

# The Dilated Times

The newsletter of the Drew University Society of Physics Students

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Editors: Adam Friedman, Emily Hamilton, Tina Aragona

## Boeshaar Propagates to Another University



As long as I can remember, I have walked around the Hall of Sciences, examining astronomy posters and exploring the observatory on clear nights. I grew up in the area, and was able to spend time at Drew, getting to know the science departments, which have always included Pat Boeshaar. After this spring however, Professor Boeshaar will not be residing in her office at Drew University. There will be fewer astronomy posters, and one less mug of candy to sample from during long afternoons in lab; these will be packed up and shipped to a new office waiting for her at the University of California--Davis.

Pat Boeshaar accepted a position at UC Davis as a senior lecturer with tenure, a position held by only one other person at the university, which she describes as similar to a full professor faculty position, with a heavier emphasis on teaching rather than research. "I wanted to make sure I was not in a 'publish or perish' type of environment," Boeshaar said. In this position, Pat will be supervising astronomy programs and doing stellar astrophysics research with the deep lens survey, searching for tiny stars and objects. She has also been asked to upgrade the undergraduate physics program, creating a stronger emphasis on astrophysics within the curriculum, which she "has been heavily involved with already," even while still at Drew.

Interestingly, while Pat maintains her office at Drew, you can find her picture on the UC Davis website, as she has officially been a faculty member there since

August of 2003, on a leave of absence. She has given a few talks at the campus, and has even voted for some promotion and tenure cases for other physics faculty members. This dual involvement has "made it very busy. Between Bell Labs, Drew, and Davis, I get a lot of email."

Boeshaar is no stranger to being busy, however. Her ten-page resume is full



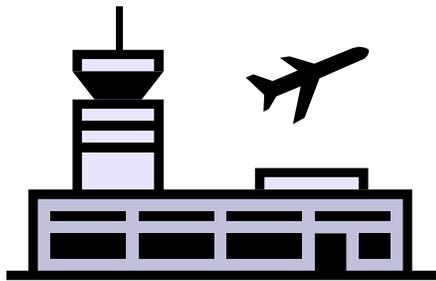
of accomplishments, from undergraduate research at Northwestern State University in Louisiana, to graduate and postgraduate work at Ohio State, as well as research and teaching positions at the Universities of Washington, Oregon, Arizona, Rider College, and of course, Drew University where she has spent the past 16 years. She lists memberships with five major professional organizations, both in physics and astronomy, and cites thirteen awards, grants, and honors awarded throughout her career. Also, her resume includes a list of professional activities that range from consultant to chair of committees, participation in numerous peer review boards, and five presentations given around the world. After all

of this, her resume includes three pages of listed publications, two pages of past courses taught, and a final page of university service.

While at Drew, Pat has run the Drew Observatory program, as well as taught introductory astronomy courses. She has overseen numerous student observatory assistants, senior projects, and Goldwater research proposals. She has also taught nine other physics courses, usually repeated across different semesters, throughout her time at Drew. She has been chair of the physics department twice, participated in numerous committees, overseen Drew search committees, as well as many other accomplishments at Drew. When asked what her major accomplishment on these committees has been, she remembers getting salary equity for faculty members, a project she and Dick Rhone undertook while she was the 1992-93 chair of the taskforce on faculty compensation, a committee under the Presidential Planning Committee. "We felt there should be equity of salary based on experience. This was one of my biggest accomplishments, with Dick Rhone."

Leaving Drew, Boeshaar notes that she will miss being at a school where she knows the entire faculty on sight, and will especially miss "Bob F. and Ash Carter," two of her colleagues. She'll also miss some of her classes, especially her first year seminars: "I have fun in there!" Also, Pat spoke about the dramatic beautification of Drew that has taken place since she has been here, but does admit that "the

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# Time For Seniors To Find New Labs to Break

## Friedman to Boston

I still remember my first physics class at Drew: Dr. Supplee playing with springs, Neil Mukerji and his infamous backpack, in the corner taking photographs, Karen Mooney always attached to a Van der Graaf generator with her hair standing straight up, and biology majors complaining about the math. Now, a plethora of classes, many picnics and taco parties, a few “mishaps” in electronics lab (the 555 incident was not my fault), a run-in with a terrible differential equations experience, a Dr. F. rectal warmer, 100 smashed liquid hydrogen covered daffodils, an independent study with Dr. Carter, a physics GRE nervous breakdown, a T-shirt, and several issues of the Dilated Times later, I am done and ready to graduate. In fact, I am even moving on in physics, and in the fall will enter a program at Northeastern University leading to a Ph.D.

