

Air Force Institute of Technology (AFIT) SPIE Student Chapter Annual Report for 2014

AFIT SPIE Student Chapter
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Introduction

In this annual chapter report, we highlight the accomplishments that our chapter made over the past year. All in all, our chapter continues to thrive.

Members

Leadership

Our chapter officials for 2015 were elected on 9 Apr 2015 and are listed below:

- Ashley Gonzales, ashley.gonzales@afit.edu, President
- Ben Eshel, ben.eshel@afit.edu, Vice President
- Nicholas Herr, nicholas.herr@afit.edu, Treasurer
- Daniel O'Keefe, daniel.okeefe@afit.edu, Secretary

Our chapter officials for 2014 were elected on 1 May 2014 and are listed below:

- Samuel Butler, samuel.butler@afit.edu, President
- Woody Miller, woody.miller@afit.edu, Vice President
- Noah Van Zandt, noah.vanzandt@afit.edu, Treasurer
- Matthew Gridley, matthew.gridley@afit.edu, Secretary

Throughout 2014, we had four quarterly meetings. These meetings helped us to recruit new chapter members and build camaraderie amongst existing chapter members. These meetings focused on: recruitment, educating the current SPIE membership on the laser propagation demonstrator, outreach, and ideas for new optical demonstrations. Additionally, we tried to arrange for an SPIE guest lecturer, although we were unsuccessful. We will continue to attempt to bring in an SPIE guest lecturer over the next several months. All four quarterly meetings served food and beverages with high attendance. Figure 1 shows our current SPIE Laser Propagation Demonstration being showcased at a meeting at AFIT, attended by current and potential SPIE members.



Figure 1. Major Sam Butler, AFIT SPIE Chapter President, showcases the Laser Propagation Demonstration to current and potential chapter members to boost recruiting and prepare our new members for Outreach events at our Fall quarterly meeting held on October 23, 2014.

Current members

As of 30 Jan 2015, our chapter has 19 Student Members and 14 Alumni Members. Current members and their membership expiration/graduation dates are listed in the Table 1. Alumni members are listed in Table 2. The AFIT SPIE Student Chapter maintains two chapter advisers, one military faculty member for continuity and one civilian faculty member for longevity. Our military advisor is Major Milo Hyde, Ph.D., and our civilian advisor is Dr. Michael Marciniak. Both advisers are regular members of SPIE and have written consent from their respective department heads (as required by the chapter constitution). The AFIT SPIE student chapter also elicits the participation of AFIT faculty members who are current members of SPIE or show desire in becoming members of SPIE. Their continued involvement increases chapter support and longevity.

Table 1: Current members of the AFIT SPIE Student Chapter.

Student Members:	Membership Expiration Date
Harun Altun	24 September 2015
William Bauer	22 October 2015
Sean Baumann	20 February 2015
Matthew Bean	28 April 2015
Goldie Boone	4 February 2015
Samuel Butler	11 April 2015
Adrian Catarius	30 April 2015
Ben Eshel	7 May 2015
Matthew Gridley	6 May 2015
Joseph Haefner	17 July 2015
Tyler Hardy	1 April 2015
James LeMieux	10 September 2015
Theodore Josue	30 April 2015
Woody Miller	6 May 2015
Sarah Myers	28 February 2015
Robert Slaughter	22 August 2015
Michael Steinbock	6 October 2015
Noah Van Zandt	20 February 2016
Robert Vincent	12 April 2015

Table 2: Alumni members of the AFIT SPIE Student Chapter.

Alumni Members:	Graduation Date
Christopher Lenyk	May 2009
Michael Marciniak	September 1995
Salvatore Cusumano	(not available)
Edward Hurd	March 2011
Jason Tellez	September 2011
Jason Vap	September 2012
James Harris	(not available)
Glenn Perram	Aug 1966
Mark Spencer	Mar 2014
Seth Swift	September 2015
Brian Neff	Sep 2013
Ronald Coutu	(not available)
Victor Gamiz	May 1995
Michael Seal	Sep 2013

Chapter Activities

Community Outreach

This year, we continued to showcase our chapter's legacy outreach effort, the *Laser Propagation Demonstration* (LPD), to a wide range of students in a variety of locations. Figures 2, 3, 4, and 5 below show the LPD as part of our outreach activities. In total, we estimate our chapter was able to showcase our LPD to over 400 elementary, junior high, and high school students since our last report!

In addition, we have purchased a padded Pelican case for transport of the Laser Propagation Demonstration, with room also available for other demonstrations currently in construction. This case will pay for itself over the life of our chapter by allowing us to transport the demonstration as checked baggage on airline flights (such as to San Diego for Optics & Photonics) at a reduced cost, rather than paying substantial amounts for shipping and handling to and from San Diego; two round trip shipping trips will more than pay for the Pelican case in the cost of shipping. This case should enable us to more easily take the LPD to events outside of the greater Dayton area, as many of our students and faculty routinely travel; we hope this will encourage SPIE members to capitalize on opportunities to demonstrate the LPD at schools in their hometowns across the USA to reach a more broad audience.

