CROSS SECTION

Stetson University Physics Department Annual Newsletter, Spring 2012
www.stetson.edu/physics ~ physics@stetson.edu

Hello from DeLand and Stetson Physics!

Apologies for the delay in getting this out to you this year. Laura was tied up in a number of time-consuming activities which only seemed to absorb more and more of her time as the semester progressed, not the least of which includes assisting us with our recent faculty search and the University's recent dean searches. We have good news to report on both counts:

First, ***WELCOME Allan Thomas!*** Allan comes to us from the University of Arkansas—Little Rock, where his doctoral work is in applied physics, with a specialization in nano-technology. Allan's appointment is a one year (with option to renew for a second) visiting assistant professor position, and he'll be supporting the department tremendously by picking up College Physics as well as E&M in the fall and Quantum II in the spring. Kevin, George, and Danielle have structured this position to be akin to a teaching post-doc, where a newly minted Ph.D. can strengthen their teaching skills under the mentorship of experienced faculty. Allan gave a couple great guest lectures (one to Kevin's Electromagnetic Theory class, the other on his research to Colloquium) during his interview, thus demonstrating that he is already off to a great start as a lecturer; this position will allow him to hone his skills and set him up for a successful tenure-track hire in the future. Additionally, he brings energy and enthusiasm and he is eager to help us grow our enrollment in general and work implementing our new Applied Physics track in the physics major. Allan will arrive in August.

Which brings us to our biggest departmental news: after 44 years of teaching, including the past three at "senior" status (part time teaching/part time retired), Tom Lick retired fully at the end of this spring semester. We will miss him around the Department, and his contributions to shaping Stetson Physics have been significant, but he is looking forward to an active retirement – and, if last summer is any indicator of his plans, they'll include things like kayaking, biking, zip-lining, and even para-sailing!

Next, we are excited to welcome Dr. Karen Ryan, new Dean of the College of Arts & Sciences. A Russian Studies expert, Dr. Ryan comes to Stetson from the University of Virginia and brings with her a wealth of scholarly and administrative experience. After 14 great years at the helm of the College and being a wonderful advocate for the Natural Sciences, Grady will be returning to the classroom (in English), and while we look forward to welcoming him back "from the dark side," we also look forward to the vision and expertise that Dr. Ryan will bring. She starts in late July.

It's been another good year for us. We graduated six students in May and another two in December. While we currently no May graduates, we have one junior who is poised to complete the dual degree option in engineering at the University of Florida , plus three more juniors, and three sophomores. University Physics had an enrollment of eight, with several of them planning to continue on in the major. It's a good group!

SPS (the Society of Physics Students) was active this year with the usual fun stuff like pizza, bowling, video game nights, the annual t-shirt contest, a graffiti board in the hall, liquid nitrogen ice cream, etc., but additionally SPS planned outreach activities for local area elementary schools, a telescope/star-gazing night, and fun elementary school physics presentations (cool demonstrations to spark kids' enthusiasm for learning about science and physics).

We hope all is well with you. Please do stop by if you're in the area—and/or become a "fan" of the department on Facebook. We love to hear from you! And as always, if there is anything we can do for you, please don't hesitate to ask.

—Kevin Riggs
Physics Department Chair

From the Dean

The Dean's Last Hurrah!

Over the past 14 years, I've been so fortunate to work alongside our talented faculty and staff in physics, our world-class students, and our extraordinary network of alumni. Now and again, I've even been able to pass myself off as a member of the department.

You see, I have an extensive collection of physics department t-shirts, which I love to wear wherever I go, at least until someone stops to ask me a pointed question about one of the enigmatic formulas and diagrams displayed on them. Even when outed as a physics imposter, however, I'm proud to know that I have a connection to the energy and imagination, the devotion to discipline, the joy in discovery and learning that set our physics faculty, staff, students, and alumni apart, decade after decade.

Next year, I begin a return to teaching, in English a field I once knew a little. I'll take with me considerable wisdom from my time as a t-shirted physicist, and I'll do my best to establish the same high standards and emphasis on the joy of learning that I have seen so powerfully at work in the physics department.

Who knows, perhaps there is a team-taught course ahead on "writing physics" or "science fiction as narrative and as science" or "cosmology and myth." As the physicist in me knows to say, first we'll do the thought experiment, then we'll see, we'll see.

