Welcome Dr. Minjoon Kouh!

By Michael Jokubaitis (‘10)

The Drew Physics Department is pleased to announce the tenure-track appointment of Dr. Minjoon Kouh as assistant professor of physics. Dr. Kouh has a Ph.D. in physics from the Massachusetts Institute of Technology and comes to Drew following postdoctoral research at the Salk Institute for Biological Studies. Dr. Kouh's hiring is part of an effort to bridge the worlds of physics, neuroscience, and computational science at Drew, and is initially funded by a Howard Hughes Medical Institute (HHMI) grant.

*The Dilated Times* was fortunate to have an opportunity to speak with Dr. Kouh about his research, how he has enjoyed his time in the department so far, and what he envisions for the future of biophysics and computational physics in the Drew physics curriculum.

Continued on Page 2...

Celebrating the Career of Dr. Robert L. Fenstermacher

By Dr. David J. McGee

In a few short months, Bob Fenstermacher will retire from Drew after 42 years of unwavering dedication and service to the physics department and the university. Under his guidance, the department brought the excitement of physics into the very heart of the liberal arts learning experience. Here are just a few of his many accomplishments:

- A vibrant Society of Physics Students Chapter that has won many awards and has its own newsletter!
- The development of the Drew Observatory.
- Founding director of the New Jersey Governor’s School in the Sciences.
- Courses in Astronomy and How Things Work, which are the highest enrolled physics courses.
- Recognition from the American Institute of Physics as a national top-20 department in women physics majors.
- A 75% rate of graduate school admission for physics graduates.

Continued on Page 2...
“Farewell Dr. Fenstermacher,” continued from Page 1...

To honor Dr. F on his retirement, the University is pleased to announce the establishment of the Robert L. Fenstermacher Summer Research Fellowship. When fully endowed at $100,000, the Fellowship will provide annual funding to support summer research by physics students, as part of the Drew Summer Science Institute (DSSI). A small group of less than twenty physics graduates, faculty, and friends of the department has already put forth over $77,000 towards the fellowship. As the new chair of the department, I can’t think of a better way to honor Dr. F than by making a contribution to this worthy effort.

A number of events have been planned to celebrate Dr. F’s retirement, and I am hoping that all physics graduates and friends of the department can participate in some way:

- The spring issue of the Dilated Times will be the Dr. F issue. Please contribute thoughts, anecdotes, funny stories, etc. and we will try to publish as many as possible. All submissions will be compiled and bound as a remembrance for Dr. F. Submit your contributions online by March 15th at http://www.drew.edu/drf
- Save the Date!—May 1, 2010 will be a daylong party in Madison, starting with a technical symposium on campus in which physics alums are invited to present short talks on their post-Drew careers. Following the symposium there will be a party at Dr. F’s house, where you can meet your former classmates, make new connections, and of course, wish Dr. F well on his retirement.

Watch for more details in your mailbox. You should have received a Save-the-Date postcard and magnet (which is hopefully on your fridge right now!), and you will shortly receive a mailing with more details about the Fellowship and the May 1 events. In the meantime, please feel free to contact me if you have any questions or need any information about Dr. F’s retirement celebration. I hope to see you on May 1!

“Welcome Dr. Kouh!” continued from Page 1...

Your work is primarily concerned with neurosystems. Can you describe some aspects of your research?

The fun and exciting aspect about studying the neural systems is that there are a lot of unanswered big questions in the field. There is a lot of information processing going on in the brain, but we do not yet know what the fundamental, underlying computational principles are. While people talk about consciousness a lot and how we recognize objects, we don’t know exactly what these mean or what is taking place in our brains.

What grabbed me was the difference I saw between most physics courses and neuroscience. If you take quantum mechanics, for example, you start by this axiomatic approach: here is this Schrödinger’s Equation and if you can solve it, you can describe what is happening. When I was taking neuroscience courses, the interesting thing was that the professor would say “Here is a big question about the brain function – we don’t know the answer to it.” Then, he or she would say “Here is another big question – and we don’t know the answer to this either.”

