

2014 UNM SPIE Annual Report

# The University of New Mexico SPIE Student Chapter Annual Report

December 2014



1313 Goddard St. SE  
Albuquerque, NM  
87106

Phone: (505) 272-7800  
Fax: (505) 272-7801

## **Table of Contents**

Introduction	3
Chapter Officers	3
Members	4-5
Seminars	6-7
Outreach Activities	8-10
UNM SPIE Student Chapter Individual Activities	11-12
Social Activities	12
Financial Summary	13
Plans for 2015	14-15
Thank you, SPIE!	16

## **Introduction**

The University of New Mexico's SPIE student chapter is proud to report its 2014 achievements, as well as its plans for 2015. Our chapter's headquarters are in the Center for High Technology Materials (CHTM) in UNM's Science and Technology Park. CHTM is a wonderful home for our chapter as its interdisciplinary research projects in optics, optoelectronics, materials engineering, physics, chemical engineering, electrical engineering, and other disciplines attract a variety of students from all over the world.

The mission of our chapter has been to advance light based technologies and help support its associated community through participation and organization of activities such as seminars, outreach projects, and social events. We are passionate in our pursuit of nurturing interest in science in young minds. Our aim is to nurture intellectual, communal and professional growth in each of our members, through seminars and networking opportunities. SPIE provides our members a network on a global scale.

## **Chapter Officers**

*January 2014 – September 2014*

**President:** Brianna Klein- [bklein01@unm.edu](mailto:bklein01@unm.edu)

**Vice President:** Sadvikas Addamane - [addamane.sadvikas@gmail.com](mailto:addamane.sadvikas@gmail.com)

**Secretary:** Lilian Casias - [lkacosta@unm.edu](mailto:lkacosta@unm.edu)

**Treasurer:** Theodore Schuler-Sandy - [tedschuler@gmail.com](mailto:tedschuler@gmail.com)

**Facebook Guy:** John Montoya - [lostinsocorro@gmail.com](mailto:lostinsocorro@gmail.com)

**Chapter Advisor:** Dr. Sanjay Krishna – [skrishna@chtm.unm.edu](mailto:skrishna@chtm.unm.edu)

*September 2014 – September 2015*

**President:** Lilian Casias- [lkacosta@unm.edu](mailto:lkacosta@unm.edu)

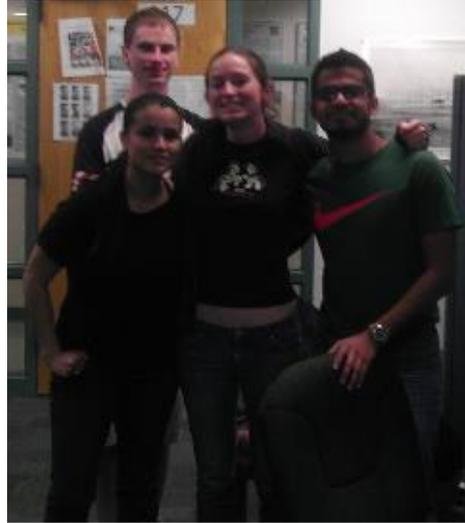
**Vice President:** Sadvikas Addamane - [addamane.sadvikas@gmail.com](mailto:addamane.sadvikas@gmail.com)

**Secretary:** Brianna Klein – [bklein01@unm.edu](mailto:bklein01@unm.edu)

**Treasurer:** Theodore Schuler-Sandy - [tedschuler@gmail.com](mailto:tedschuler@gmail.com)

**Facebook Guy:** John Montoya - [lostinsocorro@gmail.com](mailto:lostinsocorro@gmail.com)

**Chapter Advisor:** Dr. Sanjay Krishna – [skrishna@chtm.unm.edu](mailto:skrishna@chtm.unm.edu)



2014 Chapter Officers



2014 gathering with SPIE members

### **Student Chapter Members**

	<b>Name</b>	<b>Expiration Date</b>
1	Lilian Casias	December 1, 2015
2	Sadhvikas Addamane	December 1, 2015
3	Nahome Bete	June 20, 2015
4	Fei-Hung Chu	June 30, 2015
5	Ted Schuler-Sandy	December 1, 2015
6	John Montoya	December 1, 2015
7	Brianna Klein	July 24, 2015
8	Aram Gragossian	January 16, 2015
9	Md. Mottaleb Hossain	December 18, 2014
10	Geoffrey Jenkins	July 30, 2015
11	Seth Melgaard	January 4, 2015
12	Zhou Yang	November 9, 2015
13	Alireza Kazemi	November 2015
14	Zahra Taghipour	December 1, 2015
15	Marziyeh Zamiri	December 1, 2015

### **Alumni Members**

	<b>Name</b>
1	Alexander Albrecht
2	Jonathan Andrews
3	Paul Schanwald
4	Stephen Myers
5	Andreas Schmitt-Sody
6	Victor Gamiz
7	Alex Raub
8	Felix Morgan
9	Brian Newnam
10	Christopher Wilcox
11	Andreas Velten

## **Seminars**

This year, we had 2 main seminars that were organized directly by the SPIE student chapter, highlighted below. In addition, there were another 5 seminars co-hosted by our chapter (not included in this list).

