

# The Dilated Times

The newsletter of the Drew University Society of Physics Students

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Editor: Natalya Katsap

## Drew Hosts SPS Zone Meeting

**T**his past February the Drew University Chapter of the Society of Physics Students held a Zone Meeting for Zone 3 schools.

Back in the fall, during electronics, Dr. Fenstermacher said that it was about time for Drew to bring Zone 3 together for food, fun and physics talks. So the current SPS administration agreed to take it upon themselves to organize the Spring Zone meeting. A date of February 19<sup>th</sup> was agreed upon, to make it relatively early in the semester when the work load was a little lighter. Next we searched for a keynote speaker, with a good reputation in an attempt to draw a larger crowd. Our initial choice for the speaker regretfully declined citing too much work and being very busy. The search continued and Dr. David Wilkinson agreed to be our speaker.

Dr. David Wilkinson is a professor at Princeton University. He is most famous for his research on the 3 degree background radiation. He was a founding member of COBE and is currently working on a follow up project to COBE which will provide greater angular resolution for the anisotropy in the cosmic background radiation.

Dr. Wilkinson's talk was entitled "Why is our Universe so Strange? A Problem for Your Generation". He spoke about how far physics, in particular cosmology, has come in understanding the universe and how odd it appears to be, with many asymmetries and unexpected results. Then he went on to discuss how it has been his generation that has mapped out the universe and begun to understand the basic principles of it, however, the task is left to our generation

to figure out why it is this way.

The day of the Zone meeting was fret with perils, for the night before it had rained and snowed somewhat, causing the roads to be very slippery. We were wondering who would be courageous enough to still show up on such a morning. Registration began at 9 am and the Drew students began to file in between then and 10 am. The first visitors to arrive were a professor and a student from Wilkes University. Then nearing the end of registration, three people from Georgian Court arrived. We were afraid that no one else would show up, but the meeting had to continue and so Dr. Wilkinson began his talk, albeit a couple minutes late to try and give more time to anyone else who would yet make it. During the talk, more people did show up, hindered by the weather, but they made it fine. Nine people from Rowan arrived and two people from East Stroudsburg showed up as well. All in all 43 people were in attendance at the Zone meeting, 13 of which were Drew students. SUNY Stony Brook sent their regrets that they could not make it due to the weather.

At the end of Dr. Wilkinson's talk, and everyone having arrived, we took a short break and prepared for the student talks. There were three presentations lined up, and some open time for any late discussions during the hour. However, when it was time for your humble writer to present his talk, using Corel Presentations, the computer froze as I predicted it would. The first law of physics, if something can go wrong it will. So I apologized and restarted the computer, hoping for a smooth second time, but no, it froze again. Embarrassed, I left with Nimel to go make copies

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## Drew Summer Science Institute



Preparing for the DSSI.

**L**ooking for something to do this summer? You are in luck! Dr. David McGee and many other professors have just the thing for you!

It is D.S.S.I., the Drew Summer Science Institute. What exactly is this institute and why is it offered by Drew?

D.S.S.I. was set up as a way for students to gain a feel for the world of research before they graduate from Drew University. In this program, students are paired with a faculty member from Drew University for 6-10 weeks. During this time, they conduct full-time research on a topic which is approved and discussed with the faculty advisor the student has chosen. Not only is the research conducted, but the students also attend weekly meetings with others in the program and they present brief reports on their topics. At the end of the summer, their work is presented in a poster session. The student receives a stipend of \$250 a week and free housing.

Many topics have been covered in this program. Last year a group worked

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# Zone Meeting D.S.S.I.

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of my slides, while we moved on to John Paley's talk on "A New Precise Measurement of the Muon Anomalous Magnetic Moment." Nimel and I made slides and waited. By the time John's talk was finished, after all the delays due to the weather and extremely not cooperative equipment, it was already near lunchtime. We decided to hold off on Nimel's presentation as well as my own, until after lunch.