—Grady Ballenger
Dean, College of Arts & Sciences

Current upper-class majors

Eric, Christian, Brett, and Maya
Amber, Jeff, and Nick holding Jacob

Senior Research Project

ANALYZING REVERBERATION TIMES IN THE RINKER ENVIRONMENTAL LEARNING CENTER

BRETT C. ABRAHAM

This research analyzes reverberation times and how they can be reduced by certain materials. The goal was to provide an analysis of and solution to the high reverberation times of a classroom. The results showed that reverberation time could be reduced significantly by covering a portion of the walls with acoustical tile.

Student News

2011-12 Society of Physics Students:

- President: Eric Hall
- Vice President: Amber Reeve

2011-12 Sigma Pi Sigma:

- Eric Hall—new member; president

Honors Convocation Honorees—May, 2011:

- *George L. Jenkins Prize in Physics:*
  Maya Carter
- *Jack Gibson Endowed Physics Research Award:*
  Stephanie Lengemann

2011 Summer Research Participant:

- Brett Abraham
  Analyzing Reverberation Times in the Rinker Environmental Learning Center
- Jacob Either
  Atomic Force Microscope Imaging of Magnetotactic Bacteria
  (Funded through the NSF STEM program.)

Congratulations!

Brett Abraham

We didn't have any seniors graduate in May, but Brett is poised to continue on his path in the pre-engineering dual degree option. Having completed the Physics major here, Brett has been accepted at the University of Florida, where he will complete a second undergraduate electrical engineering.

It is not so very important for a person to learn facts. For that he does not really need a college. He can learn them from books. The value of an education in a liberal arts college is not the learning of many facts but the training of the mind to think something that cannot be learned from textbooks.

—Albert Einstein

Meet our current Featured Alum

Robert G. Bedford, Ph.D.

Senior Electronics Engineer
Sensors Directorate, Air Force Research Laboratory

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robert.bedford@wpafb.af.mil

Education:

1998-2003	Optical Sciences Center, University of Arizona (2003) PhD: "Finite Aperture Tapered Unstable Resonators" (2000) MS
1994-1998	Physics Department, Stetson University (1998) BS (Physics), Minor (Info. Tech.)

Professional Organizations: (2000-present) IEEE Member
(1999-present) OSA Member

Select Publications:

M. Fallahi, and R. Bedford (2012) *High power diode lasers*. In *Semiconductor Lasers- Fundamentals and Applications* (Alexei Baranov and Eric Tournie, Ed.)

R. Bedford, G. Triplett, D. Tomich, S. Koch, J. Moloney, and J. Hader, "Reduced auger recombination in mid-infrared semiconductor lasers," J. of App. Phys., Vol 110, pp 073108-1, 2011.

C. Hessenius, N. Terry, M. Fallahi, J. Moloney, and R. Bedford, "Gain coupling of class A semiconductor lasers," Opt. Lett., Vol 35, pp 3060-2, 2010.

M. Walton, N. Terry, J. Hader, J. Moloney, and R. Bedford, "Extraction of semiconductor microchip differential gain by use of optically pumped semiconductor laser," App. Phys. Lett., Vol 95, pp 111101, 2009.

OPEN LETTER TO PHYSICS MAJORS:

I am not sure what I really have to contribute to present students' futures, but here is my story in which something may be gleaned. First, a little about me: I grew up in central Florida, was reasonably good at high school math, although was more interested in music. I chose Stetson not only because of its beauty, but also because the school offers an excellent program wherein the family of faculty and staff are provided a tuition scholarship, and my mother was on the computer programming staff. When I entered Stetson I had no clear career goals and had no distinct aspirations for my future.

Figure 1 Mid-IR optoelectronics research group at Sensors Directorate, AFRL, 2012 (left to right Sarah Dooley, Robert Bedford, Tuoc Dang, Igor Anisimov, Saima Husaini. Not pictured: Afusat Dirisu)

While coming to the conclusion that a business degree would be “suitably vague”, I had the good fortune to stumble into Professor Riggs' “Science of Music” course. Because I had studied piano for 14 years and percussion for seven, this was a perfect combination of math and music. Quickly, I realized that physics rang true to me – the propensity of physicists to wonder and test not only how things work, but also *why* they work. This may have been the most pivotal stroke of luck in my life and career.

