



# 2009-10 Society of Physics Students ANNUAL CHAPTER REPORT

In order to be considered for an **Outstanding Chapter Award** and the **Outstanding Chapter Advisor Award** (\$5,000), this report must be filled out in full (pages 1-3) and returned to the SPS National Office. This report is the basis for which the **Outstanding Chapter Awards are granted**. However, if an updated listing in the SPS Information Handbook is all that is needed, just fill out and return page one.

Please type or print the report, keep a copy of the completed report for your files, and send two copies to the SPS National Office at the following address: SPS National Office, Annual Chapter Report, One Physics Ellipse, College Park, MD 20740. This completed Microsoft Word document may also be saved and emailed to the national office at: [sps@aip.org](mailto:sps@aip.org)

**NEW FOR 2010:** Preferred method—submit your chapter report online at: <http://www.spsnational.org/governance/chapters/reports.htm> and the report will be stored in the SPS database, allowing you to add to and edit it until the June 15 deadline. A copy will be emailed to you upon approval by the SPS national office, usually within two business days, and you can access the report at any point in the future.

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Please provide the following information about the chapter officers to be listed in the 2010-11 SPS and Sigma Pi Sigma Information Handbook. This information can also be updated online at: <http://www.spsnational.org/governance/chapters/reports.htm>

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(give title, e.g., "Historian," "Publicist," etc.)

Report prepared by Shannon Bourke, President Date 14 June 2010

(signature and position)

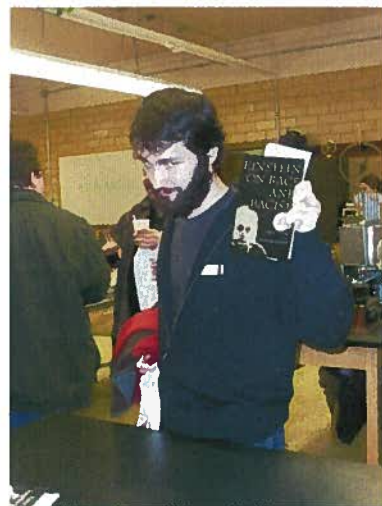
Report reviewed by Chapter Advisor Dr. Diane Jacobs Date 14 June 2010

(signature)

## 1. Participation in SPS Zone meetings

We attended two Zone 7 meetings this year: one at Grove City College in Pennsylvania, and one at Kettering University in Michigan.

Seven of us, and our advisor, traveled 260 miles to the Zone meeting at Grove City which had a large attendance and was run very smoothly (with a schedule open enough as not to be too rigid). We enjoyed the speakers and activities that were available; one of our favorite talks was titled "Jewels of Orion's Belt" given by Dr. Nancy Morrison from Toledo University. Brad Wade wrote a skit called "121 Evening News Einstein and the Bomb!" which we presented to everyone at the meeting. It was well received and Brad has just sent it to Dr. Neuenschwander for possible publication in the *Observer*.





The Zone meeting at Kettering had a much smaller attendance. This meeting took place about a week after classes were finished for us so only 5 of us were able to attend. Two of us gave presentations. One of our senior members, Don Ellison gave a talk titled “Radio Astronomy at EMU: The EARTHS Project”. He did the work at Eastern Michigan University with Prof. Patrick Koehn. Our president, Shannon Bourke, gave a talk titled “Visualizing Standing Waves in Musical Instruments”. She did the work at EMU with Prof. Joseph Lowry. This particular zone meeting was very focused on student research. Our favorite part of the meeting was getting to hear Dr. Gary White speak about different job and research opportunities for physicists.





Overall, the meetings were very engaging and the interaction with other physics students, professors, and industrial researchers was invaluable. We look forward to attending, and hosting, more Zone meetings.

## 2. Participation in other professional meetings

In the February 2010 two of our SPS members presented posters at the National AAPT Meeting in Washington, D.C. Ransom Brown's poster was entitled "Mock Mars Rover Mission: Increasing Interest in STEM Courses"; Charles Borener's was "Measuring the Acceleration Due to Gravity in a Sophomore Physics Lab". These research projects were conducted at Eastern Michigan University under the guidance of Prof. Diane Jacobs.

Ransom Brown applied for, and received, a grant from SPS to attend the meeting.