During lunch everyone sat around, enjoyed the food, and talked about physics. The Drew alums noted the changes at the university since their departure, and reminisced about the good old times, while the members of all the SPS chapters mingled, sharing their experiences of involvement with SPS as well as about their schools in general.

Later the representatives from each chapter were invited to quickly talk

about what their SPS chapter does and share their thoughts on what they would like to accomplish in the future. Although the majority of those present expressed rather optimistic views on the role and activities of their SPS chapters, the students from Wilkes delivered disheartening news of how their physics department was being "phased out."

After lunch everyone had a chance to tour the physics facilities seeing the new laser/optics lab and the observatory.

Finally, our special thanks to alums Larry Barisciano '96, Alice Chu '98, Matt Diamond '98, Steve Gausepohl '92, and Jon Paley '97 who led an animated panel discussion in the afternoon on the topic "Is There Life After the BA/BS in Physics?" Their varied experiences assured us of the many options available to physics majors.

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on the effects of nitric oxide to the pathology of Alzheimer's disease. Another individual worked on the synthesis and characterization of cadmium sulfide based nanobubbles. Another topic researched was reading comprehension in relation to actions and attributes. All of these topics are related to the sciences whether they are biological, chemical, or behavioral. Maybe soon we will see a topic related to physics listed among the others.

Only one year of a science appropriate to the desired research topic is required for the program. Also, the help of a faculty advisor is required. The hours and weeks of work are fairly flexible, and the program is very rewarding. So, what are you going to do this summer?

## A-Lab Constants

Despite the fact that the speed of light was measured by numerous methods and by a myriad of scientific teams, and besides the fact that the gravitational constant  $G$ , or index of refraction of air at STP have been assigned values commonly accepted by all, the students in Advanced Physics Lab have conducted their own experiments, often proving the accepted value to be well, wrong.

After many hours in the physics lab the students found that the light happens to travel a lot faster here at Drew, or in the Hall of Sciences anyway, and that Force of Gravity pulls just a little less on them when in lab (talk about the physical difficulty of being a physics major).

Here are the new values of some fundamental constants re-measured:

<b>Speed of light <math>c</math></b>	<b><math>3.01 \cdot 10^8</math> m/sec</b>	<b>by: Tricia and Dave</b>
<b>Speed of light <math>c</math> (3 weeks later)</b>	<b><math>3.005 \cdot 10^8</math> m/sec</b>	<b>by: Pete, Joe and Natalya</b>
<b>Excitation Energy of Hg</b>	<b>4.984 eV</b>	<b>by: James and Gustav</b>
<b>Index of Refraction of air at STP</b>	<b>1.000292</b>	<b>by: Nimel and Matt</b>
<b><math>e/m</math></b>	<b><math>1.84 \cdot 10^{11}</math> C/kg</b>	<b>by: Justin, Betsy and Frank</b>
<b><math>g</math>-factor of electron</b>	<b>1.97</b>	<b>by: Nimel and Matt</b>
<b>Magnetic Field of the Earth</b>	<b><math>5.22 \cdot 10^{(-5)}</math> T</b>	<b>by: Justin, Betsy and Frank</b>
<b>Gravitational Constant <math>G</math></b>	<b><math>6.45 \cdot 10^{(-11)}</math> N-m<sup>2</sup>/kg<sup>2</sup></b>	<b>by: Pete, Joe and Natalya</b>

# New Science Building In Progress

**The 30 Million Dollar project for the renovation of the Hall of Sciences as well as a new addition to the science building is underway.**

