

Annual Report 2014-2015

Introduction

The Washington State University SPIE student chapter was established in January of 2011. Our chapter operates jointly with the Washington State University OSA student chapter. Over the past year, we have expanded our focus to establish a well known and reliable outreach program, as well as maintain a strong academic and professional development program for our members with events such as the SPIE Visiting Lecturer and our Graduate Student Lecture Program. We have been successful in building our joint SPIE/OSA membership by hosting recruitment events and social activities. Our popular outreach program provides educational science activities to nearby communities with an emphasis on K-12 students. This program is growing rapidly, requiring more and more of our members to participate. In this report we describe our chapter's activities over the past year and our plans for the future.

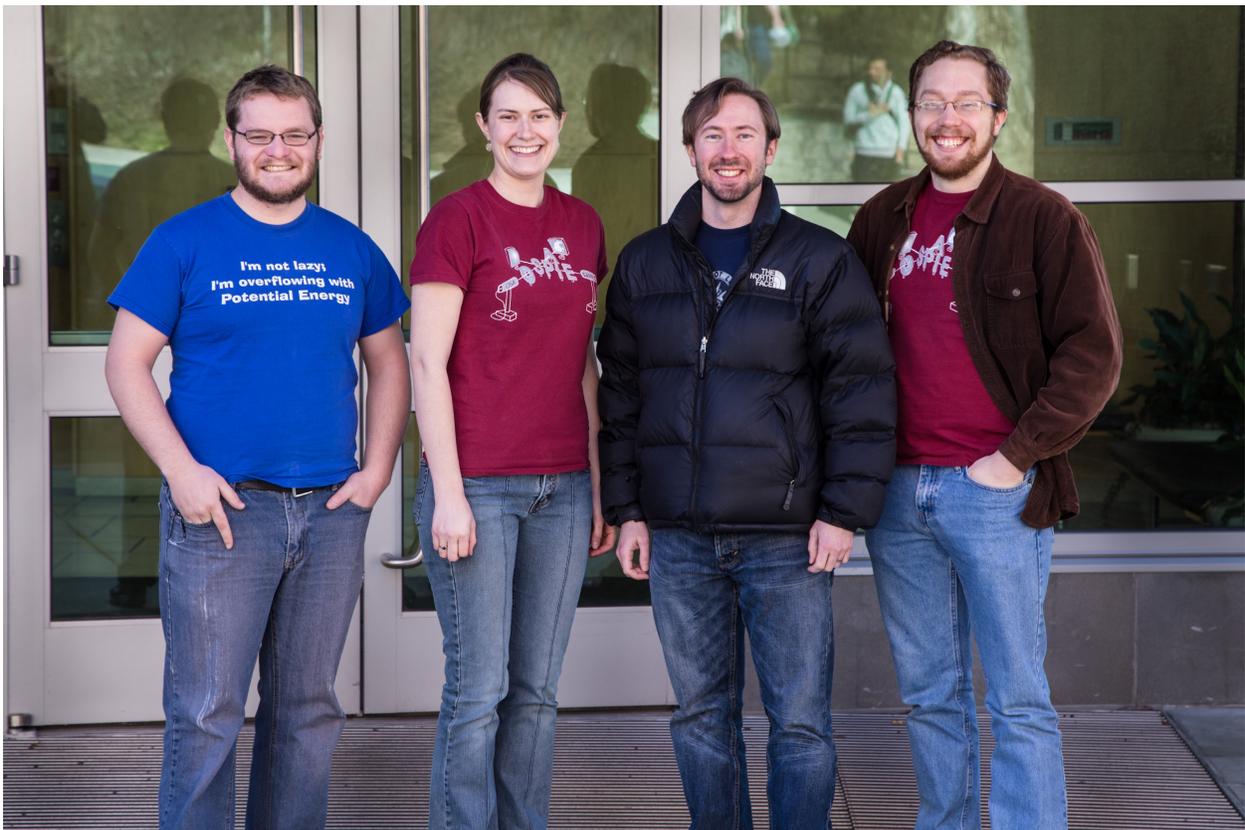
Officers

Josef Felver, President, josef.felver@wsu.edu, 342716

Elizabeth Bernhardt, Vice President, elizabethdoesphysics@gmail.com, 3472077

Thomas Bersano, Secretary, thomas.bersano@wsu.edu, 3498568

Sean Mossman, Treasurer, sean.mossman@wsu.edu, 3472067



Members

Elizabeth Bernhardt

Thomas Bersano

Ankita Bhuyan

Viktor Bollen

David Buckley

Josef Felver

Md Khalid Hossain

Sara Humphreys

Sheng-Ting Hung

John Igo

Joseph Lanska

Jason Leicht

Christopher Leishman

Kasey Lund

Maren Mossman

Sean Mossman

Jethin Pulikkottil Jacob

Anya Rasmussen

Nathan Rasmussen

Samaneh Tabatabaei

Nate Turner



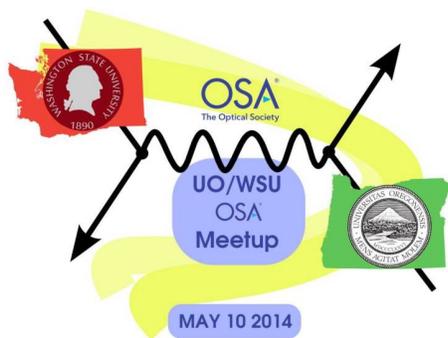
Chapter Activities

Summer 2014-Spring 2015

Professional Development Activities:

WSU-UO OSA Meetup (10 May 2014)

At the end of the last school year, the University of Oregon (UO) and Washington State University (WSU) OSA Chapters met in Eugene to create connections between graduate students from different research foci and backgrounds. A group of 5 WSU OSA-SPIE members traveled to the UO campus to



participate in an afternoon of short talks from both UO and WSU members as well as short discussion breaks. A total of 25 people participated in the event, and OSA provided funding for food and transportation (\$278.74). The mini-conference was well received by those in attendance, as participants enjoyed the academic discussions with peers from a different collection of research backgrounds while still being able to relate to the content. Speakers specifically benefited greatly from the experience of giving a professional

conference style talk while maintaining a relatively low stress environment. Overall attendance for the event was strong, though the long drive and last minute illnesses made attendance from WSU members a bit more difficult. Our chapter will benefit greatly from the connections established with nearby research institutions, future colleagues and peers in optics research. Our hope is that this event will become a regular event including not only WSU and UO but other OSA-SPIE chapters nearby housed at University of Washington, Oregon State University, and possibly University of Idaho. This event was not described in our funding request.



Graduate Student Lectures

Our Graduate Lecturer Program continues to be one of the most successful activities of our chapter. This program allows graduate students to present their current work to peers in a non-stressful environment. Held during a lunchtime meeting, these presentations help the student presenter prepare for future conference-type events, practice answering questions about his/her research, and gain self-confidence in his/her public speaking. The event is open only to graduate students; the absence of professors gives the speaker the opportunity to be the “expert” in the room. The program also enables the members to understand the work being done by other graduate students in our department. The chapter provides lunch for the student attendees with funding from SPIE and the WSU Graduate and Professional Student Association (GPSA). This event was described in our funding request. This year’s presentations have included the following topics:

“Self-healing in dye-doped polymer matrices: A new phenomena and a 150-year-old problem,” by Sheng-Ting Hung (19 September 2014)

“Modeling fiber Bragg grating device networks in photomechanical polymer optical fibers,” by Joseph Lanska (7 November 2014)

“The coldest place in space: Bose-Einstein condensates on the ISS,” by Maren Mossman (12 March 2015)

SPIE Visiting Lecturer (2 December 2014)

The WSU OSA-SPIE Club hosted Dr. Roberto Morandotti as part of the SPIE Traveling Lecturer program. During Dr. Morandotti’s visit, he was able to meet one on one with WSU physics faculty members as well as graduate students that share similar research interests. The OSA-SPIE club welcomed Dr. Morandotti with a light breakfast of coffee, tea, bagels, and cream cheese in the morning (SPIE funded \$18.86). For lunch, sandwiches from Jimmy John’s were available for graduate students from any department on campus (GPSA funded \$211.45). The department funded and organized light snacks prior to the colloquium. Following the colloquium, there was a private dinner with Dr. Morandotti and OSA-SPIE members at South Fork restaurant (SPIE funded \$171.25). Dr. Morandotti gave a colloquium about nonlinear frequency generation. This event was included in our funding request from 2014.

Outreach Activities:

Outreach - Girl Scouts of Northern Idaho and Eastern Washington (12 August 2014)

Five of our chapter members traveled to Lewiston, Idaho to assist the Girl Scouts of America with a mini science camp. Our chapter members designed an activity based on the science of bubbles and then the girls used common household ingredients to create bubble mixtures. Next, they performed five simple experiments to quantify how good their bubble solution actually was. The girls also learned about the

importance of repeating trials for experiments, recording results, averaging, and making observations. At the end of the activity, we let the girls tabulate their results altogether with histograms, followed by each scout sharing something they learned during the activity. There were 10 girl scouts, aged 8 to 13, that participated in this event. This outreach event was funded by OSA (\$44.99) and Girl Scouts of America. This activity was not described in our funding request.



In November, the Girl Scouts were excited to work with our chapter again, so two of our members met with 9 girl scouts to do some activities involving lenses, lasers, and light mixing using the OSA Optics Fun Kit we received. The girls created their own jello lenses with moderate success. This activity was also not described in our funding request.

