

CROSS SECTION

Stetson University Physics Department Annual Newsletter, Spring 2000

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Area Happenings

Hello Everyone!

Greetings from DeLand and welcome to the third edition of your newsletter, CROSS SECTION. Our apologies for the delay in getting this out to you — somehow this semester is busier than ever. Thank you for sending in your news and for your continued warm support of this publication and the Department in general. We are excited that alumni response continues to be high, and everyone in the department loves hearing what you've been up to lately.

The Physics Department is alive and flourishing. Our enrollment is clearly up this year, with two seniors (one of whom has decided to stay for a 5th year), six juniors (three of whom came out of last year's University Physics class), three sophomores, and six currently enrolled in University Physics (PS-202). It is wonderful to have this many majors in and around the Department every day. Recently, George Glander created The Physics Major's Handbook which outlines suggested courses of study for our students. It doesn't lock the department into specific sequencing (allowing for variations due to student interest and faculty availability), but it is proving beneficial to students in the advising process.

The Department is feeling the many side effects of our increased enrollment. We are all re-getting used to the increased size in the upper division courses. The largest (upper) class enrollment we have is only eight students, but even this number has a profound impact on how we manage the lab sections for our majors. For example, Kevin Riggs is holding four lab periods to accommodate the needs of his Experimental Physics students. We are gearing up to support six students who will be completing their senior research projects over the summer and next fall. (We are pleased to note that we are consistently able to offer quality research opportunities for our upper class majors. Over the past 10 summers we have, without exception, placed students in research positions: some on campus as a research assistant, some with Stetson Undergraduate Research Experience [SURE] grants, and others in Research Experience for Undergraduate [REU] programs at other institutions.) We are still able to offer offices to all our upper level majors (those who've completed PS-201/202), but many of them are doubled up. As Physics and the other science departments grow and space in the building becomes more elusive, it is not clear to us that student offices will remain available at the sophomore level. Physics continues to have a reading room/student lounge which is the size of a classroom, and we are actively working to make it comfortable and accessible to all science students. Finally, our increased enrollment means we are able to support more Physics majors who have work-study awards. We currently have seven students working for the Department. This means all our introductory and 150-level courses have grader support, and we are able to offer more tutoring for these classes, which is proving to be of great benefit to those students.

We've done a lot to "spruce" up the department. Last summer we were included in a widespread effort by Facilities Management, and several labs and our primary lecture room, the Jenkins' Room, were given fresh coats of paint. Recently we replaced the chairs in the Jenkins' Room, taking out the orange

seats and bringing in new deep burgundy ones. New carpet is slated for that room sometime soon – perhaps even as soon as this summer. Lecture room 205 across the hall just received 14 new, bigger student desks, which make the room much more comfortable for the students. Downstairs, the Physics Department reading room has been thoroughly transformed. The size of a classroom, this lounge has a refrigerator, lab tables, and comfortable living room type furniture. Last summer two lab tables were removed to make better space for the couches and chairs. The remaining two lab tables were refinished (they look beautiful now). And through a generous gift by one of you to the department, we purchased several rugs to help warm up the cement floor. Finally, the entire room was painted a soft blue and a couple of enthusiastic sophomore majors, **Liz Smith** (currently on leave) and **David Falls, '02**, painted a sunset mural on one wall. The room is comfortable and inviting, and science students from throughout the building use it a lot. Other improvements of note: our department display case shows off a hologram and some physics toys. And through another generous gift to the department we were able to permanently mount and protect posters on the second floor corridor – these posters were received by the department as a part of the centennial celebration of the American Physical Society, and they do a beautiful job of depicting the history of physics in the twentieth century.

It is interesting to note that the University is beginning to contemplate the possibility of a new science building. The thought is to put all the Natural Sciences Division (Physics, Chemistry, Math, Computer Science, and Geography/Geology) all in one building. This is still in the very preliminary stages, and while it has made it onto the University's wish-list, it has not yet made it onto the five year plan. Still, we eagerly discuss all relevant rumors (!), and Kevin Riggs is serving on the Cosmos Committee which has been charged with the task of exploring the possibilities.

Last spring Kevin Riggs chaired the committee which put on Stetson's first Undergraduate Scholarship and Performance Day. A campus wide event including all three schools, USAPD applauded the outstanding scholarly efforts of students. It was run like a professional conference, and talks, presentations, performances, and poster presentations occurred throughout the day. The newly established, prestigious Maris Prize was awarded to the top student in each category. In Physics, we had two students enter the poster presentation category. **Amanda York, '00**, presented her work with Kevin Riggs on vibrational holography, and **James Stock, '01**, presented his work with George Glander on Kikuchi electron diffraction. Both had been recipients of prestigious SURE (Stetson Undergraduate Research Experience) grants the summer of 1998. James was a co-winner of the Maris Prize for best poster presentation.