**T**he Hall of Science Renovation and Expansion Program (HaSREP) Committee has been meeting at least bi-weekly throughout this academic year to develop the plans for both a new addition to the Hall of Science and a complete renovation of the current building. Originally the new addition was to be considered Phase I and constructed with monies from the current capital campaign. The renovation would be Phase II and completed later as more funding became available. As planning progressed it became clear that this would bring significant problems for the ongoing operation of all of the science departments and probably cost more in the long run as well. A successful appeal to the Board of Trustees in December resulted in a \$30M go-ahead decision for both parts of the project. There were great cheers in the land and we all breathed a lot easier, for a short time anyway. Everyone, thinking that \$30M was indeed a very large amount of money felt that we could easily accomplish our goals. But we quickly learned that \$30M doesn't go as far it used to in building science buildings, and our earlier planning had produced a product that, when priced out, still was over budget. So our spring meetings have focused on bringing in both parts of the project at the budgeted amount. At the moment we have achieved that result with most of the departments still talking to one another, and most but not all of our goals intact. Groundbreaking is scheduled for the new addition next spring with construction to last from 12-14 months. It will be located in the current parking lot with additional space for parking gained from the demolition of

Davies House. As soon as the addition is finished and occupied, renovation will begin immediately on the current building. The end result will be a seamless facility with similar construction and design throughout.

Physics will occupy the third floor of the new addition, connected to mathematics, computer science, and RISE in the old building. Our floor space will increase by about 40% giving us more laboratory space for expanded undergraduate research efforts and team oriented experimental work. And we will have the good fortune of moving in directly following the completion of the addition. The observatory will be moved to the end of the addition with a pier to the ground for structural stability. A separate warm room for the telescope will be located on the roof for computer control and more comfortable observing.

Biology along with neuroscience (formerly psycho-biology) will occupy the first floor of the new complex, with chemistry, biochemistry and molecular biology on the second floor. A number of small classrooms and seminars rooms will also be scattered among the three floors. The two original lecture halls will remain. The next few months will concentrate on the details of the design for each laboratory. The process is moving quickly now and everyone is excitedly awaiting final plans with drawings showing what it will look like. The architect has even promised computer generated images showing interior spaces for our examination.

Stay tuned...drawings for this grand project will be forthcoming shortly.

Dr. Fenstermacher



## Career Corner

A new feature for the Dilated Times, this section will try to present diverse bits of career information for current students. Alumni are also welcome to contribute information that may be valuable to our students. The American Institute of Physics has just released statistics showing job prospects for bachelor's degrees in physics increasing significantly in recent years. Their numbers show the following salary information:

### Median Starting Salaries: Physics Bachelors Class of 1998

Industry	\$40,000
Civilian Government	\$37,000
High School (teaching)	\$30,000
Active Military	\$30,000
College (technician)	\$27,000

Also on the teaching front, the borough of Madison, NJ is planning to hire a new high school science teacher for fall 2000 at a starting salary of \$50K! While obviously not your typical school district, it's nice to know this kind of offer is out there.

Information on current and future internships is available at the **Career Center**, and can be accessed on the internet:  
<http://www.depts.drew.edu/career/>

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# Senior Plans and Partying Words

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**Becca Fraser:**

In the fall I will be heading off to Cornell University to pursue my PhD in developmental psychology. In general, I will be working in the area of cognitive development, and in particular studying children's eyewitness testimony. I plan to become a professor after earning my PhD and to perform research in the field. It looks like my natural science background may be coming in to play during my graduate career as Dr. Steve Ceci, my future advisor, is beginning to make great use of MRIs in his research. As an interesting note, Dr. Ceci was a physics major as an undergraduate!

I want to thank everyone in the department for supporting me and giving me wonderfully strong roots. Being a physics minor has helped me in all of my courses here at Drew in one way or another, and I am sure having that physics background will continue to serve me

throughout my life. I will never forget that my first publication was in physics, even after I have published hundreds of articles in psychology (a girl can dream...)! And I don't care how wonderful and beautiful Ithaca is, I am sure I will still miss those infamous Taco Parties every time December rolls around!

**James Davidson:**

As the school year comes to an end and graduation rapidly approaches, I begin to question my decisions as to what I'm going to do. Get a job. Was this the best choice? With interview after interview, rejection letter after rejection letter, the question looms over my head. I have decided to take a break before continuing my education; sit back, relax, put my feet up, and join the work force, struggling from month to month to pay the rent. Maybe relaxing will not be a part of it; but it certainly will be a

change from the current routine.