There are so many brilliant scientists working in the field of neuroscience, and they are all making fantastic progress. However, the neural system like our brain is a very complex dynamical system that is difficult to analyze. Hence, the field is filled with many challenging and unanswered questions, and that was very exciting to me.

Neuroscience is a vast field. Some people study molecular interactions in the brain. Some people look at the biophysical properties of the neurons. Some people study large-scale oscillations in the brain. Some people study diseases in the brain like epilepsy, Alzheimer’s disease, etc. What I work on are the systems-level neural networks that are composed of millions of interacting neurons all talking to each other. For such a system, the analytical approaches are intractable – it’s a large-scale many-body problem and computational modeling is one viable way of studying such a problem. So, I design a computational model and then use that model to try to gain deeper insights and understanding about the underlying neural mechanisms, and to make sense of the vast sea of experimental data that is out there.

Is there a particular area of the brain or neural system in which you are particularly interested?

While, ultimately, everybody is interested in how the brain works as a whole, it is such a large system that each neuroscientist tends to pick just a few aspects to study at one time. My concentration is in visual systems, particularly the human visual system. Other senses – auditory, olfactory, and tactile – are also very interesting, but I am very drawn to the vision science because we humans are very visual beings and there are many fascinating aspects and phenomena of the visual system that can be studied, such as optical illusions. I study the visual systems of primates – humans and monkeys – and focus on how we recognize objects: faces, for example.
So, are you modeling the visual neural system, treating a visual stimulus as a type of input to that system, and then observing and predicting how the neural system responds to that stimulus?

That’s a very good way of framing the problem. We can treat a visual stimulus, an image on the retina, as an input to a highly complex dynamical system, which is the brain, and treat our perceptions or behaviors as output. From these input-output pairs, we can ask “What is the underlying computations and functions occurring in our brains that can relate the given input to the observed output?” My goal is to understand exactly what those non-linear, dynamical functions are.

Because of the nature of your work, how much interaction do you foresee having with the biology and neuroscience departments?

A lot. I have been talking with many people from the biology department, the neuroscience program, and also the psychology department, because there is an obvious overlap in research topics. I am interested in learning from their expertise and studying different aspects of the neural systems together. In this way I hope to form bridges between these departments and the physics department. I also hope to make even closer ties with the math and computer science departments, because my projects take advantage of various computer algorithms as well as ideas from computer vision and artificial intelligence research. So there are research questions involving all of these disciplines, and I am looking forward to working closely with the professors and students in not just the physics department, but all those fields.

Do you envision your research being purely computational or do you plan to set up experiments with the neuroscience, psychology, and biology departments to test and refine your model?

That is the general direction in which I would like to head. My research projects are mostly model-building, but science without the experimental verification is meaningless. I definitely plan to collaborate with the people in those fields in and outside of Drew to test the hypotheses generated by the model. For example, if the model says X, can we set up a controlled experiment, either at Drew or at another place, to verify or falsify it? And if the model is shown to be false, that’s great! Models are there to be disproven; that is the only way that we can develop better, more precise models, and learn something new. This is one of the exciting parts of my research; when we discover something that is not congruent with our current model that is when we start to gain a deeper and broader understanding about the real system. Experimentation formed a significant portion of my postdoctoral research, and in conjunction with the theoretical and computational approaches, I definitely hope to pursue it further through independent and/or collaborative projects.

What opportunities do you see for students taking part in your research?

There are many interesting research questions and many different types of projects that I would like to work on with students at various levels. An easy way of getting involved in a research project would be to start with one of the existing models that I have developed over the past few years. If students are interested in the primate visual systems model, he or she can study the model of the visual cortex, and start from there. Models are there to be tested, expanded, revised, or disproven all together, so I am always interested in new ideas and suggestions by the students.

Other projects may involve the analysis of experimental data. For example, there is a set of data that relates different natural stimuli to the corresponding neural responses from the visual cortex. By studying these input-output pairs, we may discover the underlying computational principles and functional roles of these neurons and their networks.