Although I have had my run-ins with various Drew University Departments including facilities, the career center, and food services (God, I hate Aramark!), I can honestly say that I feel privileged to have been a physics major at Drew. I have greatly enjoyed all of the personal attention that I got from the Professors here (I took 6 classes with Dr. Supplee!), which no doubt enabled me to better understand physics. Also, I am

greatly in debt to Dr. Carter for his guidance and the time that he devoted to my independent study project on Quantum Scattering. Moreover, I owe my fellow classmates, those graduating and those who are not, a heartfelt “thank you” for all of the help they have given me and for all of the good times we have had doing quantum problem sets at night and complaining about sociology and a certain optics text. And, of course, I have felt honored to serve as your Dilated Times editor for the past two years. I will greatly miss all of these things—but it is time for me to move on. So, in an effort to not be sappy, I will leave you with a some-what unrelated piece of Yiddish wisdom: *Mit mazl ken men alts ton* (“With luck one can do anything”).

Adam Friedman ‘04



Adam, Courtesy of Tom

## Ovalle to Boston

Upon graduating Drew this May, I will do a bit of traveling before I continue with my education. Only two days after graduation, I will be flying down to Honduras with the Drew Honduras Project for two weeks. The other Project members and I will spend our time there volunteering at an orphanage and doing construction at a school in Tegucigalpa. The trip will definitely be rewarding after the many months of planning and fundraising with the other Board members. I will then go to the Dominican Republic (DR) in late June for two weeks with my boyfriend Chris. While in DR, I hope to visit lots of family and get plenty of sun at the beach. In September, I will start to work on my Masters degree in Romance Languages and Literatures at either Boston College or Boston University. As I write this, I am on a trip to Boston to visit both schools (I'm writing this email in the BC library). I then plan to get my Ph.D. and eventually become a Spanish Literature professor. I guess you would end up calling me one of those “closet” physicists, but a physicist nonetheless. Even now, while visiting my prospective graduate schools, I have managed to really impress people with the fact that I've studied physics. So, for those of you underclassmen reading this, my advice to you is that you should stick with physics because it can really take you places.

Arlene Ovalle ‘04

## Mooney Not to Boston

Next fall I will be starting grad school at the University of Virginia in Charlottesville, VA. I am looking forward to getting my Ph.D. and becoming Dr. Mooney. Four years at Drew have introduced me to a lot of great people, and a lot of physics. The things that I will miss the most about Drew Physics are the Taco Party and the picnics. We have such a great, close-knit department and it will be a big change to go to a state university. By far my favorite class at Drew, from any department, was Physics Seminar. Seminar allowed us to get to know each other outside of the classrooms and labs, and I got to write a paper about the Loch Ness Monster!

My biggest piece of advice for the underclassmen is to work together as much

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## Tom Makes a Speedy Decision

### Mooney

(Continued from page 2)

as you can. Problem sets that seem impossible can teach you a lot when you see how other people approach them. Also, I wholeheartedly support the REU program. It was the perfect taste of grad school, enough to let me know that I really want to continue in physics. As for a last-will-and-testament thing, I very gratefully leave the observatory to Allison Steele; may you enjoy two years of praying for cloudy nights!!

Karen Mooney '04

As of late, the question on everyone's mind (including mine), has been "What will Tom be doing next year!?" Condensed matter research at Brown? Optics at Rochester? High energy physics at Boston University? Sweeping the floor at McDonalds?

The answer to this question has eluded me for several months now. I visited everywhere that I was accepted, and after much travel am pleased to announce that I will be attending the Rochester Institute of Optics next fall. Weather concerns aside, the Institute of Optics is an exciting place, with roughly 30 faculty members and 100 graduate level students in both the Ph.D. and M.S. programs. It is the oldest optics program in the US, and widely recognized as the one of the best in the world. There are tons of opportunities for graduate study at the Institute. In addition to millions of

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## What's "u" in McGee's Lab?



A lot of times, one thinks of a large research university as the only place to do, well, research. This is clearly not the case, and Dr. Dave McGee is the person to talk to about Drew's research opportunities in the sciences.

Dr. McGee has been conducting research from his Drew University lab since he began teaching here, and collaborates with Lucent Technology's Bell Laboratories, the University of Wisconsin, and the City College of New York, along with others. McGee is studying the optical properties of organic polymer thin films, with help from students in the physics and chemistry departments here at Drew—currently Danielle Bousquet, Anthony Caruso, Karen Mooney, Melissa Yang, and Tom Zielinski. While all of the synthesis and optical characterization of the organic polymers is done at Drew, McGee notes that because "most fabrication is in the nanomaterial realm, some of the research cannot be conducted at Drew facilities."