Outreach - Rico's Pub Trivia Night (9 September 2014)

Our chapter collaborated with a local pub to host an evening of trivia centered around physics and science. Two new members of the chapter were tasked with creating categories and questions about light, optics, and physics in general. Two separate members acted as hosts during the trivia event, judging the 8 different team's answers and providing fun anecdotes for those in attendance. The chapter used a portion of its outreach funds (OSA funded, \$79.58) to provide beverages for participants. There were 60 people who participated in the trivia event. This was not described in our original funding request.



Outreach - Boy Scouts of America (December 2014)

Five members visited two different scout troops; the first troop was five boys in the fifth grade and two members assisted with the activity; the second troop was seven boys in the third and fourth grade and three members assisted with the activity. Our members brought the SPIE Laser Classroom outreach kit and utilizing gummy bears and lasers, taught the scouts about color/light mixing. The goal of the activity was to learn how light interacts with objects to reveal the color of the objects. The boys created their own table to record data, then guessed how a certain colored gummy bear would react to a certain colored laser (e.g. the green gummy bear will absorb the green laser). After making a hypothesis, the boys tested their guesses and recorded if they were right or wrong. This event required no funding outside of the student chapter outreach kit. This activity was not described in our funding request.



Outreach - Cusick Elementary School (January 2015)

Cusick Elementary is a small school in a rural area serving a largely agrarian and Native American community. Working with our collaborators from the USDA Agricultural Research Unit here at WSU, we were asked by the school to provide content on the topic of energy for third, fourth and fifth grade classes.



Our members took existing equipment from our undergraduate physics labs on pendulums and developed engaging worksheet-based curriculum appropriate for the third through fifth grade students. This lesson described principles of energy through a hands on experiment testing how the period relates to different pendulum parameters while emphasizing the scientific method. Small groups of students each did period measurements on two different pendulum configuration then the class was lead as a

whole through data analysis, concluding in how the pendulum was affected. The event was funded by the USDA. This activity was not described in our funding request.

Outreach - Pullman and Colton Schools

Outreach teams traveled to local schools and gave demonstrations on the nature of waves to different levels of classes.

In March 2015 our chapter visited multiple schools in the area to promote physics:

- Two of our members traveled to the nearby town of Colton (2 March) to present demonstration to 5th through 9th graders about sound. The demonstrations showed there are different types of waves (longitudinal and transverse) and how those waves can interact with each other to form interference patterns we can hear (using tuning forks) and see (using a Ruben's Tube). There were about 40 students who participated in the event. OSA chapter funds were used to purchase propane for the Ruben's Tube demonstration. This activity was not described in our funding request.
- Two of our members traveled to Franklin Elementary (3 March) to work with a class of third graders to discuss sound. The demonstrations showed there are different types of waves (longitudinal and transverse) and how those waves can interact with each other to form interference patterns we can hear (using tuning forks) and see (using a Ruben's Tube). There were two classrooms of students (about 45 people) who participated in the event. The presentations were very well received and our chapter have been invited to return to give more physics demonstrations. This activity was described in our funding request from 2013.
- Two of our members went to Lincoln Middle School (20 March) to work with six classes of sixth graders about spectroscopy. Our members began by talking about light and how it can be observed using spectroscopy. A worksheet was developed to guide the students through the activity. The students observed different types of elements and lights, drew the spectra, and then proceeded to answer questions in the packet our members prepared for them. The OSA provided funds (printing worksheets) for the event. This activity was not described in our funding request.



- Four of our members went to Sunnyside Elementary (17 March) to work with classes of third to fifth graders. Demonstrations focused on polarization, properties of materials, stress and momentum. There were a total of 9 classes of students who participated in the outreach event throughout the school day. During the event, our members spent time advertising our upcoming Laser Maze event. Taking content from the Optics Suitcase†, our members described a reusable heat pack and the ‘happy/sad balls’ to break the ice, then described how light behaves like a polarized wave, how linear polarization filters behave, then finally showed how to construct a polariscope to observe stress in common plastic objects. This activity was not described in our funding request.



† OSA Optics Suitcase, http://www.osa.org/en-us/membership_education/youth_education/optics_suitcase/

Outreach - Lacrosse High School (11 March 2015)

Lacrosse is a small town about an hour away from WSU. The school itself is K-12 with the high school only housing 9 students. Two of our members traveled here and began by talking about light and how it can be observed using spectroscopy. The students were then tasked with building their own take-home

spectrometer, the pieces for each being cut out by our members prior to the event. Once built, the students observed different types of elements and lights, drew the spectra, and then proceeded to answer questions in the packet our members prepared for them. The USDA funded the majority of the supplies while OSA provided additional supply funds for the event. This activity was not described in our funding request.