These are just two of the possible projects that I foresee for the near future and there will be many more projects to be planned and implemented.

What languages are you using to write your algorithms?

The primary software that I use is MATLAB, because it is an easy platform to make quick prototype models and to tweak them. For some computationally intensive algorithms, I sometimes work with the C programming language.

What was the career path that you took to get to this point?

Some people go through undergraduate, graduate, post doc, and faculty positions in a single sweep, but that was not the case for me. After my undergraduate and master’s degrees in physics, I did consulting in information technology for two years, working with database and web applications. Then I went back to school as a graduate student and got my physics Ph.D., working in the field of computational neuroscience. Right before I did my post doc, I worked in the financial industry. I tried to get some taste of what life was like in industry and academia, and I found that what works for me is a combination of research and teaching. I enjoy the challenges of scientific research. At the same time, sharing what I’ve learned and am still learning with students is also very rewarding and exciting. I’m fortunate in that I have been able to find a career that balances both aspects of my life.
When did you first become interested in studying neural systems?

I did not enjoy my high school biology class. But my college biology class, which I had taken as a requirement, was an eye-opener as I was introduced to some aspects of molecular biology and genetics, which were quite interesting. However I was busy taking my physics courses in college and didn’t pursue biology any further. But when I got to graduate school, I decided to take more biology classes. One of those classes was in neuroscience and I was hooked. I also contacted several professors who were doing research in this field and narrowed down my options until I found my thesis advisor, and it just went from there.

How do you like Drew?

I love it. I love having the opportunities to teach and do research at Drew. I feel grateful and blessed to be surrounded by many incredible and talented people. It is a pleasure to work with the faculty members, staff, and administrators at Drew. Everyone in the physics department has been most supportive and helpful since the day I arrived here. I also enjoy working with the Drew students, whom I find to be very polite and hard-working. I am looking forward to working closely with students on research projects during the summer as part of the Drew Summer Science Institute (DSSI). In the spring semester, I am starting a new interdisciplinary course (PHYS-111 / NEURO-111: Computational Modeling of Neural Systems), which will be a lot of fun for me (and hopefully for the students, too), as its topics are closely related to my research.

Outside of physics and your research, what do you enjoy doing (hobbies, etc.)?

My main hobby is playing the janggu, the hourglass drum used in pungmul – a type of traditional Korean folk music. It’s a fun instrument to play, and which I started playing in college. Outside of work, my family is my main focus. I have a wife and two kids.

How have you enjoyed your experience teaching PHYS 1 this semester?

It’s going very well. A lot of biology students take PHYS 1, especially for the pre-med track, so I have been trying to introduce relevant examples from biology and medical applications. Hopefully that has made things more interesting for the students in the course. For example, take the concept of velocity. In PHYS 11, we are used to talking about the “speed and direction of a car” or a particle, but we can also talk about it as the velocity of the IV fluid being injected into a body. We also could talk about force-equilibrium cases. Rather than the beam suspended by the cable and pivoting against the wall, we can look at the human forearm trying to hold a weight steady, where the forearm is the beam and the muscles and tendons are the cables. For me, rethinking physics concepts under new contexts is quite enjoyable because it gives me a new perspective on the universal applicability of physics.

What do you envision for yourself in the next few years?

For me, I’ve always wanted to be in a place like Drew, where I hope to continue to do my research and at the same time to teach students.

The Dilated Times would like to thank Dr. Kouh for taking the time to talk with us and we wish him all the best in his career here at Drew, which we have every confidence will be a bright and tremendously successful one.

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Send Us Your Stories for the Dr. F Issue!