One of the main goals of the Drew polymer research is to produce novel fabrication methods for optical components. McGee poses the question: "Can we print optical circuits in the same way that an ink jet printer can print on a piece of paper? That's one of the long term goals—to print optical circuits. The way it's done now is clunky and expensive." Dr. McGee, along with Drew students, can help work toward a better method, and any interested students should contact McGee for more information, either for a summer project or during the semester. "We're going to keep this research going as long as we can," says McGee, encouraging students to get involved in his lab.

Indeed, Drew's science faculty recognizes the importance of offering students research opportunities. For this rea-

son, McGee directs the Drew Summer Science Institute (DSSI), a program funded by local pharmaceutical firms and installed at Drew to prepare students for research in academe and industry. Every summer the program hires 8-10 students throughout the sciences who have applied for a position. Every applicant must choose an advisor, and can then either work on an established research project or propose an independent experiment. Since the program began, there have been about ninety students who have participated.

McGee feels that the program is important to have at Drew. "Most schools we like to compare ourselves to," he says, "have something like this in the summer." Furthermore, he stresses the importance of getting research opportunities in the sciences, as the program is intended for (although not restricted to) rising juniors as a first lab experience outside of class. This is invaluable experience for a student to have, and many DSSI participants have easily obtained prestigious internships in following summers with help from this experience. DSSI "gets the REU people very excited, I would think," McGee said. "They would much rather have someone who has been in a lab. DSSI is really a training ground for REUs and other research opportunities." In fact, Tina Aragona, a 2003 DSSI participant is planning on attending an REU this summer, and she noted that her Drew experience will be very helpful when beginning a new experiment: "Although Dr. McGee assigned me some projects, I was able to do a lot on my own."

Any students interested in participating in the 2005 DSSI program can access information from the Drew department website, or by speaking with Dr. McGee.

Emily Hamilton '04

### SPS Election Results!!!

President – Tina Aragona  
Vice President — Nathaniel Woodward  
Activities Coordinator – Christina Conzentino  
Newsletter Editor – Jacquelyn Haynicz



Emily Hamilton, associate dean of the h-bar & grill

### Physics Quotations

"I personally hate that. When teachers make you do work...I do! It's stupid!" -Christina

"That's why the school is a carnival and not a university."  
-Emily

# Newsflash: Freshman Likes Physics

When I told people that I was planning to study physics, I would get two responses. Some would just awkwardly stare at me until they could think of a way to change the subject. Others would shriek in terror as they witnessed the inhumanity of my desire to torture myself for the next four years of my life. These were not exactly the encouraging reactions that I was hoping for.

As the summer drew to an end, I soaked up every bit of free time that I could, as if on a death sentence. I was looking forward to working long hours into the night on insane physics problems, trying to think through experiments that strange dead physicists had thought up 300 years prior. Boy, was I wrong!

College life wasn't nearly as bad as I had made it out to be. I took AP Physics in high school, and even though I didn't understand most of it, it was basically the same stuff I took this year. However, studying physics here at Drew has been a much better experience. First, the labs have been really awesome. We

hardly ever did labs in high school. We made a rubber-band-powered, tennis-ball-shooting car thingy. That was it. The labs performed here give a great hands-on look at what all of these equations really mean. I was scared when I saw on my schedule that I would be in lab for 3 hours, but the time goes by quickly.

The labs and the lectures would be useless if it were not for the great professors who teach the courses. I do not know all the professors in the physics department, but those whom I do know actually seem like real people. They teach in a way that makes physics fun (as if there were any other way), and really make sure that everyone understands the material.

I have had a great experience so far with my physics classes, and I am excited about learning stuff that will make me appear intelligent to the non-physics majors. I still get weird looks when I tell people that I'm a physics major. Now, I just smile and nod.

Evan Smith '07

## Tom at Rochester

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dollars of traditional optics research conducted annually at Rochester, the optics department is currently in the process of constructing a new building in conjunction with the Biomedical Engineering department. The hope is that this newfound proximity will breed collaborative developments in the super-hot field of medical imaging and diagnostics. Furthermore, Rochester is also home to the Laboratory for Laser Energetics. This lab is very closely tied to the optics institute, with many professors holding joint positions in both and employing graduate students. It also houses the Omega laser. With a cool name like Omega, not much more needs to be said, but I will mention that it is the worlds largest infrared laser, the size of a football field, and will shortly be capable of producing petawatt pulses for fusion research! With exciting opportunities like these, I look forward to continuing my education at Rochester.