Recruitment Activities:

Welcome Back Picnic (September 2014)

For the third year running, we assisted our department in hosting and planning the Welcome Back/ Recruitment picnic at Sunnyside Park in Pullman, Washington. All students from our physics department were invited and encouraged to bring friends. Food was provided by the department, while activities were provided by our club.



This was the first year we made giant bubble wands for the kids in attendance to play with, and it was successful at bringing them out of their bubble - in a manner of speaking. Many of the attendees



participated in the 3rd Annual Physics Disk-Golf Tournament. Players were separated into beginner, intermediate, and experienced and prizes were awarded to the first and second places from each category. Prizes for the tournament were \$25 gift certificates to a local sporting goods store. Funding for this event was provided by OSA (\$150). This activity was not described in our funding request.



Bowling with Prospective Graduate Students (12 March 2015)

One of the events the WSU Physics Department holds is a recruitment weekend in the Spring for prospective graduate students. When this happens, the department asks the OSA-SPIE Chapter to hold an event for the students, usually in the form of an activity where the visiting students can feel comfortable and ask current graduate students questions about the department. This year, we held a bowling night at Zeppoz in Pullman, WA. We had a good turnout with 19 people showing up to the event, 11 of which were not current members of our chapter. By doing this event, we hope to recruit future members of the club. This event was funded by OSA (\$300), supplemented by the graduate students in attendance (\$60). This activity was not described in our funding request.

Social Activities:

Winter Solstice Party (19 December 2014)

This winter, our chapter held its 3rd Annual Solstice Party. Bringing our chapter together to celebrate the end of a semester and the beginning of a new year has been a great opportunity to encourage a sense of community amongst graduate students and encourage participation over the next year. This year, for the sake of cost, the gathering was held at the house of one of our members, asking the attendees to bring a

small dish if they were able. The funds used were to subsidize food ingredients for those who volunteered to prepare homemade main courses. Attendees were also asked to bring an inexpensive gift for our very popular “white elephant” gift exchange. Entertainment included word association games, video games, movies, and board games. The event was advertised widely amongst all of our graduate students through Facebook, fliers and individual invitations. This brought a record-breaking 30 people, including some family members. Many of the graduate students who attended the event do not regularly participate in chapter business, but have since expressed more interest in chapter activities. The activity ended up being quite crowded for a small residence and would be better served next year at a larger venue. This activity was described in our funding request.

Future Activities

Outreach Activities:

Optics Carnival

The WSU OSA-SPIE Student Chapter will host an outreach event titled “Optics Carnival” during popular weekends of the school year, including - but not limited to - Lentil Fest, Dad’s Weekend, Mom’s Weekend, and Homecoming Weekend. This event would invite WSU community members as well as non-WSU community members to share in the exciting world of physics and optics, while being able to win prizes. By creating a fun environment for various ages, this event caters to undergraduates, graduates, and families alike. Graduates and undergraduates get a chance to enjoy a night of winning prizes, fun demonstrations, and exciting games, while families enjoy all the same benefits as well as a relaxed learning experience with their children. The chapter anticipates building 3-5 demonstrations, as well as 8-10 games by the end of this summer. Funds for start-up have been provided by the WSU GPSA.

International Year of Light Laser Maze (11 April 2015)

To commemorate the International Year of Light, our chapter will be hosting a laser maze challenge open to the entire community. Using funds granted to us by SPIE, we are in the final stages of completing our preparations for the event. Advertisements for the events have been posted in a variety of different places, including: the WSU radio station, the WSU Student Union Building, the Pullman Community Update (a monthly newsletter), and multiple locations in and around the WSU campus. Local Boy Scout Troops attended our “test day” on 28 March 2015 and immensely enjoyed the experience of crawling through laser beams. There will be 4 demonstration tables for participants to view/interact with as they wait in line for the main Laser Maze attraction. This activity was described in our International Year of Light funding request.



Outreach Collaboration with Cougar Laser Arena

At the beginning of the calendar year, a laser tag arena and arcade opened in Pullman. It is the goal of our chapter to collaborate with this business to perform outreach with nearby elementary and middle school

students. The idea would be to reserve the arena for an hour during the day, whereby our chapter members would spend 30 minutes talking about how lasers work, followed by 30 minutes of the kids being able to play laser tag. The owners of the business have worked with our officers to establish a flat price for this use. It is our chapter's goal to perform this outreach 3-5 times each semester with local and nearby schools.

Cougar Quest Light Workshop (Summer 2015)

Washington State University annually hosts an academic summer camp for college-bound students between grades 7-12. Our chapter has won a bid for providing a week's worth of content for this program as a \$1000 grant, as well as limited supply resources. In fulfilling this program, our members are developing a series of hands-on, lab based exercises which over the course of 4 days will introduce students to the classical ray, wave, and particle natures of light ending with our IYL Laser Maze and modern optics demo tables. For more information, visit <https://cougarquest.wsu.edu/>.