Our chapter has begun purchase of components to develop a *Laser Effects Demonstration*. Our laser was ordered in December 2014, and has been received. Ben Eshel and Woody Miller are currently working on laser characterization and design of the new demonstration. This laser is a Class IV laser that will be fully enclosed in a permanently attached protective housing, with a small slit through which we can slide a piece of paper. We will have preprinted cards with the AFIT and SPIE logos, and a dark spot, which will be inserted into the path of the beam through the slit, creating a laser burn hole. We can then give attentive students the paper to take with them as a souvenir to remember both our Laser Effects Demonstration and our Laser Propagation Demonstration, as well as promote both AFIT and SPIE when the student shows the card to others. We feel this is a great opportunity to not only create a lasting impression for students, but also promote our chapter's visibility.

Prior to use, the Laser Effects Demonstration will be evaluated and certified by our AFIT Laser Safety Officer and SPIE Faculty Advisor, Dr. Michael Marciniak. This testing will include measuring the power levels of light at all viewing angles around the protective casing and comparing with ANSI Laser Safety Standards. We hope to have the entire demonstration built and certified in time to accompany us at the next Optics & Photonics Outreach Games in San Diego. We believe such a demonstration would augment the current LPD in showcasing the energy contained in a coherent, monochromatic stream of light, and would provide a lasting memory for young students to remember our presentation. It also provides us a great opportunity to educate people as to why you need to be safe when using lasers, even if it may sound like they do not have a lot of power, because coherent, directional light is deceptively powerful.

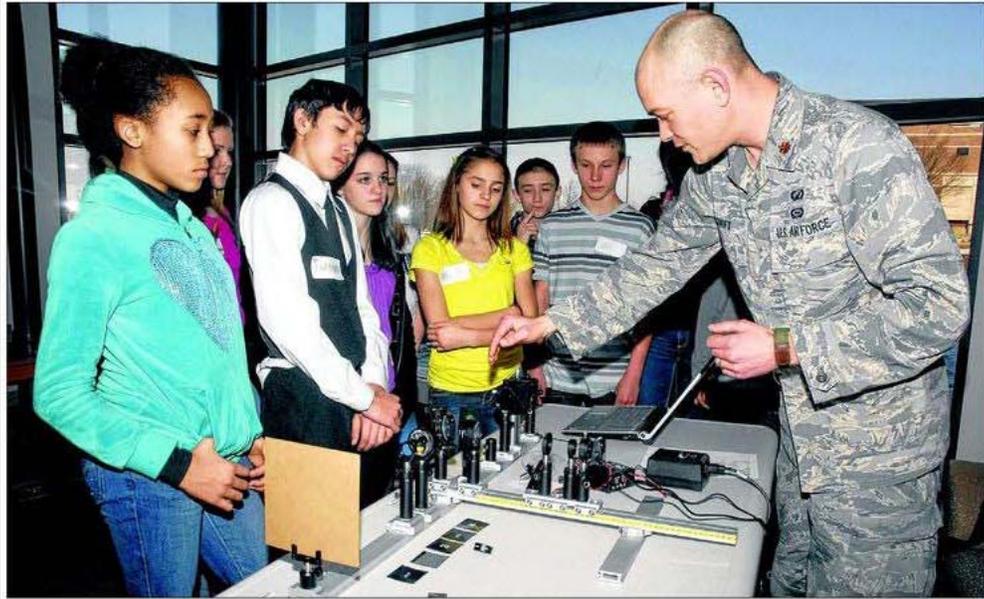


Figure 2: The LPD as part of Engineering Week at the Air Force Institute of Technology at Wright-Patterson Air Force Base, Ohio (March 2014). Chapter alumnus Maj Seth Swift explains to students how the various optics in the LPD operate.



Figure 3: The LPD as part of Engineering Week at the Air Force Institute of Technology at Wright-Patterson Air Force Base, Ohio (February 2015). Chapter president Major Sam Butler explains to students how the various optics in the LPD operate. We had over 120 total students, in 8 groups of 15-20 students at a time.



(a)



(b)

Figure 4: AFIT SPIE chapter member Michael Steinbock explains the LPD to high school students in Kentucky.



(a)



(b)

Figure 5: The LPD demonstrated to elementary school students at Broadway Elementary in Tipp City, Ohio (Feb 2015). (a) Chapter president Major Sam Butler explains to students how the LPD operates. (b) The students observe results of our optical demonstration projected on a screen (to the right, not shown). In total, about 150 students saw our LPD in 4 different sessions held at the school.