Our students are definitely developing a sense of belonging in the department. This year, for the first time, we've sponsored a t-shirt contest. We had four entries: 1. "The Physics Department – We're charged with potential." 2. "The Physics Department – We're Millikan it for all it's worth." 3. "The evolution of a physics major" which depicts the source of coffee evolving from a cup (freshman) to a thermos (sophomore) to a coffee maker (junior) to an I.V. (senior), and 4. "The real world as seen by most people vs. the world as physics majors see it" which shows a cow (a sphere), an apple falling from a tree (free body diagram and equation), a car rolling down a hill (free body diagram and equation), and a cup of coffee (gold brick labeled "coffee"). This final entry was the winner of the contest; it was designed by **Ed Wallace, '01**, and he received his t-shirt at no cost and a \$10 gift certificate to Bellini's Deli downtown. See page 11 for details on how to order one! All in all, it was a great success. The students enjoyed it, and by the time you receive this newsletter the students will be wearing their new shirts. Even Dean Grady Ballenger ordered one!

We think fondly of all of you, our alumni, and enjoy reminiscing about when you were here. A couple of notable updates: First, **Robert Bedford, '98**, had an article published in the most recent issue Journal of Undergraduate Research in Physics (JURP) titled "Modal Analysis of Percussion Instruments Using Vibrational Holography." We're pleased the work he completed here with Kevin Riggs culminated in publication (and even before he gets his Ph.D.!). Second, we are continuing our "Featured Alum" page on our web site, with this year's focus on **Thomas Moore, '78**. Check out the site and see what Thom has been up to – we welcome him back to central Florida as a member of the faculty at Rollins College.

From all of us in the Department, we hope that 2000 is a great year for you! Please keep in touch...

– Tony Jusick, Chair

Research Corner

Research this year has slowed some, but we will be back into high gear soon...

Kevin Riggs took the summer off from work in his lab, but was back involved with our graduating senior, **Amanda York, '00**, this fall finishing up her senior project. Her work involves development of a TV holography system for modal analysis of musical instruments. Amanda plans to go on to graduate school in biomedical engineering.

George Glander worked without student support in his lab this past summer. He spent the summer moving his research in Kikuchi electron diffraction ahead. He will be presenting his work at the national American Physical Society meeting in March, and he anticipates publishing his findings in the not too distant future. He has received an (increasingly competitive) faculty summer grant from the University to continue his work during this coming summer. Further, he anticipates students back in his lab this summer - two of the current juniors have expressed interest in his projects and they will be applying for Stetson Undergraduate Research Experience (SURE) grants. George has also been continuing to work with senior **James Stock, '01**, on the project they started two summers ago which evolved into James' senior research project (James has decided he likes Stetson so much that he will be staying on for a fifth year to round out his studies with more courses in chemistry and biology - he plans to go to graduate school in biophysics).

As mentioned earlier, the Department is gearing up for six more students working on senior projects. Currently in PS-497, Senior Research Proposal, these students are working with the faculty to determine what projects they might work on over the summer and next fall. Possible topics range from superconductivity to sun spots. We'll keep you posted!

—L.G.

From the Faculty

Anthony T. Jusick

Greetings to all... Life is quiet but good. Having passed along most all of my sage observations in the "Area Happenings" article, this year I have no additional pearls of wisdom to confer upon you.

Hope all is well with you — do continue to keep in touch!

—Tony
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Thomas A. Lick

I was pleased to receive e-mail messages from some of the alumni that we have not heard from in some time. The alumni have done well in supporting the newsletter. For those older alumni who remember having home-made ice cream at my house and meeting my wife, Miriam, I am happy to report that she continues to recover from her severe stroke in August of 1998 and is doing much better at getting around with her walker (and at times even without it). She is doing well enough that I have put off serious consideration of early retirement. This means that I can have a few more years of enjoyment teaching our majors (or, from the student's point of view, torturing them).

This year I tried something new for College Physics. The text I used has a companion web site filled with practice questions and problems. But the really neat part of the web site are the physlet problems which involve simulations written in Java

language. The students have to take their own data from the simulation and expend the mental effort to understand the concept behind the simulation. If you are interested in looking at these simulations (or in testing your memory of fundamental physics), the web site is <http://www.prenhall.com/wilson>. Some of these physlet simulations are great for teaching concepts. A good example of this would be the physlet problems on Archimedes Principle in Chapter 9. Test your conceptual reasoning and let me know if you pick the correct answer. The web site will grade your responses and you can have the result e-mailed to me automatically.

Unfortunately, technology often has a companion down side. Or perhaps you can just view it as another example of Murphy's Law. In this case, when I tried to use the web site for homework problems everything went well until the web site became too popular. The server used by Prentice-Hall was completely overwhelmed by the volume of use of the site and was down for extensive periods of time. Those of you who are active on the internet can relate to this problem which has often occurred. I had to discontinue the use of the site until it was upgraded.

Remember, the physlet problems for Chapter 9 are due by the next issue of CROSS SECTION!

—Tom
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Kevin Riggs

It is again a pleasure to write to all of you about what I have been up to in the past year. It is a good exercise to reflect on a year's worth of accomplishments (or lack thereof). Actually, I am having a hard time remembering what I did last year. It must be a sign that I am becoming even more of an "absent minded professor" than you all remember.