-Tom Zielinski '04

## Physics Quotation

*"Let's say you want to collect light from a bird. What are your issues?" - Dr. Supplee*

**Check out the Physics Department Web Page**  
at

<http://www.depts.drew.edu/phys/>

**NEW:** *Dilated Times* available as pdf files!!!!



Summer: Sun, Fun,  
and Physics

## Astrophysics in Air-Conditioning

This summer, I will be participating in an REU at Lehigh University. For my summer research experience, I will spend 10 weeks working on a theoretical astrophysics project under the direction of Dr. George McClusky. My work could include one of three projects involving the study of binary star orbits and solar system structure and stability. The program I am attending will also include weekly seminars, lab tours, and other events to allow each student to be aware of the projects in which his or her peers are participating. I am looking forward to this exciting opportunity to pursue research.

Tina Aragona '05

## Optics and Governor's School

This summer I will be working as a research assistant in the physics department for six weeks. This position is funded by Drew Alum Bill Clark, and provides board on campus and a generous salary. Starting in mid-July, I will be working as a counselor for the New Jersey Governor's School in the Sciences at Drew. This program lasts for four weeks, and counselors live with the students, organize activities, and assist in classes, labs, and with team projects. The project I am working on makes use of our observatory, so I am also being trained on the telescope over the summer. I am very excited to have the opportunity to be involved with these programs!

Jacquelyn Haynicz '06

## Nate Makes a Decision?

This summer is filled with possibilities for me. On one hand, I could continue working for Prestone Products Corp. in their research and development laboratory. Yet another possibility is to work for Dr. McGee in his optics laboratory here at Drew. When working at Prestone, a company that develops antifreeze and other car-care products, I run numerous tests on

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## Boeshaar

(Continued from page 1)

weather at Davis sure beats New Jersey.”

Along with the weather, Boeshaar looks forward to working with more students with an interest in astrophysics. Indeed, she has already had requests from both undergraduates and graduate students to work with her at Davis, and the school will “make sure I have time to work with them,” said Boeshaar. She will also have money to fund a graduate student or two, and plans to pick some students when she goes to the west coast. Also, many of Boeshaar’s colleagues are already on the west coast, which she cites as a major draw to the area. Furthermore, she is excited that UC Davis is giving her ample choice of courses she will teach. “They want me to teach planetary astrophysics,” she said. “That’s great fun.”

Boeshaar is undeniably passionate about her field, in fact she has been since receiving a Christmas gift at age five – a book entitled “All About the Stars.” It was this gift that propelled her toward a Ph.D. in physics. “Believe me, in the 50s, girls were not expected to do science, but I read that you needed a degree in physics to do astronomy. So I got one.” It is this determination that has led her to quite impressive accomplishment throughout her career. Drew will certainly miss this enthusiasm, and will also miss the person behind the Ph.D. In her spare time, which admittedly is scarce at the moment for Boeshaar, she enjoys interesting activities such as growing exotic rhododendrons, creating stained glass panels, reading science fiction (“not fantasy”), and trekking with her husband in far-off cultures such as Nepal, where she has visited twice for over a month, living with the native people. Although Drew is losing a long-time member of the faculty, we wish her much success at Davis.

-Emily Hamilton ‘04

## Nate-ing a decision

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their products. These tests include corrosion testing, freeze point analysis, electrochemistry, and spectral analysis. If I choose to work at Drew, I will be participating in a 6-8 week program where I would work full-time in Dr. McGee’s optics lab on various projects, setting up and collecting data. I’m sure that my summer will be extremely challenging and interesting. -Nathaniel Woodward ’06

# Drew Offers One-Time Course: Clocks & Maps 101



JACKIE, PETER GALLISON, DR.. CARTER, ADAM, CHRISTINA

On March 26, the Drew RISE program arranged for an on-campus lecture by Harvard University’s Peter Galison. Galison, Professor of History of Science and of Physics, gave a lecture based on his recently published book, *Einstein’s Clocks, Poincaré’s Maps: Empires of Time*. He has also written several books including *Image and Logic: A Material Culture of Microphysics*, which he received the Pfizer Prize for Best Book in the History of Physics in 1998.

His lecture produced an excellent turn-out from across the Drew community, with not an empty seat in Drew’s largest classroom. His lecture proved interesting to not only scientists, but also anyone with an interest in history, philosophy or technology. I, along with some other Drew students and faculty, was also invited to meet with Galison in the RISE library before the talk and ask any questions we had on his work and the history of science, which was an excellent introduction to his lecture.