I took the typical undergraduate courses and had a rewarding senior research program working with Professor Riggs on vibrational holography. As graduation approached, I realized I still didn't know what I really wanted to do and graduate school offered a good way to put off “real life”. With my experience in vibrational holography and not much else, I found that however ill-defined, “lasers” and “optics” seemed like a good idea. In 1998, there were two universities that had dedicated optics programs, The University of Rochester and The University of Arizona, with a host of other engineering and physics departments that had strong optics research. I applied and was accepted to the PhD program at the Optical Sciences Center (now “College of Optical Sciences”) at The University of Arizona in Tucson.

At a new student social at UA, shortly after arriving, I met a professor who asked what my interests were. My response was (paraphrasing) “anything except semiconductors”. I cannot say why I had this bias, but as fate would have it, I ended up in the semiconductor laser community under the guidance of Professor Mahmoud Fallahi, and have never regretted the decision. While working with more senior graduate students to whom I am eternally grateful, I was exposed to various types of advanced semiconductor lasers. These included diffraction-grating coupled lasers (both “distributed Bragg reflector” and “distributed feedback” lasers) stable vs. unstable-semiconductor lasers, as well as lasers and materials of varied wavelengths (from visible through the near-infrared regimes).

This foray into an area which I previously (and irrationally) deemed “uninteresting” has changed my life. Like many groups at the time, the research group I joined was motivated in large part by telecommunications, which was enjoying a boom at the time, and I almost got wrapped up in it. Shortly after I passed my comprehensive exams (2-years in), I took a semester off to work with a Nortel Networks company outside of Boston on broadly tunable vertical cavity surface-emitting semiconductor lasers. While this was a brief three month experience, I saw firsthand what a strong team of motivated people could accomplish in a short time.

Another graduate student and I created a new class of semiconductor laser termed a “finite aperture tapered unstable resonator”, which ultimately became my dissertation topic. This type of laser is a small modification to an existing tapered unstable resonator which opened up the area to a different thinking of semiconductor lasers, spawning research as far as Germany!

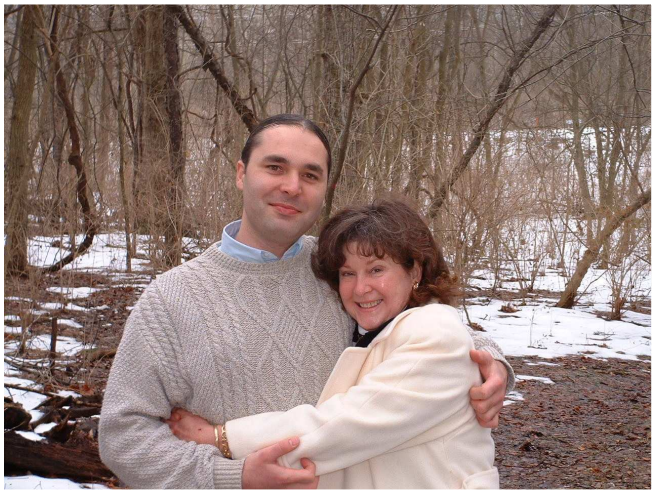

Figure 2 Robert and Patty, on their wedding day, 2004.

Upon graduation, I entertained several opportunities, including both government laboratories and private industry. In early 2004 I accepted a position onto the technical staff of the Sensors Directorate of the Air Force Research Laboratory (AFRL) in Dayton, Ohio. I have spent an amazing eight years with AFRL. We have a great deal of freedom to collaborate with the academic and commercial communities, fund others' research, as well as continue with our unique research. I can't speak for the organization at large, but from a researcher's perspective, we have critical goals designed to create technology that results in better performing, smaller, and more agile sensing capabilities. The hope is that these improved capabilities make our military’s job a little easier and safer. Additionally, I have been involved in significant components of basic research where a military system does not have to be explicitly defined. I am fortunate to be able to learn new things every day - whether I like it or not. I have given invited talks from California to Italy, have collaborated with Universities of California (LA), New Mexico, Missouri, and Massachusetts, to name a few, small and large companies, and have had many great experiences. In 2008, I was given an Adjunct Professor position at University of Arizona, and have had the opportunity to lecture several classes there as well.

While at Stetson, I met Patricia McCabe, and we finally married on New Year's Eve 2004 in Ohio. Together we raise Golden Retrievers and compete in AKC conformation and performance events. A few years ago, we discovered the joy of hunting with our dogs (they are "retrievers", after all) and rarely spend an idle weekend at home. We've been across the country several times for dog shows, which for some reason seem to also consume our vacations! We've met and formed great friendships both in and around Ohio, and try to spend as much time with friends and together as possible.