## 3. Involvement in SPS programs

**Associate Zone Councilor:** Bradford Wade ran on the Zone 7 ticket.

**Outstanding Chapter:** Our chapter was designated an Outstanding Chapter for the 2008 – 2009 academic year.

**Outstanding Chapter Advisor:** Dr. Diane Jacobs, who has been a dynamic advisor at EMU since 1984, won this award.

**Sigma Pi Sigma President:** Dr. Diane Jacobs ran for this office and was elected to serve.

**Marsh White Award:** Our chapter submitted a proposal for the Marsh White award, and it was funded. We want to start a Saturday Morning Physics program for fourth and fifth grade students. A few Saturdays a year we will have a one and a half hour program that will teach the children physics concepts. The kids will get to do a lot of hands on learning. They will get to participate in demonstrations with us and get to build something to take home with

them, so they can share what they have learned with their friends, family, and classmates. Our hope is to get children interested in science at a young age, so they will continue with that interest as they get older. Due to timing issues, we will not be able to start our program until the beginning of the fall semester.

#### 4. Participation in local SPS chapter meetings

We had 26 weekly meetings this academic year. Some highlights that were notable are as follows:

- ◆ **Rockets** - We built four different model rockets and spent a meeting launching them. It was no surprise that the smallest rocket went the highest. We even lost it and had to search the field for it afterwards. It turns out it landed and was imbedded in the ground.



- ◆ Physics Jeopardy - As a final review for our final exams Dr. Jacobs put together a Physics Jeopardy game. Our teams were very well matched and it was an extremely close contest.
- ◆ The Physics 500 - We never know what to expect for this trivia game. We are always prepared for the physics questions, but we never know what other random trivia Dr. Jacobs will ask.
- ◆ Physics Scavenger Hunt - One of our junior members, Matt Whipple, put together a scavenger hunt in the style of National Treasure. It took us 3 meetings to complete. We split into two teams and had to solve physics clues in order to get three keys that unlocked a crate. In the crate we found our treasure, light-up ducks!
- ◆ Electronics Kits - We were given snap-circuit electronic kits with schematics and raced to build different types of circuits with them using provided schematics.
- ◆ Built Pasta towers - Dr. Jacobs proposed a challenge to us – build the tallest structure or the structure that can hold the most weight, using only pasta. We thought she was crazy. We split up into three different teams and spent 30 minutes building stable structures. Ducks were awarded.



- ◆ Built our Galileo Scope - We requested our Galileo Scope and it took eight of us about 45 minutes to build it. We are looking forward to using it at a special event at the University President's residence on June 23<sup>rd</sup>.



- ◆ Farewell to the International Year of Astronomy - We said good-bye to the year of astronomy by having one of our professors, Professor Koehn, speak about his radio telescope project. We then played a few astronomy games.
- ◆ Halloween Party - We held our annual Halloween celebration. We had a costume contest; we all agreed that Brad Wade's Ben Franklinstein costume was the best. We also had a contest to make the best paper jack-o-lantern. Nick Arnold and Shannon Bourke's pumpkin looked suspiciously like Nick; they won the contest. There was good food and a lot of fun!



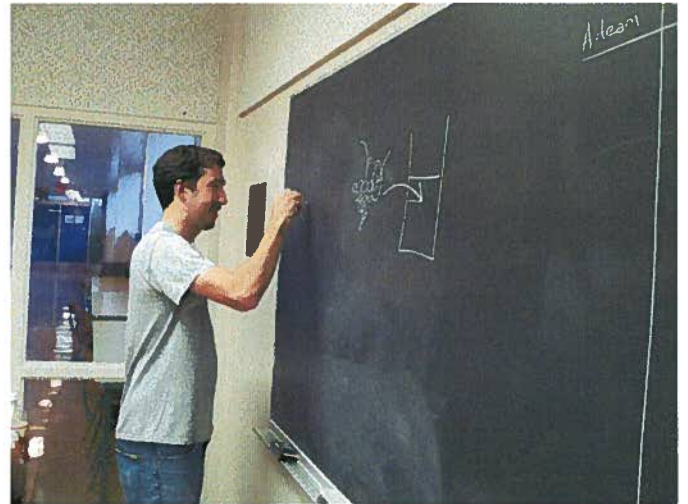
- ◆ Built circuits using household objects - We each brought in a sandwich bag full of household objects to be used as conductors and insulators. We combined these together to make different types of switches that could operate various combinations of Christmas lights.

