SPIE Annual Report 2013

Michigan Technological University Chapter
Introduction

This is the 2013 final report for Michigan Technological University's student SPIE chapter. During the past year our chapter created and promoted interest in science, technology, and engineering on campus through student designed projects and demonstrations. Our current primary mission is to design and build projects that can be shown to both college and high schools as well as entered in competitions. As with all organizations we maintain the ever ongoing goal of recruiting more members and keeping our current members informed and active.

Student Membership

Chapter Officers

President – Arash Hosseinzadeh
Vice President – Patrick McKeon
Treasurer – Kevin Kruse
Secretary – Seyedmehdi Mousavi
Advisers – Dr. Christopher Middlebrook
Dr. Mike Roggeman

Detailed Membership List

John Becker
Michael Briseno
Jacob Carrick
Casey Demars
Clayton Doyle
Chris Fisher
Arash Hosseinzadeh
Kevin Kruse
Patrick McKeon
Seyedmehdi Mousavi
Seyedmehdi Sadatgoltabarestani
Club Shirts:

With the introduction of new members and the support of OSA, the club agreed to help finance a new series of polo shirts available for the members to purchase at half price. This is an important step in branding us as optic representatives when the club conducts outreach on campus for incoming freshmen and for high school-outreach when traveling to the nearby public schools with demonstrations.

Winter Carnival Fluorescent Demo:

As a continuation of our annual campus outreach session during Michigan Tech’s Winter Carnival, the SPIE club created of display of fluorescent items to demonstrate practical optics in everyday life. During the two-hour period, the club handed out Monster energy drinks, which fluoresce when exposed to near UV radiation, to hard working snow statue builders.

In comparison to last year, which consisted of only tonic water and Monster energy drinks, our array of night-life demos has expanded tremendously. The club is now equipped with a UV laser, a shortwave UV source, an RGB LED cube, and a wide variety of fluorescent rocks. These new demos help demonstrate the wide variety of optics-related topics relevant to engineering.
Guest Speaker: Dr. Dereniak

The MTU SPIE club has had the privilege, with the help of “guest speaker” funds, to sponsor Dr. Dereniak, Ph.D., a former president of the SPIE organization, to travel to Michigan Tech and talk about his research in imaging spectrometers and polarimeters. The seminar was made available to the college public for professors and students alike to attend (and as an opportunity for students to receive extra credit with the write-up of a review memo).
LED Workshop:
With the strong interest in designing an LED cube for an optics demo at the entrance of the Electrical and Engineering Resources Building (EERC), the club agreed to finance and build two LED cubes from scratch, including a 4x4x4 RGB LED cube and an 8x8x8 blue LED cube. Meeting on a weekly basis for a semester, the RGB cube was completed and functional, with the exception of designing an enclosure before donating to the department. The larger blue LED cube is partially built and will hopefully be finished by the end of 2014.

Optics Day:
We held a recruitment event for our chapter that was called Optic Day. The event consisted of three main parts: first a brief presentation about the optics and photonics science and engineering and applications in our daily life to have students excited about this field. Then a brief presentation about the SPIE organization and benefits of being a member in this society and our chapter. In the second part participants had lab tours to the three main optics and photonics lab in Electrical Engineering department of our university. Along with lab tours our fellow graduate members explained about their research and the importance and applications of their research. Most of the students were from electrical engineering but we also had some participants from physics and Biomedical Engineering. Third part was to show the participants some of the demos that we prepared before the event including laser
microscopy, florescence, light bending, polarizer plates, spectrometer and Michelson interferometer.

This activity publicized by posting flyers on campus. We tried to have flyers in all the departments that can be interested in optics and photonics. We also advertise the activity on the university involvement link website. We had nearly 40 participants that they did not know about SPIE and our chapter. At the end we had 35 students added to our email list and nearly 15 students that showed their interest to join the chapter. We got a few very active members that have been involved in chapter activities. The activity could have been improved by advertising the event better especially in other departments other than electrical engineering for example physics, materials, biomedical, and biology departments.