Several of you have heeded my call in last year's newsletter to stop by and visit. Among recent alumni visitors back to the department was my very first research student, **Robert Ridgeway, '90**, who was visiting over homecoming weekend. Robert is now the proud father of a little boy (who looks just like Dad, I might add). We hope that he is destined to follow in Robert's footsteps and join us in a "few" years to study physics. An additional recent visitor was **Amy Johnson, '96**, another former research student of mine who is now teaching physics at a private high school in Atlanta. Amy spent a summer working with me during my sabbatical leave at Argonne National Laboratory. She must have enjoyed the Chicago area, since she is currently contemplating a move to that area in the near future. Personally, I think Chicago is a little too cold for my tastes. It is amazing that, after having grown up in Wisconsin and attending school in Minnesota, I could become such a cold weather wimp after only 12 years in Florida.

One of the most exciting events of the year was the Centennial Celebration Meeting of the American Physical Society, held last spring in Atlanta. I have never seen so many physicists together at one time in my life (roughly 10,000 attended). It seems like everywhere you went, you ran into yet another Nobel Prize winner. Usually this meeting consists of a bunch of solid state types, but the Centennial meeting featured sessions from across the many sub-areas of physics. I was able to indulge my strong interest in all things cosmological, and attend sessions on big bang cosmology, gravity wave detectors, dark matter, and all that other good stuff. I also attended an excellent lecture on the physics of brass instruments presented by a guy that was an excellent

French horn player. I managed to “steal” some ideals for my own course on the “Science of Music”. During the meeting, I was very happy to spend some time with two of our alumni, **Garrett Granroth, ‘93**, and **Glenn Teeter, ‘92**. Both had just recently finished their Ph.D.’s in physics (U. of Florida and U. of Texas – Austin, respectively), and both are now in postdoctoral positions at Department of Energy laboratories (Oak Ridge and Pacific Northwest, respectively).

My research program in vibrational holography continues to present rewards and challenges. However, last year I took a summer off from research for the first time I have been at Stetson. I mostly caught up on all the reading that I have been meaning to do for the past few years. Next summer, my wife and I are planning a first ever trip to Europe. We just applied for our passports, so assuming they let me out of the country, this year we are going for sure. I want to visit Einstein’s patent office in Switzerland and CERN (the European particle accelerator lab), but my wife, Lori, does not seem too impressed with my choice of itinerary. However, we both agree that Germany would be a wonderful place to spend some time. I can taste that fresh German beer already.

I somehow got roped into chairing the Undergraduate Scholarship and Performance Day (USAPD) yet again. I am happy to report that last year, one of our majors, **James Stock, ‘01**, was co-winner of the best poster at the USAPD poster session. Kudos goes to James, and to his research advisor, Dr. George Glander. Don’t forget to keep in touch and stop by to visit whenever you can.

—Kevin
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George Glander

It is turning out to be another busy year for me. I am teaching the same courses that I taught last year, with the addition of Senior Research Proposal and Senior Seminar this spring. This has been my second year teaching University Physics, so I have been busy with revisions trying to smooth over the rough spots that always occur in the first time through a course. There is a good group of students in University Physics II this spring, and we can look forward to many of them returning next year as physics majors.

I have continued to work on my research investigating the holographic analysis of electron diffraction data. Holographic analysis is a relatively new technique for analyzing electron diffraction data that actually produces an image of the atomic structure at the surface of a crystal. Physics major **James Stock, ‘01**, worked on the project with me during the summer of 1998. By the end of that summer, we had the computer programs that do the processing working well enough to give images of the atomic structure. The images, however, were flawed in ways that suggested there were some bugs in the software and that data set we were analyzing was probably bad (the sample that the data was collected from was old and needed to be replaced). Last summer I put a new silicon sample into the vacuum chamber, collected two new electron diffraction data sets, and fully debugged the programs we use for holographic analysis. The structures that are now being shown in the images agree very well with the known structure of the silicon surface I am working with. It now appears that I have a completely operational system for applying holographic analysis to electron diffraction data. I will be presenting these results in a paper at the national meeting of the American Physical Society in March, and I will be writing a paper next summer.

Last summer was not entirely devoted to research. Laura and I took a vacation

with our son and daughter for a week of fishing, hiking, boating, and berry picking in the Boundary Waters of Northern Minnesota. On the way home we stopped for several days to explore Mammoth Caves in Kentucky. It was a marvelous trip.

—George
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Late Breaking News!

Congratulations to Dr. George Glander! On March 10th, George received form notification that he has received tenure and has been promoted to Associate Professor. We welcome him as a permanent member of our ranks and look forward to his presence in the department for years to come!

Our First Annual T-Shirt contest:

The shirts will be dark, dusky blue with white printing. The theme of the shirt is: things as seen in the real world versus those same things as seen by a physicist. Final art work for the shirt is still being created. **Keep your eye on our web site - we'll post the final design when it's complete!**

For more information, contact Laura in the Physics office by e-mail at physics@stetson.edu or by phone at 386-822-8910...