We encourage students who are just beginning to study physics to come to the SPS meetings so they can get involved in SPS and in department activities early in their careers. Here is a reaction to the meetings from one of these students:

*Eleazar Arce: I personally enjoyed going to the SPS meetings because I was exposed to physics in a fun way and learned a few things along the way; like working with circuits and physics jeopardy. Also it was a great place to connect with other students and teachers on a personal level. I got to see the process of voting for people in office. Our zone meeting in Grove City was a wonderful experience as it highlighted being a responsible physicist or scientist in our community. Being a member of the school SPS and the National SPS keeps me informed on new ideas. I am excited about the outreach programs we have discussed along with our future zone meeting; SPS and all the guidance Dr. Jacobs has given us has been a great opportunity.*

#### 5. Participation in local SPS sponsored social events

We had our annual Fall Picnic at the beginning of the year. Normally we hold it on the rooftop of our observatory, and we do some good grilling, but this year it rained so we had to move the picnic inside and order pizza instead. We still had a great time. This gave our new students a chance to meet various physics faculty members. We played a great game of Pictionary. We played physics games and a strange game Matt Whipple brought which gave the players an electric jolt. We had no idea that one of our graduate students, Nick Arnold was so good at Pictionary. Pictures from the picnic are posted on our website.





This year we decided to go to a corn maze in late October. Ten of us went and we started out navigating the corn maze in a large group, but quickly broke up into smaller groups. It turns out that it is easier to navigate a corn maze in smaller groups. After we all made it through the maze we had a bonfire and made s'mores.

Both these activities were very fun and they definitely worked to build camaraderie among students/faculty in the department.

Our Sigma Pi Sigma induction is held every spring in conjunction with the departmental honors event. This year we inducted six new members. Next year will be the 25<sup>th</sup> anniversary of our Sigma Pi Sigma Installation so we are already planning a BIG event.

## 6. Outreach

In February we met with two packs of Webelos Boy Scouts to help them learn about inertia and Bernoulli's principles for a scout badge. This was our second year of putting on this event so we had more activities and much better preparation. The evening was a rousing success. We look forward to continuing this connection with the Boy Scouts and have written up some great ideas for improvement next year.

The South East Michigan Regional Science Fair was held at a nearby community college in March 2010. Eight people from our chapter judged posters presented by local middle school and high school students. We gave monetary prizes, as well as certificates of acknowledgement, to the projects we felt displayed the best understanding of physics and good experimental procedure. We awarded three prizes in the high school category and three in the middle school category. In the high school division there are now more experiments in

physics than in any of the other areas of science. We think we have been a significant reason for this! [Supporting material can be provided upon request.]



As mentioned earlier, we received a Marsh White Award. Unfortunately we received the announcement too late in our semester to successfully complete the activity. However, we have everything in place to implement the program in early September.

#### 7. Community Service

Ten members of our chapter provided free tutoring to the students taking physics classes in our department. We were able to offer at least ten hours of free tutoring each week during the fall and winter semesters. The department head is very grateful for this service. This year he gave each of us a laser pointer or a travel mouse for a laptop. We received them at the annual departmental honors and awards event.

#### 8. Student Recruitment and Retention

Eastern Michigan University is a large university. However, most of our students do not take a physics course and have only brief contact with the physics community. We try to schedule the meetings around the sophomore-level physics classes, so we can draw in students not necessarily majoring in physics.

Most of the activities we plan involve teamwork, and encourage students to become comfortable working with one another. Not only can the relationships built out of these activities promote membership, but they also create a dynamic between students that elicits more natural group-study habits (an invaluable tool for learning physics).

We provide tutoring (free of charge) for any interested freshman and sophomore-level students. This is a valuable resource for students who may be struggling in physics courses - without this service many students may become antipathetic to the field. It also works as a great advertisement for SPS.

Naturally, we also post a number of flyers in the department building (and sometimes across campus) to promote membership in SPS.

#### 9. Interactions with your department's alumni

This year we had two SPS alumni come and speak to us. One was a more recent student who is still in graduate school at the University of Illinois. The other graduated a while ago and now a professor at the University of Michigan. They both discussed how their time at EMU prepared them for what their current jobs. They emphasized the importance of doing undergraduate research and participating in SPS.

#### 10. Hosting a Zone meeting

When we attended the zone meeting at Grove City College we were really impressed and now want to try putting on a zone meeting at EMU next year. At the end of the zone meeting we announced our intent to host one this next school year. We are currently planning on holding the zone meeting in late October/early November.

#### 11. Strategy for promoting SPS membership

Aside from continuing the methods described in section 8, we plan on trying to get more widely-recognized speakers, we are looking to make our activities more visible across campus, and we are also searching for career-building resources that we may be able to offer students. We are sure we can meet our first goal as we now have a special, endowed speaker series for our SPS chapter. The series was initially funded by the monetary award Dr. Jacobs received as Outstanding Chapter Advisor.

We tried a new strategy for promoting SPS membership this year. Students who regularly attended the meetings were encouraged to seek out more physics students in their classes and invite them to a meeting as part of a "bring a buddy" program. Each member who brought a friend to a meeting was awarded a small prize for his or her participation in the program.