Figure 3 Robert and "Buck" at a national dog show, 2011.

We were able to find a beautiful piece of wooded property in Beavercreek, a Dayton suburb, in 2004 (we were actually married on this land in the snow!). The following year we began construction of our home. I can't say *we* built it, because there was a contractor and team of subcontractors that actually assembled it. However, I can say that both Patty and I took a significant role in the difficult process, therefore we take a great deal of credit for it. Having said that, we are presently going through and addressing rookie mistakes (five years later), hopefully from a more educated point of view. It is another outstanding learning experience for us, and we treasure it, complications and all!

Coming back to education, and Stetson in particular, I found my fundamentals and experiences within the Stetson Physics Department to be second-to-none. The nature of the department, opportunities to work with other students and the tight-knit group was one of the lucky accidents I happened into.

I would like to close with a few choice lessons that I have learned, or am in the process of learning:

If you are not completely confused by quantum mechanics, you do not understand it.

- John Wheeler

This quote by Prof. Wheeler (Princeton) is perhaps the most direct of a host of quotes by famous people like him (e.g. Feynman, Bohr). I feel it should be applied more liberally. Virtually everything (in science, career, life) seems to become more convoluted and complicated the more one considers it. As such, it seems important to remember that the pursuit of knowledge (of anything) is a process, and not a route to an end.

You have to pretend you're 100 percent sure. You have to take action; you can't hesitate or hedge your bets. Anything less will condemn your efforts to failure."

- Andrew Grove

I constantly must remind myself of this quote from the co-founder of Intel. As much as any of us know what we don't know—a corollary of (1), we have an obligation to pick a direction and attempt to proceed in that direction with gusto. This seems to be the most satisfying way to live life for me.

What kind of mind-boggling technology might emerge from graphene? Before we proffer an answer, imagine you are on a boat trip watching a school of dolphins. Everyone is mesmerized by the magnificent animals until someone spoils the moment by voicing the unromantic question, 'But can we eat them?'

- Andrey Geim

[Phys. Today, "Graphene: Exploring carbon flatland" (Aug, 2007)]

This quote comes from a great review article on a single layer of carbon atoms which assemble into hexagonal structures ("graphene", which is nomenclature for a single atomic layer of graphite). Sometimes the goals are the goals, sometimes it is the pursuit. Physics, engineering, and science can be beautiful in general, and we must always remember to appreciate its beauty. Perhaps this is the science equivalent to the old adage "stop and smell the roses".

—Robert Bedford

Faculty News

George & Laura Glander

From George:

It has been a busy year. I am in my second year as associate dean in the College. I manage all of the student requests and problems that come through the A & S Dean's Office – from late drops to readmissions, and everything in between. I frequently find myself assigned to special committees and task forces as a representative of the Dean's Office. A major task for this year has been to write new comprehensive and coordinated policies for the credit that Stetson awards for AP, IB and AICE exams. A second effort is underway to completely rewrite the University Bulletin.

I continue to serve on the Faculty Senate. This year I am chair of a Senate committee that is working on rewriting the Faculty Bylaws and a number of policies that deal with faculty. This requires a great deal of negotiations with the administration on one side, and faculty activists on the other. It is no fun being in the middle…

I am still teaching full time in Physics. Of all the work I do, I like teaching the best. It never gets boring. From year to year there are small shifts in the types of work the students are well prepared to do and in their attitudes toward different aspects of studying. University Physics has to take them with all their strengths and weaknesses and get them ready for the second year of physics courses, so every year is different. It is a very rewarding process to be a part of each year.

At home I have been having lots of fun doing genealogy research, watching old and not so old movies, and playing an occasional computer game. My major projects have mostly involved landscaping in the yard. I spent a week last summer in Washington, D.C., with my son and had a great time visiting all the museums.

From Laura:

Probably the thing I enjoyed doing best at work this past year was working on the Entry Team, where I was involved in advising incoming first year students and helping them register for their fall semester classes. I really enjoy working with students, and this made the summer infinitely more interesting for me than summers usually are (it's just too quiet around the department without the students!). My time in Academic Affairs also threatens to consume as much time and energy as I can devote to it, especially with the dean search (A&S and SoBA) organizing and scheduling. It's interesting, and I am enjoying being over there more than I thought I would, but my real home on this campus is in Physics, where I have the opportunity to really get to know our majors.