### **Dr. Toni Ciardi**

#### ***“Modeling the Growth of Aluminum Gallium Nitride ((Al)GaN) Films Grown on Aluminum Nitride (AlN) Substrates”***

**Tuesday, September 16th, 2014**

The focus of this work is to determine if it is possible to reduce the concentration of threading dislocations in (0001) oriented hetero-epitaxial aluminum gallium nitride ((Al)GaN) films grown on aluminum nitride (AlN), which have the hexagonal wurtzite structure, much like it has been done for hetero-epitaxial silicon-germanium (SiGe) films grown on silicon (Si) (1, 2), which have the cubic zinc blende structure. Most of the dislocations in the SiGe films have been confined to the region near the substrate, leaving the top of the film where devices are fabricated relatively dislocation free. It is generally agreed that device structures that contain fewer defects produce more reliable and efficient devices. Being able to produce higher quality (Al)GaN device structures will lead to making better high power diodes and transistors in electric vehicles, high electronic mobility transistors (HEMTs) used in radar systems, and ultraviolet (UV) optical emitters used to purify water. In this effort, we also determine the electronic properties of the defects to determine which ones will have the most negative effects on device operation.

### **Dr. Ralph Dawson**

#### ***“Crystal Growth – Then and Now”***

**Wednesday, November 19th, 2014**

His research interests are MBE growth of III-V arsenides and antimonides for IR emitters and detectors; monolithic integration of Silicon and III-V device structures; MBE growth of highly mismatched materials. He has more 185 journal publications, 160 conference presentations, 12 patents. He is also editor of 6 proceedings volumes. A relaxed and somewhat personal look at how semiconductor crystal growth (and the devices it produced) has changed through the years, the topics he covered in this seminar included:

Bulk Growth → Liquid Phase Epitaxy → Vapor Phase Epitaxy → Molecular Beam Epitaxy, Lattice Matched Materials → Strained Materials

This Seminar has been one of our biggest seminars in the history of SPIE UNM, with an attendance of 40 people.



Prof. Dawson Seminar & Speaker accomplishments



Prof. Dawson is Research Professor, EECE Dept., Center for High Technology Materials, University of New Mexico. He was Distinguished Member of Technical Staff at Sandia National Laboratories, Albuquerque, NM and formerly member of Technical Staff, Bell Laboratories, Murray Hill, NJ from 1969-1976. Prof. Dawson has completed his Ph. D., Electrical Engineering, *Univ. of Southern California*; M. S., Electrical Engineering, *Univ. of Southern California*, B. S., Electrical Engineering, *California Inst. of Technology*.

## **Outreach Activities**

For our outreach projects, we have been working closely with CHTM's newly-made Outreach Work Group. We have had a number of outreach collaborations, with such people as Elsa Castillo, Associate Director at the School of Engineering, Stefi Weisburd, Outreach Manager of UNM Engineering Outreach Programs, and Doris Williams, Optical Science and Engineering Program Adviser.

### **Expand your horizons for girls grade 5-8**

January 25<sup>th</sup>, 2014

Our members were able to help UNM with Explore Your Horizons event to encourage middle school girls to go into STEM. SPIE members participated as presenters to give a short talk and then direct a hands on activity. There was two 1-hr sessions.

### **UNM's ERCs big bash at South Valley Academy Family Science Night**

March 18<sup>th</sup>, 2014

SPIE students helped by setting up a couple of booths for family night at South Valley Academy. Our graduate students entertained middle school students with cool nano and Smart Lighting demos.

### **CHTM Summer Interns Tours**

June 2<sup>nd</sup>, 2014

Sadhvikas Addamane, Brianna Klein, Alireza Kazemi, Stephen Myers, and Lilian Casias organized CHTM tours for 20 summer interns where they demonstrated the following labs:

**MBE labs:** Sadhvikas / Brianna Lettuce Explain MBE / Liquid nitrogen demo

**Gowning area:** Lilian Gown One student gets to gown up, Stephen / Ali Processed material / Metal

**SEM Images:** Describe why you use it and how it works

**PL lab:** Brianna / Lilian / Happy Unprocessed sample / PL Spectrum Describe why we use PL

### **CHTM ECE101 Lab Tours**

April 23<sup>rd</sup>, 2014

April 30<sup>th</sup>, 2014

Gave tours of CHTM to the introductory-level Electrical and Computer Engineering class. This tour is designed to make freshmen university students interested in the optoelectronics research that happens at UNM.