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Society of Physics Students Activities at Drew
By Aaron Loether (‘11)

Drew’s chapter of the Society of Physics Students (SPS) traditionally holds a weekly lunch as a time to learn a little extra physics, to enjoy the company of fellow physics students and professors, and have something to eat (mmm… pizza). In past years, this lunch has been held on Fridays. This year, due to scheduling conflicts, the lunch has been moved to Thursday from noon to one. Everyone with an interest in physics is invited to come and join us for a pizza lunch and entertainment. The weekly presentations vary; so far we have seen movies on black holes, string theory, and Einstein. In addition, we had an alumna, Karen Mooney (‘04) (who wrote the “Notes from the Outside” article featured in last spring’s Dilated Times), visit from UVa and give a talk about graduate school and her research. The lunches have been arranged by Dr. Murawski (thank you!).

Dr. Murawski is also working on preparing a special trip for the spring semester. The physics department will be traveling to the Brookhaven National Lab. Tentatively, the trip will be in February, but, as of now, the particulars are not finalized. It should be a very exciting day, packed full of cutting edge physics. More information will be available as the next semester approaches. If you are curious, you can contact me (Aaron Loether) or Dr. Murawski with questions.

Summer Research

Raman: It’s a Whole Lot More Than Just Noodles
By Ben Chmielinski (‘10)

I spent eight weeks this past summer as an intern in the Drew Summer Science Institute program. In general, I spent weekdays in and around the physics wing in the Hall of Sciences, helping out Dr. Murawski (my DSSI mentor) and Dr. McGee with whatever was needed, and undertaking various physics projects alongside my fellow physics department interns: Harrison Mills, a prospective physics major from Madison High School; Paul Becker, a senior computer science major and physics minor; Bill Menges, a sophomore physics major; Jonas Folesky, a physics student from the University of Berlin (check out their articles in this issue!).

My first task was to construct an open-cavity HeNe laser. Harrison and I were given a crash course in laser theory, and then set to work aligning our tube with mirrors and the beam of a preexisting laser, in the hopes of making our own tube lase. Early on it seemed that we could do no wrong; Harrison seemed to have the magic touch, getting coherent light out of the tube by simply poking and prodding our output coupler, which was held up by an almost ridiculously slipshod contraption, with his finger. Still, the emitted light was weak. Seeking a stronger beam, I made it my personal mission to gain more and more control over every facet of our would-be laser, in an attempt to optimize every possible variable. While on this quest we searched the lab for any components that could conceivably be slapped, jammed, or glued onto our setup. The output coupler was re-mounted on a sliding track; to the track we added a two-dimensional translator; the translator was then removed and reattached with the addition of a fine angle adjustor, which was later further modified with a rotating platform. The device, designed to minutely adjust the position of an optical element about the size of a peanut, was nearly the size of a human head by the time it was abandoned and disassembled. Early on we had approached, but never quite exceeded, the beam strength that we had achieved by simplistic poking and prodding; but later, some time after Harrison had left and Bill had taken his place, and in spite of all our care and precision, the tube stopped lasing altogether. We eventually concluded that something had gone wrong inside of the tube itself (where we could not fix it).

After the laser, the next challenge was constructing a Michelson interferometer. After the weeks of mostly unfruitful toil that had gone into the laser, it was almost a shock when this project was completed so relatively quickly and painlessly. Around this time we were also given the job of individually labeling the gas tubes used in second-semester Introductory Physics labs and making plots of their spectra. This was good practice for what would prove to be my ultimate goal for the summer: taking data using the department’s newly-assembled Raman spectroscopy lab, and gaining a deeper understanding of the theory behind Raman spectroscopy.

Dr. Murawski oversaw my education in the field of Raman, both by directing my attention to useful texts and practice problems, and by explaining and demonstrating the relevant ideas. Once it was assembled, actual operation of the Raman lab was as simple as placing a sample in the path of a laser beam and pressing a button, but understanding the process well enough to con-

...Continued on Page 6
vey the basic ideas of the theory and the significance of the data to another person required a bit more subtlety. As a member of DSSI, I was required to deliver a presentation about my summer research, so it was important for me to attain that level of understanding. The knowledge I used to deliver a successful presentation would later contribute to the creation of my research poster on Drew’s new Raman capabilities, which I presented at the DSSI poster session, and again at the Fall in the Forest Banquet with the Board of Trustees.