I'm looking for any job except for retail or Burger King (Those will be next month), hopefully in industrial physics or video production.

If anyone out there knows of a position or is looking for a graduating physics major, I can be reached at (973) 408-4208 or by email at [Jdavidso@Drew.edu](mailto:Jdavidso@Drew.edu). I have plenty of résumés ready to be sent!

**Chris Perry:**

After graduation I'll be joining the working world. Unfortunately, I don't know where yet. I'm currently searching for jobs in business, which ideally will be science and/or technology related, making my major a significant advantage. I can't say that the job search is much fun, but I'm making some progress, and hopefully will have good news to report before graduation.

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## Plans for the Summer 2000

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As the students scramble for summer jobs, or dream about doing nothing but hang out on the beach and trying to forget the stress of work and studying, a few physics majors are taking advantage of the internship opportunities this summer. Here is where they are headed:

**Matthew McMahon '01:**

I will be at Vanderbilt University in Nashville, Tennessee, in the summer REU program. I will be working on an ongoing research project there in the field of lasers/thin films/nano-structures or high-energy nuclear physics.

It should be a really good time being in Nashville, too.

**Joe Kinast '01:**

I will be spending my summer internship at Lehigh University's REU program. I will be working with Dr. Yong Kim of Lehigh's physics department to study the factors that appear to govern avalanches. Using thousands of little silicon beads, piles of grain can be constructed that are

then analyzed for stability. Among other things, is hoped that the results of this research will add to our knowledge of 1/f fluctuations.

**Dave Benjamin '01:**

This summer I will be participating in a Research Experience for Undergrads (REU) at Cornell University in Ithaca, NY. I will be one of ten science and engineering students participating in the REU at Cornell's Laboratory of Nuclear Studies (LNS). There will be many other students from other schools also doing research at the LNS, including University of Rochester and the University of Illinois Urbana-Champaign.

My specific project has not yet been assigned, however the areas of research include: Experimental Elementary Particle Physics, Theoretical Elementary Particle Physics, Accelerator Physics, Microwave Superconductivity, Instrumentation for Scientific Research, High Performance Distributed Computing, and Synchrotron Radiation in Scientific Re-

search. I hope to come away with a greater understanding of nuclear and particle physics in general and a better idea of what I would like to do after I graduate.

**Natalya Katsap '02:**

For reasons yet to be discovered I was accepted into an internship program with Lucent Technologies, so I will spend ten weeks of my summer doing research at Bell Labs. Working with Carol McClelland and Lou Lanzerotti, I will be working on projects in the fields of geophysics and interplanetary physics, conducting various experiments, and using the measurements of the magnetic field of the earth collected by satellites. This research, among other things, seeks to discover ways to improve wireless communications by studying the interactions of the magnetic field of the Earth with solar winds.

# How Special Are We?

The ancient Greeks believed the earth to be at the center of the solar system and, indeed, the whole cosmos. Copernicus reasoned that the planets rotate around the sun but he guessed that the orbits are circles. Tycho Brahe and Johannes Kepler straightened him out on that point, and Newton proved mathematically that the orbits are ellipses. Galileo and Bruno suffered religious persecution because they sided with “Copernican modesty.” Einstein’s general theory of relativity showed that there is no special place in the universe; everything is moving away from everything else. So any egocentric ideas we may have are surely suspect.

Along comes the anthropic principle, less pretentiously called “anthropic reasoning” (anthropic=relating to human beings). In 1970 a physicist named Carter (Brandon, not A.H.) wrote a paper, never published, describing the “coincidences” in the values of the fundamental constants and argued that if they were only slightly different, life would not exist, here or anywhere else.

For example, if the gravitational constant were larger or smaller than it is, there would be no stars. Without stars, life would be impossible. (“We are made of stardust,” says Sir Martin Rees, Britain’s Astronomer Royal.) If the nuclear coupling constant were a bit weaker, no nuclei heavier than hydrogen could be formed. And so on. Why is the universe as it is? Some assert, “Because we are here.” Others claim that the question and answer should be reversed.