### **Nano and Smart Lighting Outreach**

September 27<sup>th</sup>, 2014

An outreach targeted for middle schoolers around the Albuquerque Area in Stamm Study Commons in Centennial Engineering at the University of New Mexico, the purpose is to promote nanoscience in young minds.

**UNM School of Engineering Open House – Fall Semester**

October 8<sup>th</sup>, 2014

Emma Renteria was responsible for setting up a booth at the school of engineering open house to welcome new engineering students into UNM and promote the optoelectronics field.

**Belen High School Tours**

November 25<sup>th</sup>, 2014

Our members were responsible for setting up a presentation and lab tours for 30 high school students from Belen, New Mexico. We were able to collaborate with CHTM coordinator, Joel Starquadine to have an all day successful event at UNM.

2014 UNM SPIE Annual Report



2014 Outreach Photos

## **UNM SPIE Student Chapter Individual Activities**

### **CHTM Outreach Workgroup Student/SPIE Representative – Lilian Casias**

Is in her second year of volunteering to be the student representative for CHTM's Outreach Workgroup. This group's purpose is to organize and perform outreach activities for promoting optoelectronics, nanoscience, and engineering. Her work collaborates with the Hispanic Engineering and Science Organization (HESO) where some of the planned events target minority students around the university.

### **Optical Science and Engineering Orientation – Sadvihkas Addamane**

August 20<sup>th</sup>, 2014

Gave a presentation to incoming graduate students in Optical Science and Engineering on the benefits of joining SPIE.

### **SPIE Student Travel Grant – Lilian Casias**

SPIE Photonics West, San Francisco, CA, February 4-7, 2014

Presented her paper titled "*Investigation of Quantum Efficiency in Mid-Wave Infrared (MWIR) InAs/GaSb Type-II Strained Layer Superlattice (T2SL) Detectors*"

"

### **SPIE Student Scholarship – Md. Mottaleb Hossain**

2014 Optics and Photonics Education Scholarship

**Md. Mottaleb Hossain, a CHTM and OSE-ECE graduate student,** was awarded \$2,000 for his potential contributions to the field of optics and photonics

### **UNM SPIE Student Chapter Website updates – Brianna Klein**

This was built and maintained by Brianna in 2013 but been maintained throughout the year 2014 by her, it is our second year of using the new website where in our recruitment events we try to recruit students by referring them to our website.

<https://sites.google.com/site/unmspiestudentchapter/>

### **CHTM GREEN Workgroup Student/SPIE Representatives – Sadhvikas Addamane and Brianna Klein**

January 2014-August 2014

In helping the University of New Mexico with energy efficiency and conservation, "GREEN LOBO" group was started by CHTM with SPIE members leading the student section of the group, they help create awareness around CHTM to become more energy efficient and participate in monthly meetings.

### **Cleaning SPIE Office & Cleaning CHTM Cleanroom – Lilian Casias and Brianna Klein**

April 4<sup>th</sup>, 2014

Brianna Klein organized a day to clean the CHTM cleanroom, there was volunteers led by her to help at different shifts and notable cleaning was done which was something CHTM had not accomplished in several years.

**QSIP and MBE conferences – SPIE UNM provided volunteers**

QSIP: June 29, 2014 to July 3, 2014 in Santa Fe, New Mexico

MBE: September 7-12, 2014 in Flagstaff, Arizona

For the QSIP conference we planned/hosted/organized the conference using SPIE officers. For the MBE International conference we also provided volunteers throughout the conference. Websites for both conferences: <http://qsip2014.chtm.unm.edu/wordpress/> & <http://www2.avs.org/conferences/MBE2/>

**Social Activities**

Our chapter organized and hosted the social activity outlined below. Due to many conferences hosted this year by our university as well as our president Brianna Klein graduating in October 2014 as well as our two main members: Lilian Casias and Sadvikas Addamane taking the qualifying exam, we were unable to do more socials. However, next year should be more flexible for our officers and you can find the plan activities in the “plans for 2015” section in this report.

**Annual SPIE/OSA Barbeque**

August 22nd, 2014

Meet other students in different departments at the annual barbeque. We had a great turnout even though the weather was rainy, below are some pictures. Some of the food was donated to SPIE by CHTM so we did not have to spend much on it.