At home I've started a quilt project for our bed. It's slow going (because I'm not spending very much time on it yet!), but I think I'm going to enjoy the final product. The fabric is batik, in a range of greens and blues and off white. Very soothing, I think.

From us both:

Our son, Ian, is a senior this year, and is graduating in June with a BA in political science/international relations. He's planning on pursuing a career in some aspect of national security or some other related international affairs field, so we expect him to ultimately land in the DC area. This year, he's enjoying some intensive course work with one of his professors whose professional interests are in this area. Just like he would have received at Stetson, the one-on-one personal attention he's found has been fabulous, and he is thoroughly enjoying it and taking full advantage of the opportunities it affords (he chose a school like Stetson, with one teeny advantage in his mind: he's far, far away from mom and dad!).

Our daughter, Beth, is in her third year of pursuing her career in the professional ballet world. She has completed a wonderful season with Louisville Ballet this year. It was a parallel move in terms of position, but she has found working with new artistic staff has helped push her further, which is a good thing. She's very excited about the coming season, when she'll be joining Dayton Ballet as 2nd year apprentice. Meanwhile, she and her fiancé continue to build their relationship via Skype – and a fabulous trip to Germany (where he is stationed) for her last summer.

We hope you are all well! Please keep in touch via email or Facebook, and of course, drop by and say "hi" anytime you're in town!

—George & Laura

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TONY JUSICK (EMERITUS)

Well, hello to everyone once again. I have tried to die gracefully but it seems at least a temporary resurrection is in process. I am still visiting the department on a daily basis and providing free tutoring for the students in Dr. Lick's college physics class. I am not visited by many but of course those who do are always in for a rare treat. I seem to provide about as much career counseling as I do the solutions to physics problems but that is probably much more valuable to them anyway. I enjoy talking with them as I enjoyed talking with many of you during your days here. That still seems to me to be the prime value of a Stetson education. The ability to encounter faculty on both a professional and personal level. In a sense to drink from both the cups of knowledge and wisdom. Both are essential in living a fulfilling life.

My golf game is slowly eroding but then there wasn't that much there to start with. I keep telling myself that this is fun but I am having more trouble believing it as time goes on. When I finally decide to quit I hope I have the courage to go out in style by tossing bag, balls, and clubs into the nearest pond instead of letting them rust quietly away.

We just acquired a new puppy. A Maltipoo. For those not in the know that is a Maltese-Poodle hybrid. She's a doll but still in the stage of thinking that everything is suitable eating material and I mean everything. It keeps me and my wife on our toes. I hope all of you are well. These are difficult times and a sense of humor is a valuable asset to keep on file. Sometimes that's a tough act to manage. Godspeed to you all!

—AJ

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TOM LICK (EMERITUS)

As many of you know from my previous comments, I am now in my last 3 months at Stetson and I will be fully retired at the end of this semester in May. I have already emptied my office of most personal effects accumulated over the last 44 years, and I am ready and anxious to start a new cycle in my life. Yes, I will miss Sage Hall and the students, but I plan on having many activities to keep me busy. I want to do a lot of traveling that I was not able to do while Miriam was disabled during the last 12 years of her life. It would be nice to take an Alaskan cruise in June and a trip to Europe including England and Italy. So if any physics alumna are living in Europe and would like a couple guests for a week, let me know. I would be happy to accommodate you. If any alumni are in town for a day, you are always welcome to come by my house and see me. As I have been thinking during the last month, it is the journey not the destination that is important and I have enjoyed my journey during my tenure at Stetson.

—TAL

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DANIELLE MOREL

Greetings from DeLand! What a busy year for physics and astronomy: Kepler's discovery of near earth-like planets in other solar systems; the Nobel prize in physics for the accelerating expansion of the Universe; high energy physicists closing in on the elusive Higgs particle; the heartbreaking end of the space shuttle era; to name but a few. Of course, just to remind us that humans are behind all that science, we had faster-than-the-speed-of-light neutrinos … at least for a little while. Gotta love it!

2011 was also a busy year for Stetson Physics as we graduated eight students between May and December. This is a milestone of sorts for me as they were all in my Modern Physics course during my very first semester at Stetson (Hi guys!). I loved being able to watch them mature into adults, share with them as they went through the often gut-wrenching process of choosing a career path, and see some take that memorable walk to the podium to claim their diploma in front of family, friends, and very proud faculty. What a remarkable group! Thank you for the memories!