Over the past three decades anthropic reasoning has assumed various guises. There is the Weak Anthropic Principle (WAP): We are lucky to be here, so our situation in space and time is privileged. The Strong Anthropic Principle (SAP) states that the universe was designed and fine-tuned with the goal of generating and sustaining observers. The Participatory Anthropic Principle (PAP) springs from quantum mechanics: Observers are necessary to bring the universe into existence. And then there is the Final Anthropic Principle (FAP): Intelligent beings must come into being in the universe and they will never die out. (Martin Gardner calls this the “Completely Ridiculous Anthropic Principle.” You can make up your own acronym.)

Most physicists don’t take all this very seriously and note that none of these statements are scientific because they can’t be proven either true or false. There are some cosmologists, however, who like to theorize about the possible existence of multiple universes. They argue that our Big Bang may not have been the only one. Other universes may be out there, governed by different physical laws with different basic constants. Unfortunately, the speculation goes, there is no way to know whether they are real or not. These dreamers like the “multiverse” concept because it is less anthropocentric than the stronger anthropic principles.

As for me, I have enough trouble trying to understand the world I live in, and I’m just thankful that the constants are what they are.

Ashley H. Carter

(Reference: *The Anthropic Cosmological Principle*, by J.D. Barrow and F.J. Tipler, Oxford University Press, 1989)



## Want to Work with the Stars?

The physics department is seeking an **observatory assistant** for the next academic year. On-the-job training for using the computer-controlled telescope – quiet working conditions.

For further details contact Dr. Pat Boeshaar:  
pboeshaa@email.drew.edu

# Sigma Pi Sigma Inductees

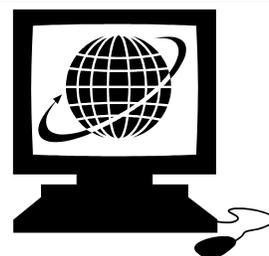
The Society of Physics Students and the physics department will have their annual awards banquet this year on April 26. In addition to the awarding of the traditional departmental prizes, the physics honorary society, Sigma Pi Sigma, will induct into its membership five of our current physics majors:

**David Benjamin**  
**Joseph Kinast**  
**Matthew McMahon**  
**Tricia Missall**  
**Elizabeth Rickter**

The Department extends advanced congratulations to this year’s GAG class.

## Congratulations!

The Dilated Times sends special congratulations this year to **Joe Kinast** and **Becca Fraser** for their induction into the Drew chapter of Phi Beta Kappa.



Check out the  
Physics  
Department  
Web Page at:

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



## Upcoming SPS Events...

**Wednesday**  
**April 26, 5:30 pm**  
**University Commons**  
**Awards Banquet**  
**Sigma Pi Sigma**  
**Induction**

**Sunday**  
**May 7**  
**SPS**  
**Spring Picnic**

# New SPS Officers Elected

On Thursday April 13th, the Drew University Society of Physics Students held elections for the offices of the SPS for next academic year. **Congratulations to the new officers who are:**

**David Benjamin, *President***

**Tricia Missall, *Vice president***

**Justin Hotchkiss, *Activities Chair Person***

**Joe Kinast and Natalya Katsap, *Newsletter Editors***

The new officers are looking forward to expanding the role and the scope of activities of the Drew chapter SPS beyond what has been traditionally done in the past. Their enthusiasm and dedication promises great things for the Society of Physics Students in the future.

The newly elected officers would like to thank Nimel Theodore for his dedication and leadership in his role as the President for the 1999-2000 year. Although he will not need it, we would still like to wish Nimel the best of luck in his pursuit of graduate studies at William and Mary University.

**The Dilated Times**

**Drew University**  
**Department of Physics**  
**Madison NJ**  
**07940**

*Address Correction Requested*



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Chris Perry, Corrie Aukema, Becca Fraser, James Davidson, Matt  
McMahon, Joe Kinast**