DSSI was a great experience. Of course I learned a lot of physics and got some research experience, but I also got to know better the members of the physics department, both students and professors. In particular, I find the theory behind Raman spectroscopy to be a lot of fun to explain to anyone who’s interested; it’s very simple at first glance, but more careful examination reveals that some rather complicated things are going on at the fundamental level. Telling all my friends at home that I was busy building and firing lasers wasn’t too bad, either.

Learning to be Flexible: The Making of Organic FETs

By Bill Menges (‘12)

From late July through the end of August, I worked under the guidance of Dr. McGee in the Drew photonics laboratory. I began work with Ben Chmielinski, and Harrison Mills, a Madison High School student, on a project to build an open-cavity HeNe laser from scratch. This proved to be much more difficult in practice than it appeared in concept. Although at several points we had it working, the output was never as powerful as it should have been. When we tried to remedy the problem, we discovered an inoperable mirror inside the tube, thus rendering any further attempts to fix the setup useless. Ben and I then moved on to classify several unknown gases using spectral analysis.

Ben and I were soon joined by Jonas Folesky, a German physics major from the Technical University of Berlin. Jonas, Dr. McGee, and I traveled to Baltimore to learn the processes involved in making organic, flexible semiconductors in a non-industrial setting from the Johns Hopkins University Materials Science and Engineering Department. While there, we enjoyed generous accommodations courtesy of Dr. McGee. The first day at Hopkins we became acquainted with Dr. Katz, chair of the Materials Science department, along with the post-doc student Jia Sun and his assistant. Jia Sun and his assistant gave a detailed explanation showing us how to fabricate solution based semiconductors of both the organic and inorganic types. By the end of the second day we had made both types of transistors and successfully tested them. It was really an amazing experience having the opportunity to work in a place with such superb facilities and to see the types of projects on which the researchers there were working. One person in particular was testing out their apparatus to “sniff” out small traces of TNT in the air.

After spending our days in the lab we went to see what Baltimore had to offer in terms of nightlife. With extra time between the end of our project at Johns Hopkins and the weekend, Jonas and I decided to visit Washington D.C. for a day. When we returned to Drew, I completed instruction manuals on how to fabricate these transistors while Jonas went on to do his own research in Dr. McGee’s lab. This was an exceptionally fun learning experience and I would strongly urge anyone to apply for one of these opportunities either at Drew or through the Research Experiences for Undergraduates program funded by the National Science Foundation.

The Drew Photonics Laboratory Goes Global

By Dr. David J. McGee

Summer research in the physics department took on an international dimension with the visit of Jonas Folesky to the Drew photonics research lab. Jonas is an undergraduate physics major from the Technical University of Berlin, and he worked in my lab alongside Paul Becker from August to October, 2009. Jonas’ visit was funded by a new program of the German Academic Exchange Service (DAAD) called the Research Internships in Science and Engineering (RISE). The program matches research labs in the United States with German students, and provides stipend and travel assistance for the students.

Jonas participated in all aspects of our summer research program; he lived in the dorms, attended weekly group meetings, and presented a talk to SPS on the typical undergraduate physics curriculum taken by German students. Although he was here only briefly, Jonas brought a valuable international perspective to the sciences at Drew, and we look forward to continued visits through the DAAD-RISE program.

“Summer Research” section continued on Page 7...
Team Comet: A Summer with the NRAO

By Melissa “Missy” Louie (‘10)

This past summer I had the awesome experience of working as a Research Experience for Undergraduate (REU) Summer Student Intern at the National Radio Astronomy Observatory. I worked under Dr. James Miller-Jones on his research of X-Ray binary systems. My job was to look at the system GRO-J1655 and determine if one of its relativistic jets happened to be hitting some nearby interstellar medium (ISM).