Our chapter also participated in outreach events which did not include the LPD. For example, we participated in the 2014 State Science Day as Judges for the SPIE Optics and Photonics Science Fair Award. This event took place at The Ohio State University in Columbus, Ohio. Our chapter supplied four judges, as seen from left to right in Figure 6 below. Each judge visited different student presenters, grades 7-12. After, we awarded first, second, and third place prizes to the top science fair projects with research in optics and photonics. It was a great experience and a really close race between the finalists. We look forward to continuing our participation in this event in the years to come.



Figure 6: Judges for the SPIE Optics and Photonics Science Fair Award (May 2014).

Travel Grants

As the 2014-2015 chapter president, Sam Butler applied for and received a SPIE Student Chapter Travel Grant to attend the 2014 Student Chapter Leadership Workshop at Optics + Photonics in San Diego, California. According to Sam, “the experiences at Optics + Photonics were incredible!” Sam also designed and presented the AFIT SPIE chapter poster at the Student Chapter Exhibition, and presented two conference papers. Dr. Mark Spencer, founding president of the AFIT SPIE chapter, was also in attendance, having graduated from AFIT a few months prior to the conference. Mark presented a paper on the Laser Propagation Demonstration, and also attended the Student Leadership Workshop. Sam presented our chapter poster, which can be seen below in Figure 7. We greatly appreciate SPIE’s continued support in the form of travel grants! The ability to network with other student chapter leaders and optics and photonics experts from all around the world continues to help our chapter members excel and gather new ideas for the road ahead.



Figure 7: Our 2014 poster display at the Student Chapter Exhibition session of Optics + Photonics in San Diego, California (August 2014). Sam Butler (left) stands with the founding AFIT SPIE chapter president, Mark Spencer (left).

Best Light-Based Master's Thesis

SPIE Fellow and Board Member, Dr. Michael Eismann awarded the third annual *Best Light Based Master's Thesis* award. This year, we had four submissions from Master's thesis advisors at AFIT. PhD student members ranked these submissions based on application. The 2014 winner was Jason Wyman, as shown in Figure 8. An award was given to him during the AFIT-wide graduation awards ceremony. He received a commemorative plaque and a \$50 check to sponsor a year of continued SPIE membership as an Early Career Member.

Additionally, the 2015 award recipient was Mr. Noah Van Zandt. Unfortunately, Noah was ill for the AFIT awards ceremony, so we do not have a photo to show; however, he also received a similar commemorative plaque and a \$50 check to sponsor a year of continued SPIE membership as an Early Career Member. We had a very competitive group of award nominees in 2015, with 8 nominations for the *Best Light Based Master's Thesis* award! This is a sign that our presence is being noticed among faculty, staff, and students at AFIT, and is a testament to the value of the award in promoting the SPIE chapter.



Figure 8: Dr. Michael Eismann (left) presenting the 2014 Best Light Based Master's Thesis award to Jason Wyman (right). This picture was taken during the AFIT-wide graduation awards ceremony (March 2014).

Future Activities

Moving on to the next year, our chapter has several ideas to increase involvement, relevance, and outreach. We highlight these ideas in bullet format below.

- We hope to complete our new Laser Effects Demonstrator to complement the current LPD as an effective mechanism for outreach.
- We hope to increase the number of schools and public demonstrations where we can showcase our LPD and, when ready, the new Laser Effects Demonstrator.
- We hope to increase chapter visibility around AFIT and the community by seeking novel approaches to outreach.

Financial Information

Our financial records through 8 April 2015 are shown below in Table 3.

Table 3: Financial records for the AFIT SPIE Student Chapter.

2014-2015 Financial Records (Through 8 Apr 2015)	
Balance as of 31 Dec 2013	\$568.89
Outreach Events	(\$414.92)
- Pelican Case for Transporting Demos	(\$219.95)
- New Laser for demo in development	(\$194.97)
Food & Supplies	(\$511.15)
- Best Light-Based Thesis (March 2014)	(\$85.00)
- Best Light-Based Thesis (March 2015)	(\$85.00)
- Food, drinks for 4 Quarterly Meetings	(\$227.70)
- Other expenses	(\$113.45)
2014 SPIE Activity Grant	\$900.00
Balance as of 9 Apr 2015	\$542.82

Summary

In closing, we feel like this has been a successful and productive year. We have several goals for the year to come, which will continue to grow chapter involvement, relevance, and outreach. From all of us here at the AFIT SPIE Student Chapter, thank you!

Samuel D. Butler
President
SPIE Student Chapter
Air Force Institute of Technology (AFIT)
9 April 2015

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Student Chapter
Air Force Institute of Technology