The formal discussion focused on the difficult task of synchronizing time and coordinating clocks, which plagued scientists at the end of the 19<sup>th</sup> century. Everyone in Europe seemed to have different ideas about how to do this, however Galison focused on Henri Poincaré and Albert Einstein, discussing how both scientists thought quite differently about simultaneity. Poincaré, a great mathematician in Paris and president of the French Bureau of Longitude, would draw maps to attempt to solve any problem, this included. Einstein, young and unknown at the time, worked at the Patent Office in Bern, where many ideas involving simultaneity landed on his desk. This led to Einstein’s reevaluation of the concept of time, as well as the realization that there is no absolute time, a thought that ultimately led to the special theory of relativity. Galison explains how the theory could be considered a junction between technology, philosophy, and physics, and introduced a little history of science to an enthusiastic audience. The Drew community thanks him for visiting.

-Christina Conzentino ‘05

*Thanks to Colin McLaughlin (‘03) for his generous gift of a subscription to the Skeptical Inquirer. Patrons of the h-bar & Grill thank you heartily for your donations. You should expect an official letter of thanks from the newly appointed dean shortly.*

*-The faculty and students of the Drew Physics Department*

# 2003-04 Independent Studies

## Scatter!

Last fall, I completed an independent study project on Quantum Scattering with Dr. Ashley Carter. Some scattering problems can become quite complicated and far too difficult to approach from a direct or numerical integration of the Schrödinger equation. So, there are many different ways to study a scattering phenomenon, with each approach best suited to where a particular set of conditions exist.

A good way to determine which method to use is by examining a quantity called the coupling parameter. This parameter is basically a ratio of the strength of the potential of the scattering center to the kinetic energy of the incoming particle or wave. In my research, I examined how the coupling parameter can affect the results of a scattering problem. To do this,

I considered several methods of studying scattering problems, deriving them all, and then comparing them. I looked at the Born Approximation, the WKB approximation, and the Eikonal approximation.

The Born approximation reveals a very simple and uncomplicated way to calculate the differential scattering cross sections for the scattering problem. However, the Born approximation fails entirely in the strong coupling situation. Therefore, when the coupling parameter is large we must seek other methods.

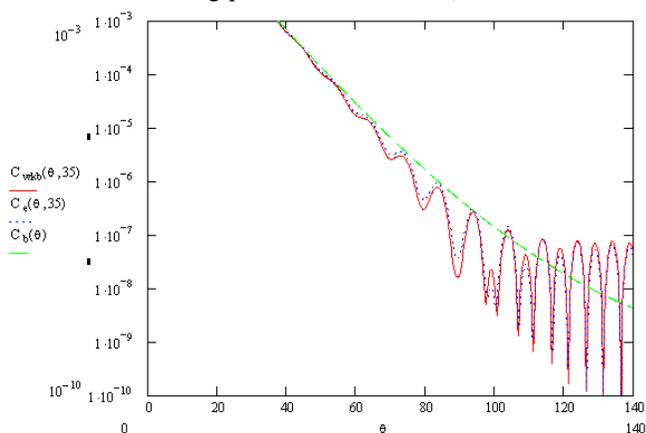
The WKB method can be taken to be exact in the strong coupling limit. However, the formula for the differential scattering cross sections using the WKB approximation can be quite complicated. Nevertheless, the WKB approximation should be applied for large values of the coupling parameter.

The Eikonal approximation, which can be derived directly from the

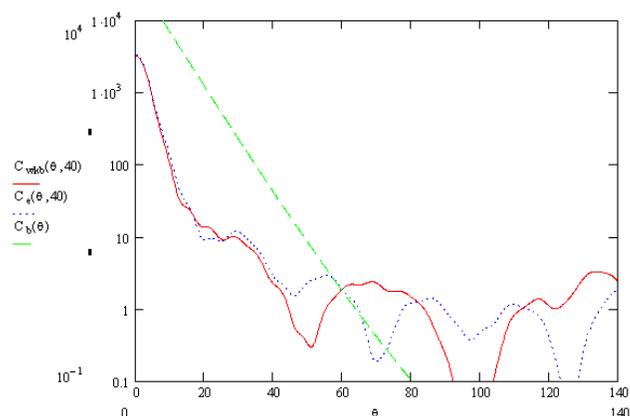
WKB approximation in the high-energy limit, presents a much simpler way to calculate the phase shifts than the WKB approximation, but does not give its accuracy, and can still become quite complicated.

We see from graph 1 that when the coupling parameter is small, it is best to use the method of the Born approximation, as it is easiest and gives accurate results. However, when the coupling parameter is large, one can choose between the Eikonal or the WKB approximations. Graph 2 shows that the Born approximation does not even come close to the answers given by the other two approximations. Therefore, simply by examining the magnitude of the coupling parameter, we can learn a lot about how to tackle a scattering problem.