**Demo Contest and Christmas Party**

In the fall semester of 2013, nearing finals week, we held a demonstration contest to promote outreach in applicable optics the different wavelengths of light being sensed, and simulated the bands accordingly on a public website.

To help promote the demonstration contest, we held our annual holiday party hosting pizza and pop for attendees. Each person was to bring one cheap gift to be randomly exchanged with other members of the club and trades could be made to please each participant. It was
quite successful and created a good environment for our club to interact with one another discussing projects and club activities alike.

Photo Contest

Over the Winter break of the 2013/2014 school year, our club held its first ever photograph contest which we shared with our community. Students of Michigan Tech would be able to submit local recent photographs of the way light interacts with the environment. An example would be showing how light reflects and refracts through a large chunk of ice. With over 10 different photograph submissions the winner was selected by a public vote and was awarded a $100 Amazon gift card. This contest helped bring students awareness of our club and encouraged them to come up with unique ideas thinking about how we can use light to create beautiful artistic images.
Youth Outreach Program

Trips to the Local High schools:

We are holding a series of the outreach events to the local high schools. We will continue these events once a month in the spring semester. We started our outreach events in December and we had two trips to a high school in Baraga, MI. We had demos, including thermal camera, fluorescence, and demos about refraction index. In addition, we talked about the optics and photonics program in our university and future of this major and potential careers. We expect that by these outreach trips the Photonic program in our university and our chapter are getting recognized by the local high schools. Most of these students will go to the Michigan Tech to earn higher degrees and by these events we can introduce them our photonic program and our chapter. In addition, by these trips the optics and photonics awareness is increasing in the area that is one of main missions of the SPIE.
Summer Youth Program

Summer youth program is a very well organized event during summer in Michigan Tech. In the summer of 2013, for the second year, our chapter joined this event by organizing a series of workshops in holography to help promote the study and interest in photonic-related disciplines. The program consisted of two weeks for four groups of 14 high school students. Each group had one hour time in a day. The students got hands on experience in making holography, in addition our fellow graduate members had presentations about applications of optics/photonics in the modern world, different research and work areas in optics/photonics and working principles of the lasers and optical fibers.

College Outreach

In the fall of 2013, demonstrations in various disciplines of photonics were conducted during the MTU engineering explorations, where college freshmen students explore the various aspects in the field of engineering. Small groups of 8 students were split up between current graduate students to make the activity more interactive and open for questions/discussion. Hands-on demos included holographic plates, fluorescence samples, spectroscopy of gases, laser communication applications, and the utilization of diffraction for image formation.

Journal Club

Journal Club continues to meet at least once a month to discuss a paper from different areas in optics and photonics. The main goal of these meeting is to broadening the knowledge in our members while having social activities. The meetings generally take place at a local brew pub in order to keep the atmosphere friendly and not overly serious. This is a good time to get people together and obtain a different perspective as well as increase camaraderie within the group.

Photonics Learning Center

The photonics learning center started again in the fall 2013. We have plenty of motivated volunteers and will be holding help sessions on Thursdays 5-7pm. Our group also offers
study sessions for other upper level classes on an independent basis. The learning center helps to support the following classes:

EE2190 – Introduction to Photonics (Spring)
EE3140 – Electromagnetics (Fall, Spring)
EE3190 – Optical Imaging and Sensing (Fall)
EE4256 – Fourier Optics (Fall)
EE4257 – Digital Image Processing (Spring)
EE4290 – Optical Communications (Spring)
EE4441 – Lasers and Non-Linear Optics (Spring)

**Conclusion**

The chapter has been beneficial not only to chapter members but also to the department, the university, and the community as a whole. We have helped run a learning center designed specifically to aid optics and photonics students, conducted lab tours, run a fluorescence demonstration, taught young kids about optics and holography through the summer youth program, and helped upkeep the universities observatory. The Michigan Tech Student Chapter thanks SPIE for their continued support and looks forward to another great year.