopy

Programming Skills:

Programming Languages: Python, Java, HTML, CSS, C#, Unity, Mathematica

Software: Visual Studio, Eclipse, Atom, InDesign, Photoshop, Lightroom, and Premiere

Operating Systems: Mac OS, Windows, Linux, Oculus Rift, Microsoft Hololens

RESEARCH EXPERIENCE:

Materials Research Lab, Massachusetts Institute of Technology

February 2020 - Present

Project: *Interlayer Excitons in 2D Magnetic Materials*

Advisor: Riccardo Comin

- Using Raman spectroscopy, MOKE, cryo-strain cells, and diamond anvil cells (DAC) to measure and analyze properties of 2D magnetic materials and heterostructures

Computational Chemistry Lab, Suffolk University

September 2019 - Present

Project: *Modeling of Linear Polyynes using 1D PIB and simulations of UV-vis spectra*

Advisor: Kelsey Stocker

- Using the quantum mechanical PIB model, perturbation theory, UV-vis spectroscopy to determine energies of electronic transitions in linear polyynes with non-hydrogen end groups

2D Crystal Consortium: Multi-Module UHV MBE Lab, Pennsylvania State University

May 2019 - Present

Project: *In situ ellipsometry of epitaxially grown bismuth antimony telluride on sapphire*

Advisor: Nitin

Samarth

- Using Raman, Atomic Force Microscopy X-Ray Diffraction and Refraction to characterize thin films of $(\text{BiSb})_2\text{Te}_3$ to create more accurate ellipsometry models for in situ and ex situ analysis

MGH Department of Radiation Oncology in collaboration with Suffolk University

September 2017 - Present

Project: *Neutron Distributions Surrounding a Medical Linear Accelerator*

Advisor: Walter Johnson

- Using high purity metal foils and neutron bubble detectors to map the neutron flux around a 15 MV medical LINAC and proton source in order to determine the best materials for radiation shielding and help oncologists dose patients more efficiently

PROFESSIONAL EXPERIENCE:

Undergraduate Researcher - Center for Multiple Realities

September 2018 - May 2019

Suffolk University, Boston, Massachusetts

- Working in the Physics Augmented Reality and Virtual Reality Lab on the development of applications, management of equipment, and teaching students and faculty how to use the equipment as part of class lectures, labs and projects.

Peer Tutor & Research Scholar - Center for Learning and Academic Success

September 2018 - May 2019

Suffolk University, Boston, Massachusetts

- Serve as a peer tutor for subjects including Physics, Computer Science, Math (through Multivariable Calculus) and Statistics
- Enhance students learning and improve students performance through study skills and engaged learning
- Conduct research on pedagogy and peer tutoring in STEM, presenting research findings at local and national conferences

Teaching Assistant - College of Arts and Sciences

August 2018 - May 2019

Suffolk University, Boston, Massachusetts

- Assist in teaching a First-Year Experience (CAS- 101) course that creates an opportunity for students to connect with peers
- Plan lessons and assignments, lead group discussions, counsel students through adjustment to college life

Web Development Intern - ADK Group

September 2017 - February 2018

Boston, Massachusetts

- Used Search Engine Optimization (SEO) techniques to drive more traffic to clients websites from sites like Google, Bing, etc.
- Worked with project managers to improve the quality of website marketing for clients in order to drive traffic to a client's site

AWARDS:

SMART Scholarship, Department of Defense, Air Force Research Lab

Cohort Year: 2019

Sponsoring Facility: Wright-Patterson Air Force Base, Sensors Directorate, Active Electro-Optics Branch

- One of only 150 undergraduate students selected for this award (approx. 2000 applicants)
- Full tuition, \$25,000/year stipend, healthcare and textbook allowances, summer internship (Summer 2020), and 1.5 year commitment civilian research scientist position post-graduation (January 2021-July 2022)

Geno A. Balloti Research Scholar, Center for Learning and Academic Success, Suffolk University

Cohort Year: 2018 - 2019

- \$5000 scholarship awarded for academic achievement and student leadership. Requires active work as an academic tutor in addition to conducting research on peer-to-peer tutoring and it's benefits.

EXTERNAL FUNDING:

Society of Physics Students, Chapter Research Award

Received: 2018 & 2019

Grant Amount: \$2000

- Project: Neutron Radiation Around an AmBe Source at Massachusetts General Hospital

PRESENTATIONS:

Presenter: *In situ ellipsometry of epitaxially grown bismuth antimony telluride on sapphire*. American Physical Society (APS) March Meeting. March 2020; Denver, Colorado. [[Abstract](#)]

Presenter: *Neutron Distributions Surrounding a Medical Linear Accelerator*. American Physical Society (APS) April Meeting. April 2018; Columbus, Ohio.

PROFESSIONAL ASSOCIATIONS:

- American Physical Society
- Society of Women Engineers
- Society of Physics Students

LEADERSHIP:

Associate Zone Council Representative, Executive Committee, National Society of Physics Students

November 2019 - Present

Associate Zone Council, National Society of Physics Students

June 2018 - Present

Co-Chair, Physics Congress Committee, Society of Physics Students

June 2019 - Present

Co-Chair Centennial Recognition Committee, Society of Physics Students

June 2018 - June 2019