

# SEMI 203

## EDUCATION

- *Master of Science in Materials Science* (Anticipated) June 2018
- *Bachelor of Science in Physics, emphasis on physical chemistry* June 2017

## RESEARCH EXPERIENCE

**Materials Science Undergraduate Research Assistant** June 2016 – June 2017  
*University of Oregon – David Johnson Lab*

- Characterized composition of PVD 100-500 Å thin film heterostructures using x-ray diffraction, reflection and fluorescence (XRD, XRR and XRF).
- Graphically analyzed data from hundreds of samples in order to find trends describing the XRF spectrometer's raw count measurements, finding that a samples' raw XRF counts are directly proportional to atom content in the ultra-thin limit.
- Improved lab productivity when data from the XRF-count project allowed group to switch to a composition targeting method that takes a day, down from one that takes three days to a week.
- Assessed silicon background fluorescence in ultrathin samples by describing XRF intensity scans of films and blank Si wafers with a functional approximation in Mathematica. Results showed that background signals have various non-linear functional forms.
- Made progress on a method for systematic Si background subtraction using integrated intensity, which is more accurate than the previously used linear subtraction method.
- Discovered that the background signal in Si when measuring molybdenum is large enough to obscure the true signal for molybdenum diselenide films less than 30 angstroms thick, indicating that a lower energy x-ray may be desirable for those measurements.

**Particle Physics Undergraduate Research Assistant** Summer 2014, June 2015 – June 2016  
*CERN - ATLAS at University of Oregon – Stephanie Majewski Lab*

- Developed and tested a geometry-based algorithm in Python to detect low-energy top quark decays, finding that such algorithms can increase detection by over 10%.
- Verified that proposed particle detector upgrade could reduce background signal detection by 10-20% by improving a simulation of the detector, written in C++ and utilizing Pythia8 and FastJet software, and assessing detection rates under varying conditions.
- Presented monthly progress talks to the international ATLAS group and presented at the University of Oregon 2016 Undergraduate Research Symposium poster session.

## WORK EXPERIENCE

**Math Tutor, University of Oregon** Sept 2015 – March 2017

- Ensured that material was available and comprehensible and that expectations for success were clear by communicating directly with professors.
- Instructed groups of up to 20 college students, using physical examples to illustrate math concepts.
- Demonstrated patience and used communication skills to empathize and give encouragement while tutoring students who were falling behind in their coursework.

**Writing Tutor, Reed College** Sept 2013 – Dec 2014

- Worked with students of diverse cultural backgrounds to improve English comprehension and writing. Spent time working with each individual, even in group sessions, and tailored tutoring style to fit each person's needs.
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## **PROGRAMMING LANGUAGES**

- Python, Mathematica, TeXWorks – intermediate proficiency
- Matlab, LabView, C++ and HTML – some experience

## **GRANTS & AWARDS**

- Undergraduate Research Opportunity Program mini-grant recipient, University of Oregon, Fall 2015
  - Commendation for Academic Excellence, Reed College, Spring 2013
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