John L. Waczak

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Education

2015-2019

Oregon State University
B.S. in Physics and Mathematics

Thesis: Simulating the Brownian Dynamics of a Two-Dimensional Model for the Dynein Motor Protein
Thesis Advisor: Dr. David Roundy

Research Experience

2016 - Now

Roundy Research Group
Oregon State Physics Department

I have been working with Dr. David Roundy to develop and test computational simulations for a physical model of the dynein motor protein. I regularly edit and run our simulation code in c++, I write python scripts to perform data analysis and visualization, and I present my work at our weekly group meetings. This work is the focus of my undergraduate thesis and we plan to publish the results soon thereafter.

Jun-Aug 2018

Simthsonian Astrophysical Observatory Solar Physics REU
Harvard-Smithsonian Center for Astrophysics

Advisors: Dr. John Raymond, Dr. Chengcai Shen, Jakub Prchlik

Using simulations for non-equilibirium ionization in coronal plasma, I analyzed the structure of spherical shock waves generated by coronal mass ejections in order to map the electron temperature and density at various positions along the shock. This involved writing Python code to interface with FORTRAN simulations, analyze FITS files from the SDO Atmospheric Imaging Assembly, and write code to fit the simulation output to observation while accounting for the round geometry.

Work Experience

2015 -Aug 2018

Cooper Environmental Services
Intern

I worked for Dr. John Cooper on an x-ray fluorescence spectroscopy continuous heavy metal monitors. I developed a program in C# to automate the quality assurance continuity check for wire harnesses before they are installed. Designed and implemented a PID control loop for setting a flow rate on a vacuum pump. I created code to make data accessible locally via a Modbus slave device.

Teaching Experience

Spring 2018 - Present

Paradigms in Physics
Learning Assistant

I am the learning assistant for the junior year sequence of physics classes at OSU. My duties include meeting with professors daily to prepare active engagement activities, running activities during class, holding office hours, and providing feedback to professors to identify student difficulties with course material and assignments.

Fall & Winter 2018

PH 211, 201: Introductory Physics
Undergraduate Teaching Assistant

I served as a laboratory TA for PH 211. I taught two sections of laboratory, held multiple office hours, graded weekly assignments, and proctored examinations.

Winter 2017

PH 199: Introduction to the Physics Major
Undergraduate Teaching Assistant

I served as a teaching assistant for the student organized survey of the physics major. This involved organizing lab tours, inviting guest speakers from the department, and coordinating a panel of upper division students to talk about undergrad research and the curriculum.

Community Service and Outreach

2018

OSU Discovery Days
Physics Outreach

I volunteer as part of the physics outreach group. This fall, we created two activities to teach classes of K-5th graders about *stimulated emission* and lasers for OSU's Discovery Days event. I helped create and setup the activities and guided multiple groups through them.

2015 - Now

Community Outreach Inc.
Lambda Chi Alpha Fraternity

I volunteer for Community Outreach Inc. in Corvallis, Oregon through my fraternity.

Skills

Programming Skills

Python, C++, Git, Github, Mathematica, LaTeX, SQLite, HTML/CSS

Software

Linux, Windows, MS Word, MS Excel, Google Docs

Electronics

Arduino, Raspberry Pi, Soldering, Oscilloscopes

Memberships

2018

American Geophysical Union
Member
Presenter

I presented results from my summer REU at the AGU 2018 Fall meeting in Washington, D.C.

2017 -Now

ΣΠΣ Physics Honor Society
Member

2015 -Now

ΛXA Fraternity
Vice President (2017), Fraternity Educator (2016), Member (2015)