Adam Friedman '04



Graph 1: Weak coupling, graph of the differential scattering cross section for the WKB approximation in the dark solid line, the Eikonal approximation in the dashed line, and the Born approximation in the lighter solid line, versus the scattering angle in degrees for the polarization potential. We can see that all of the approximations are close to one another.



Graph 2: strong coupling, graph of the differential scattering cross sections for the WKB approximation in the dark solid line, the Eikonal approximation in the dashed line, and the Born approximation in the lighter solid line, versus scattering angle in degrees for the polarization potential. We can see that the Born curve is not even close to what the other two approximations yield.

## Karen Works with Optics

For the last two semesters, I have been working in Dr. McGee's optics lab on a variety of independent study projects. Last fall I worked on continuing the diffraction efficiency measurement that Tina and Katie started over the summer. Quick refresher: electro-optic polymer films form a diffraction grating when two identical laser beams interfere in the film. You can tell how strong the grating is by allowing a third laser beam to pass through the grating and measuring the fraction of light dif-

fracted. After several inconclusive experiments, we determined that air currents were adding significant noise to our data. One of my jobs was therefore to build a tent to shield the experiment. My main job was to introduce an averaging procedure into the diffraction efficiency program. This was done in LabVIEW®, a very popular and interesting graphical data acquisition program. This semester I will be finishing up with that project by looking at how the grating develops over time as a high voltage field is applied.

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## More Optics...

If you've been in the Hall of Sciences on Tuesdays and Thursdays this past year, chances are we've run into each other. I've been hard at work on a senior honors thesis in physics with Dr. McGee entitled, "Orientational Dynamics of Azodyes in Photorefractive Polymer Composites: Influence of Chromophore Structure on Rotational Mobility and Diffraction Efficiency." Fancy titles aside, the goal of this research is to determine the effects of a

dipole molecule's design on its speed of orientation in an electric field.

Photorefractive polymers are a very exciting novel class of materials that have been proposed for use in optical memory, optical information processing, dynamic holography, image processing, optical interconnects and optical correlators. Their function, however, is intrinsically tied to the orientational performance of the dipolar molecules dissolved in the polymer host. While we can increase the orientational performance of these mole-

cules with certain structural modifications, chemical stability usually suffers. On the other hand, modifications that increase stability typically result in degraded orientational performance. In a one sentence summary, the thesis looks at three different molecular designs and compares their orientational performance. If you want the very exciting expanded version of this story, you will have to attend my honors thesis defense on Monday, April 19th at 2:30PM in HSC-4.

Tom Zielinski '04

## The Voice of Albert Einstein

In my course, The History of Physics in the 20<sup>th</sup> Century, there is seldom a class meeting during which Einstein's name is not mentioned. How could it be otherwise? And next year has been declared the World Year of Physics in commemoration of Einstein's "annus mirabilis" of 1905. So Einstein is and will continue to be very much on our minds.

A treasure for any Einstein enthusiast is a little book entitled "The Quotable Einstein," published in 1996 by the Princeton University Press. Here are a few of my favorite quotations (not all of which are in the book):

"I want to know how God created this world. I am not interested in this or that phenomenon, in the spectrum of this or that element. I want to know His thoughts; the rest are details."

"Put your hand on a hot stove for a minute, and it seems like an hour. Sit with a pretty girl for an hour, and it seems like a minute. That's relativity."

"Falling in love is not at all the most stupid thing that people can do – but gravitation cannot be held responsible for it."

"Common sense is the collection of prejudices acquired by age 18."

"Only two things are infinite, the universe and human stupidity, and I'm not sure about the former."

"Do not worry about your difficulties in mathematics; I can assure you that mine are greater."

"We have to do the best we can. This is our sacred human responsibility."

"The more one chases after quanta, the better they hide themselves."

"Teaching should be such that what is offered is perceived as a valuable gift and not as a hard duty."

"The Lord God is subtle, but malicious He is not."

"I do not know with what weapons World War III will be fought, but World War IV will be fought with sticks and stones."

"Warfare cannot be humanized. It can only be abolished."

"Science and art are the only effective messengers for peace. They tear down national barriers; they are far better assurances of international understanding than treaties."

"A happy man is too satisfied with the present to dwell too much on the future."

"In the past it never occurred to me that every casual remark of mine would be snatched up and recorded. Otherwise I would have crept further into my shell."