Some BBQ 2014 pictures

**River of Lights End of the Year Social**

December 30, 2014

A last social to say goodbye to the year while walking around the river of lights in the Albuquerque Aquarium.

## **Financial Summary**

<b>Description</b>	<b>Date</b>	<b>Expenses</b>	<b>Deposit</b>	<b>Balance</b>
Balance end of 2013	November 2013			\$445.73
2013 Activity Grant	November 2013		\$900.00	\$1345.73
Initial Balance 2014	2014			\$1345.73
2 Seminars	2014	-\$85.93		\$1259.80
Meetings	2014	-47.21		\$1212.59
BBQ with OSA	August 2014	-\$63.1		\$1149.49
Outreach	2014	-\$0 (we provided volunteers, food donated, used supplies we have)		\$1149.49
Final Balance	December 2014			\$1149.49

Our chapter spent a total of \$196.24 in 2014. Seminars accounted for almost half of our spending (44%), chapter meetings were 24% and the annual SPIE/OSA barbeque was 32%.

## **Plans for 2015**

### **I. Outreach**

Below are a few of the outreach projects we are interested in for next year, however our plan for 2015 is to do at least 10 outreach events which we will be discussed in the beginning of the year of 2015.

#### **Albuquerque Institute for Mathematics and Science, AIMS photonics day**

March 2014

Volunteers needed to be presenters who give a short talk and then do a hands-on activity. We plan to give a presentation as well as provide pizza to about 20 students.

#### **International Year of Light SPIE Student Chapter Activity**

Summer 2015

For our activity grant 2014 which is due Dec. 15, we plan to use this grant to plan an event during the summer with our big group of summer interns where we demonstrate demos on light and celebrate 2015 as the year of light. The grant will be used to buy 2 new demos as well as provide food for all participants. Ideas include: Solar cell project for AIMS and Laser Tag tournament. Specific idea to be listed in our activity grant for 2014.

#### **Science and Technology Day at the New Mexico State Fair**

September 2015

We plan to attend the Science and Technology Day at the New Mexico State Fair And take a couple of demos to the event.

### **II. Send Representative to Photonics West Student Chapter Meeting**

We are planning on sending Alireza Kazemi our chapter representative to Photonics West. There, he will attend the student chapter meeting as well as present a talk on his Graphene research at UNM.

### **III. Seminars**

We have an upcoming Visiting Lecturer lined up for next year, she has confirmed but not confirmed a date yet as she was in maternity leave, we plan to apply for our visiting lecturer grant as soon as we confirm the date early next year. We do plan to have about 5 seminars this year including the visiting lecturer one, as our members have a more flexible schedule this year, below are our possible seminar preseters:

#### **Dr. Elizabeth Steenbergen**

Tentative, Summer 2015

Visiting Lecturer

ASU graduate & Air Force Research Lab employee

**Other ideas invited speakers for 2015 Spring/Fall Seminars (Lilian and Sadvikas to contact each):**

- Dr. Atwater (Caltech)
- Dr. Nakamura
- Dr. Moloney (UNM)
- Dr. Agrawal (Rochester)

#### **IV. Keep-up with SPIE Bulletin Board**

To encourage recruitment and make our activities known at UNM, we constructed it in Dec. 2013 and plan to continue to keep up with it & have more updates.

#### **V. UNM SPIE Student Chapter Tee Shirts 2015 Design Competition**

We have had several requests for UNM Student Chapter Tee-Shirts in our last meeting in September 2014, we issued a deadline of March 2015 to complete a design where we will be judging for best design and order shirts by April 2015. The amount of extra money collected we can use it as a fundraiser for any other activities we can plan for 2015.

#### **VI. Outreach Demonstration Improvement Projects**

Several of our outreach demonstrations need to be improved and repaired. We plan on doing this at the beginning of the year (first SPIE meeting in January). In the year 2014 due to the 2 conferences in the summer we were unable to plan too many outreach events as many of our officers had to host a conference (QSIP). However, in the year 2015 we plan to have many more events.

#### **VII. 2015 Officer Elections**

Officer elections for 2015 will take place in September 2015.

**Thank you, SPIE!**

Without SPIE's funding and support, our many achievements of 2014 would not have been possible. We owe a special thanks to the devotion of Dirk, Tasha, Alison, and Ben who make student chapters possible. The SPIE community provides many unique opportunities to enrich our members' careers and lives. The travel scholarships, seminars, and conferences enable students to network with experts in their field, while funding support for outreach projects encourage the local community to learn about more about optics and science. We are proud to be a part of SPIE. As students studying optoelectronics- and optics-based fields, we realize the significance of SPIE's mission to advance light-based technology. Thank you, SPIE!

*-2014 SPIE Officers*