#### 12. Publications

None of our chapter members published during the academic year.

#### 13. Co-sponsored events

A member of our chapter gave a presentation during the Departmental **Lunch Time Physics** program on the REU he did last summer.

Eleven members of our chapter gave presentations at the **Eastern Michigan University Undergraduate Symposium**:

Nickolas Miller and Kyle Zachrich – *Simulating Two-state Transitions without Heat Loss*

Shannon Bourke – *Visualizing Standing Waves in Musical Instruments*

Ransom Brown – *Mock Mars Rover Mission: Increasing Interest in STEM Courses*

Donald Ellison – *Radio Astronomy at EMU: The EARTHS Project*

Nickolas Miller – *Researching Ice Nucleation and Timing Circuits: A Summer Studying the Clouds*

Audelia Wittbrodt – *Studies of Ionospheric Interactions at HAARP*

Mariano Marks – *Experiencing Quantum Mechanics with a Classical Device*

Naseem Rayyan, Richard Roe and Audelia Wittbrodt – *Using Masses and Springs to Simulate Quantum Mechanical Systems*

John McKinnon, Louis Lello – *Manipulating Coupled Pendula to Visualize the Behavior of Quantum Mechanical Systems*



#### 14. Events with other SPS chapters

Two of our chapter members attended a meeting hosted by the Wayne State University SPS chapter. It was a bit like an informal zone meeting for the nearby chapters in Michigan.

#### 15. Other projects

We sponsored one speaker. Dr. Charles Jacobs, the Dean of Science from Henry Ford Community College, came to speak at a public lecture titled “Gunpowder, Paper, and Infinity: Technology Transfer Along the Silk Road.” It was a fascinating lecture that was attended by over 70 people from all across campus. Many students, and several faculty members, asked him some very insightful questions after the talk.

We also sponsored three lectures on Surface Science. The speakers were invited by Dr. Wade Shen and we provided the refreshments.

*Bradford Wade: I had the pleasure of presenting two of the speakers for the departmental seminars: Dr. Marco Fornari from Central Michigan and Dr. Codrin Cionca from the University of Michigan - Ann Arbor. Their presentations were on their research in light and thermoelectric cooling, respectively. I was also able to attend a talk in the fall by Dr. Veronica Barone (Central Michigan) on research into improving lithium-ion batteries. The speakers were all very passionate about their work, and it was a pleasure to have them at our university. The topics were of great interest and relevance to my studies. Unfortunately, much of their presentations seemed geared more towards graduate-level students and/or post-graduates, so a great deal of it was over my head. I think being able to have speakers that are active in physics research is fantastic, and provides the students across our campus an excellent opportunity to see what is going on in the world of physics.*

#### 16. Overall health of our chapter

Our chapter is composed of very bright students with myriad skills/talents. We see lots of unrealized potential in our organization, and wish to pursue more of the opportunities that such a gathering of intelligent, hard-working minds lends us.

There are things that we do very well (tutoring, Lunchtime Physics) and there are many things we could improve upon (intra/inter-campus interaction, outreach, funding, industry liaisons, etc.)

We need to begin incorporating more opportunities for our members to gain real-world experience in their fields of study, and we need to make more effort to bring new ideas to our meetings that will not only attract more members, but will help retain the ones we have.

#### 17. Chapter problems & what can the national office do to better serve you?

Funding and inter-chapter collaboration are two things that we desperately lack. Perhaps SPS National could help coordinate very large/expensive research projects that several chapters within, or across, zones could participate in.

We don't use the national website enough, but we will start looking to see if it can be used to announce inter-chapter events that are smaller than a zone meeting.

#### 18. Other suggestions or comments for national office

None at this time other than that listed in item 17.

## 19. Websites

Our website can be found at [www.physics.emich.edu/sps](http://www.physics.emich.edu/sps). It is maintained by the Chapter Historian. We need to work harder at helping the Historian to keep the website updated. For the past two years there has been a disconnection between what the Historian says he/she will post and what actually gets done. Perhaps we need to consider giving this job to more than one person.

## 20. Sigma Pi Sigma reception

This year six people were inducted into our chapter of Sigma Pi Sigma; there were five undergraduates and one graduate student. We do not invite a guest speaker as the Sigma Pi Sigma ceremony is always done as part of the departmental honors and award event. We will hold the event separately next year, as it will be the 25<sup>th</sup> anniversary of the ΣΠΣ chapter. We do plan to invite a guest speaker to that event (hopefully a Nobel Laureate).