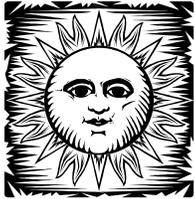
Dr. Ashley Carter

### 2004 ΣπΣ INDUCTEES:

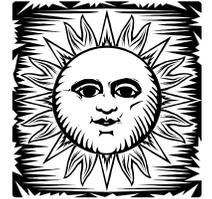
Tina Aragona, Holly Kuzmiak, Katy Rolfe, Dr. Wesley Shanks

### Congratulations to SPS members of Phi Beta Kappa:

Tina Aragona, Holly Kuzmiak, Katy Rolfe, Tom Zielinski



# Notes From the Outside



## Tricia Missall '01

I recently visited Drew to talk about my experiences since my graduation in 2001 with a degree in physics. Currently, I am engaged in an MD/PhD combined program at Saint Louis University School of Medicine. Always knowing I wanted to go to medical school, I fell in love with research during my undergraduate years. My ultimate career goal is to specialize clinically in infectious diseases while running a research lab in the field of medical mycology. My current research involves searching for new antifungal agents through work on the human fungal pathogen, *Cryptococcus neoformans*. This significant pathogen primarily causes meningitis and is a leading cause of death in AIDS patients. Keeping my research clinically relevant is important to me so

that I may help to bridge the gap from the lab bench to the hospital bed. As a student, my research success is evidenced by the awards and funding I have received from various sources including the American Medical Association, National Student Research Forum, and the American Heart Association.

Though I am not directly applying my knowledge of physics theories and formulas to answer my research questions, I am grateful for my physics education as it has trained me to think analytically. The training I received at Drew has given me a great perspective on science. With this foundation, I was able to take advantage of many opportunities early in my graduate career including a special topics course in Woods Hole, MA, conferences around the

country, and visits to various research institutions to learn new techniques from experts in the field.

Through studying *Cryptococcus neoformans*, I have identified a protein which is essential for this fungus to cause disease in a mammalian model. These findings were published recently and I am continuing to study the systems of which this protein is a part. As I continue my exciting research, I look forward to presenting more of my findings at a Gordon Research Conference this summer. The combined degree program takes seven years to complete; I will be finishing my PhD in Biochemistry and Molecular Biology in 2005 and my MD in 2008.

Tricia Missall '01

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## An Extraordinary Astronomical Opportunity!

On June 8 of this year we have the opportunity to share in a celestial phenomenon not seen by any living person on Earth. As the Sun rises in the east that morning, the planet Venus will be exactly crossing the Earth-Sun line transiting the face of the Sun and visible as a small black circle on the solar disk. Although modern transits are not particularly exciting scientifically, the past four transits in 1761 and 1769, and 1874 and 1882 were viewed by astronomers with much interest as experiments to determine the Earth-Sun distance, or the astronomical unit. While ultimately other methods were found to be more accurate in determining this distance, the transit of 1882 was the first viewed by large segments of the population with telescopes and smoked glass. And in one of the first reactions against scientific funding, the *New York Times* criticized government money being spent to subsidize astronomy transit expeditions to continually refine this distance measurement. In our busy modern world it will be interesting to speculate on how many "common people" of our day

will even be aware of this event. As a physicist it is still a reminder of the remarkable power and predictability of Newtonian mechanics. If you miss it, it will repeat again on June 6, 2012. After that you're stuck with waiting until 2117.

Viewing this "once-in-a-lifetime" event will require an early rising on June 8. While Venus will take approximately 6 hours to cross the Sun's surface, the transit will already be in progress when the Sun rises at about 5:30 am EDT on the East Coast. At 7:05 am, Venus will make third contact, with the edge of Venus "touching" the outer edge of the solar disk. For the next twenty minutes Venus will move off the solar disk, last touching the limb of the Sun at 7:25 am, called fourth contact. As with any solar viewing an appropriate solar filter is required to prevent eye damage. Solar filters are available for small telescopes. The image of the sun may also be projected from the eye-piece of a telescope onto a white surface where the image may be safely viewed. If in doubt, ask for advice or check out viewing hints at [skyandtelescope.com](http://skyandtelescope.com). And of course, hope for good weather!

Dr. Bob Fenstermacher

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### Karen!

(Continued from page 6)

Also this semester I am learning how to program an Optical Spectrum Analyzer (OSA). An OSA can measure the spectrum of laser sources with a resolution of tenths of a nanometer (not too shabby). The lovely Anritsu MS9710B and infrared diode laser combination have been filling my Mondays for weeks. I have been able to find software to control the machine using LabVIEW®, and the next step is to modify that software so I can display the spectrum of the laser in LabVIEW®. I am glad I was able to keep active in the lab for my last year, because Dr. F. wouldn't let me take anymore A-Lab!!

Karen Mooney '04



# Letter to the Editor!!!!



Dear Editor,

I read with interest your article, in "The Dilated Times", titled "Physics GRE Makes Jack Go Crazy". While you have undoubtedly written this in a somewhat humorous style, your point is well taken. Actually, your article stirred up a little fear and trepidation in me as I remembered my own facing of the GRE.