On a more personal note, I had another full year with the astronomy course growing in size and physics majors taking up the rest of my time during the semester. In January, I had the pleasure to accompany three of our physics majors to the Southeast Conference for Undergraduate Women in Physics on the campus of North Carolina State University in Raleigh. It was quite a treat to be surrounded by nearly one hundred female students and faculty for a couple of days of presentations, panels, and activities. I was also part of the conference's career panel alongside a

variety of women with radically different career paths. It was quite a rewarding experience as the panel was followed by many conversations with students with whom our professional stories resonated.

In early March, I submitted an abstract for a poster presentation at the Union of Pure and Applied Physics 7th Triennial International Conference on Biological Physics, hosted by the Center for Theoretical Biological Physics at the University of California at San Diego (UCSD) in late June. In April, my abstract was officially accepted and, to my great surprise, in May the same abstract was selected for a 15-minute oral presentation in the "Physics of Neural & Sensory Systems" symposium of the conference. This was a great honor as only 24 junior investigators were invited to give oral presentations, selected among the more than 163 accepted poster submissions. I was even more impressed (and not a little terrified) to discover that other speakers at the conference included many internationally prominent scientists from a variety of fields having connections with biological physics and no less than three Nobel Prize winners (chemistry & physics). It was a great honor to be joining their rank (and have a few in the audience), if only for 15 minutes. By lucky coincidence, I discovered that there was also an intensive course for the software that I use in my research on the UCSD campus during the few days immediately preceding the conference. I jumped on the opportunity to participate, and was therefore able to make the trip twice as productive.

What little summer was left after the conference was spent on research and a quick trip to Montreal to visit family. If you've never been to Montreal, you must put it on your list of places to experience. Summer is particularly fascinating with a never ending list of festivals and activities (you might have heard of the Montreal International Jazz Festival or the Just For Laughs/Juste Pour Rire Festival?). The entire island hums! There is music of every genre, food from every nation, parks for quiet times, architecture to enjoy, and every imaginable form of art to be found anywhere from street corners to upscale galleries! Walking around historic downtown on a warm summer's day is an experience for all the senses. Add some late night fireworks seen from the vintage of a bridge crossing the St Lawrence River and you'll go to sleep with a smile on your face. But be warned, there will be hundreds of great photographs to process upon your return!

On that note, let me wish everyone a great year filled with rewarding personal and professional experiences. To our alumni: keep up the good work, keep us posted, and most importantly, enjoy the ride!

—Danielle

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KEVIN RIGGS

It will be a time of transition in the Stetson physics department this year, as Tom Lick fully retires from the faculty after more than 44 years of service to Stetson University. I am sure many of you have fond memories attending one or more of Dr. Lick's challenging and interesting courses. I will personally miss Tom a great deal around the department; although we certainly hope he will stop in from time to time when is not off on one of his outdoor adventures. Tom was my mentor when I first arrived at Stetson. One of the most valuable things he taught me was the joys of presenting classroom demonstrations, which is something I still enjoy immensely, especially in my general education course on musical acoustics course titled *The Science of Music*. We are now in the middle of a search for a two year visiting professor position to help fill the void of Tom's departure.

Last spring I taught my usual *Science of Music* course and also *Laboratory Techniques* for the first time in quite a while in order to help give some release time to Associate Dean George Glander. George has substantially improved *Lab Tech* over the past few years, so it was very enjoyable following his lead. We had a good group of six students enrolled in the course and we spent many enjoyable Friday afternoons talking physics and analyzing data in the 217 computer lab. I continue to serve on the Undergraduate Research Committee after relinquishing the chair to my history colleague Dr. Kim Reiter. Last spring at our undergraduate research symposium, now called the ***Stetson Showcase***, we saw a record setting number of oral and poster presentations, including three from physics; **Stephanie Lengemann ('11), Angela Steinmann ('11), and Sommer White ('11)**. You can find a program of the day's events, including abstracts, at http://www.stetson.edu/other/research/media/longprogram-surcas.pdf.