When I was a physics major at Drew, I really wasn't the serious student I should have been. I had to face that reality every time there was a test because I did just well enough on tests to get by but no better. Well, I finally graduated, was accepted to graduate school in physics, and then was faced with taking the GRE (apparently, in those days one could be accepted into graduate school without first having taken the GRE).

As you can imagine, life suddenly got very serious, especially given my abysmal "track record" with physics tests as an undergraduate. Well, there was only one course of action, do some hard and fast studying for the GRE. I then found, to my great surprise and delight, that my physics and math courses at

Drew really had prepared me well for the GRE and, beyond that, for a life-time career in physics.

I am sure that Drew has maintained the same high standards in physics and mathematics that were in place when I attended there, and that you and your peers are the beneficiaries of those standards in the same way that I was. So, put some time in studying for the GRE and fear not for I'm sure that you will find that you have been well prepared and that you will do well on the GRE.

Good luck on the GRE, in graduate school, and in the physics life thereafter (if that is what you eventually decide to choose for yourself).

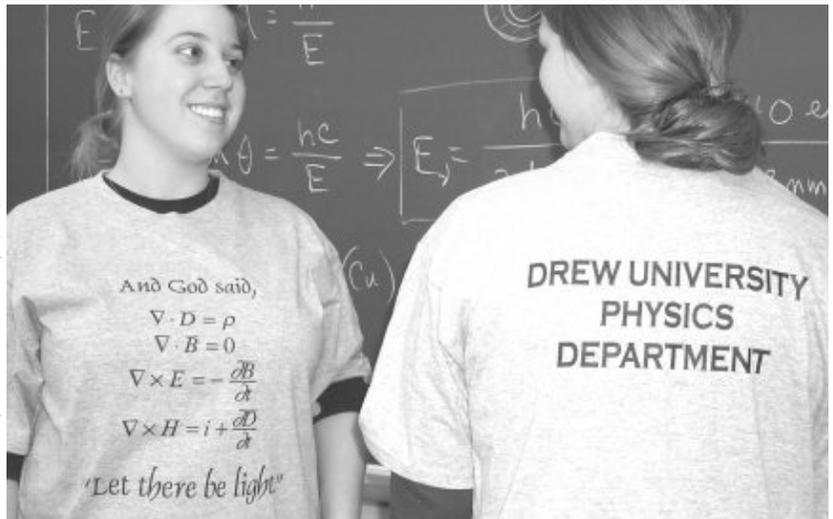
Perhaps the obviously dated, (and not completely correct) guiding theme of the physics students in my day might be of some use to you, "Physics is simple. You only have to remember  $F = ma$ . All else can then be derived from it!"

Bob Berger, Ph.D.  
Lawrence Livermore National Laboratory  
Livermore, California  
B.A. Physics, Drew University, '60

## Physics Style Section

The Drew University Physics Department finally has their own T-Shirts! The idea has been batted around for years, but this year it finally happened. The front design, inspired by a shirt owned by senior Emily Hamilton, features Maxwell's Equations and the words, "And God said, 'Let there be light' ". The back says "Drew University Physics Department." The shirts are gray with navy blue writing, and are available for \$10 from Dr. Fenstermacher (rfenster@drew.edu). Show the world what you learned in E & M with these spiffy shirts!!

Karen Mooney '04



Physics T-Shirt Front and Back



## Copernicus: Worst Hair Ever!

At a recent conference, experts have agreed to posthumously award Copernicus with the worst hair ever on a physicist.



Calling all funny physics quotations:

Send your favorite physics quotations to our new editor!

[jhaynicz@drew.edu](mailto:jhaynicz@drew.edu)

# Upcoming Events

April 17th: Spring Saturday

Come check out the physics demos!

April 26th: Physics Banquet

Come see the induction of new  $\Sigma\pi\Sigma$  members!

May 3rd: SPS Spring Picnic

Come eat food at Dr. F.'s house!

May 15th: Commencement, 10:30 a.m.

Come visit the physics table after the ceremony!

## The Dilated Times

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Department of Physics  
Madison NJ  
07940

*Address Correction Requested*

### inside...

Research, Summer Plans, Senior and Boeshaar Goodbyes, Einstein's Clocks and Poincaré's Maps, Physics Style, and more!

Contributors: Adam Friedman, Emily Hamilton, Tom Zielinski, Karen Mooney, Tina Aragona, Jacquelyn Haynicz, Nathaniel Woodward, Christina Conzentino, Evan Smith, Dr. Ashley Carter, Dr. Bob Fenstermacher, Tricia Missall, Dr. Bob Berger

I do say, my hair cut is atrocious!!