For the first time in more than ten years, I did not travel to the annual conference for the Council on Undergraduate Research last summer. Lori and I would often combine my summer conference travel with summer vacation, including one memorable week in Yellowstone after the conference at Montana State University. Instead I stayed closer to home and helped to mentor two students working on summer research projects. **Brett Abraham (dual degree student, plans to complete EE degree at UF)** worked on his senior project involving a reverberation time study

of the Rinker Environmental Learning Center (RELC). Brett has made recommendations to the director of the RELC as to how many fabric covered acoustic panels are need on the walls in order to bring the reverberation time down to an acceptable level for speech intelligibility. Brett presented his work both at Stetson Showcase and also at the Florida Undergraduate Research Conference, which will be hosted by Stetson this year (http://www.stetson.edu/other/research/conference/). You can find an abstract of his work elsewhere in the newsletter.

Also working with me last summer was **Jake Ethier ('13)**, who learned how to use the Atomic Force Microscope (AFM). We made progress on a project involving imaging magnetic patterns in small magnetic chains found in magnetotactic bacteria in collaboration with Dr. Dave Stock in the biology department. Dr. Stock is in charge of the "care and feeding" of the bacteria and looking at their behavior in an applied magnetic field. We worked on isolating and imaging the magnetic chains using a technique called Magnetic Force Microscopy (MFM). Jake's summer stipend was supported by funding from the National Science Foundation Scholarships in Science, Technology, Engineering, and Mathematics (NSF S-STEM) program. Jake recently learned he has been accepted into the prestigious Science Undergraduate Laboratory Internship (SULI) program sponsored by the Department of Energy, and will be working at the Jefferson Lab (www.jlab.org) next summer on a project involving computational nuclear physics.

This past fall I taught the third edition of my freshman seminar course, *Energy and the Environment*. Jake **Ethier** ably served as the TA for the course for the second time. We had a record twelve students enrolled in *Electronics*, including several math-major/physics-minors and even one biochemistry major! It was fun to have a diverse mixture of interests in the course. I need to run two lab sections of six each in order to avoid dropping from exhaustion trying to trouble shoot twelve circuits simultaneously. I also taught my usual *Quantum Mechanics I* course, so it was a busy semester all around since I also spent the fall working on a detailed proposal to justify the hire of a replacement for Tom Lick

My musical endeavors continue to go well. Our faculty jazz quintet, *Thin Film Magnetism,* recently performed as the featured band in the annual Mardi Gras themed dog parade on Feb. 18th (http://www.dogparadedeland.com/). In the past few years we rode on a float in the parade, which was always a lot of fun. This year we were invited to play a four hour gig on the main stage near the old courthouse steps on Indiana Avenue. The band had a great time and the crowd seemed to enjoy the music as well. We also performed at the fall 2011 Stetson faculty/staff picnic and at the fall 2011 Sage Hall picnic, performing live from the balcony of the new addition to Sage hall. Although I enjoy playing jazz guitar with my band mates; Sims Kline (Library) – Piano, Michael McFarland (Communication Studies) – Drums, John York (Chemistry) – Bass/Guitar/Electric Mandolin, and Chris Laghi – Sax/Flute, I don't think we have to worry about anyone going pro anytime soon (with the possible exception of our amazing Sax/Flute player, who is not associated with Stetson in any case).

I hope all goes well in your own endeavors and please stop by to visit us anytime you are in the area, or at least keep in touch and let us know how about your latest accomplishments. The ultimate reward of any teacher/professor/mentor is seeing their former students going out into the world to accomplish great things.

—Kevin

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Danielle Morel, Laura & George Glander, Tony & Becky Jusick, Susie with Tom Lick, Kevin Riggs

Physics Department Annual T-Shirt Contest

Physics: It's not all Greek to me.

$$\oint_S \vec{E} \cdot d\vec{a} = \frac{1}{\varepsilon_0} \int_V \rho dv$$

$$\oint_S \vec{B} \cdot d\vec{a} = 0$$

$$\oint_C \vec{E} \cdot d\vec{\ell} = -\frac{\partial}{\partial t} \int_S \vec{B} \cdot d\vec{a}$$

$$\oint_C \vec{B} \cdot d\vec{\ell} = \mu_0 \int_S \vec{J} \cdot d\vec{a} + \mu_0 \varepsilon_0 \frac{\partial}{\partial t} \int_S \vec{E} \cdot d\vec{a}$$

This year's winning shirt was designed by Brett Abraham.
The shirt is black with bright green ink.

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CROSS SECTION is edited by Laura Glander

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