My first task was to do a sweep of the NRAO public data archive for all data on my target and the surrounding region. I was then able to reduce all of the data which was collected over the past 15 years. After that I was able to look at the ISM to try to determine some of its properties in order to figure out what was causing the emission. I had collected data at 1.4 GHz and 5 GHz and was able to look at data that my mentor had in two different optical bands along with other radio data. By the end of the summer, I was able to analyze the nearby ISM and to conclude what was happening near GRO-J1655.

I worked out of the NRAO headquarters in Charlottesville, VA. There were six undergraduate interns working with me in Charlottesville. Two other groups of interns in the same program worked in New Mexico near the site of the Very Large Array (VLA) and in West Virginia near the site of the Green Bank Telescope (GBT). Living in Charlottesville for the summer was a great experience in and of itself. Living right next door to the University of Virginia was awesome. Although we all love Drew, it is nice to see what college outside the land of the small liberal arts university is like, and being able to live in Charlottesville was a great chance to experience this.

In the middle of the summer, all of the Charlottesville interns had the chance to go to Green Bank, West Virginia and complete small observing projects. My fellow intern, Patrick McCauley from James Madison University, and I worked on observing OH emission from two different comets. This was one of the three possible observing projects that were open to us; the other two projects were the study of the recombination of radio lines of various sources and the observation of HI presence in galaxies. Being able to operate the GBT was something that I will remember for a long time to come.

I will be presenting my research at the upcoming 215th AAS meeting in Washington D.C. I am grateful to have had this experience and truly appreciate everything that I have learned from Dr. Miller-Jones and everyone at the NRAO.
Reprogramming the Drew Photonics Laboratory
By Paul Becker (’09)

This past summer, I participated in the Drew Summer Science Institute and had the privilege of being paid to work in the laser lab with Dr. McGee and Jonas Folesky (from the Technical University of Berlin). Being a mathematics and computer science major, this was my first journey into a “real” physics laboratory. Our job was to improve upon and calibrate the existing experimental setup designed to test nonlinear optical materials. I learned the LabVIEW graphical programming language – a drastic but enjoyable diversion from my normal fare of strictly textual programming languages – and learned about GPIB, a standard scientific-device computer-interface protocol. I rewrote the motor control program, which rotates the sample, and which had been experiencing intermittent failure. The data gathering programs also had to be rewritten to account for an additional photomultiplier. These programs read the intensity of light coming through the sample. We added the additional photomultiplier to act as a reference, thereby eliminating laser power drift as a variable. We had to determine the best way to acquire the 50-microsecond pulses coming from the photomultipliers. Our current method is to feed the pulses to gated integrators, and then sample the integrated value with the data-acquisition card (DAQ) that is triggered by the laser pulse. Many of the programs I wrote required learning and experimenting with the vendor-dependent protocols of the boxes involved – i.e., the motor controller or the spectrum analyzer (which is not part of our current experiment, but which is a very cool machine). Jonas used my programs (tweaking them as he went) to take data and to calibrate the setup. He also worked on fitting incredibly sensitive theoretical curves to the data. Unfortunately, just as we were really gearing up, Jonas had to return to Germany. I had a lot of fun, learned an incredible amount during a relatively short period of time, and highly recommend the experience.

Getting Plasma in My Blood: A Summer Internship at PPPL
By Michael Jokubaitis (’10)

This past summer I was fortunate to have the opportunity to experience what it is like to work in the world of “big physics” at a major research institution. I received an internship from the National Undergraduate Fellowship (NUF) in Plasma Physics at the Princeton Plasma Physics Laboratory in Princeton, NJ to work on a computational research project to simulate neutral beam prompt-ion loss in the National Spherical Torus Experiment (NSTX) – the main research tokamak currently in operation at the lab. Working with my mentor, Dr. Douglass Darrow, my goal was to write a program in the Interactive Data Language (IDL) to convolve an existing constants-of-motion code I helped develop, thereby accounting for the prompt-ion’s complete motion and enabling individual prompt-ion orbits to be traced backwards through the volume of the torus (tokamak). However, due to a lack of precision in the conserved quantities when the IDL code was benchmarked against a high-precision FORTRAN program, it became necessary for me to manually port and translate 4500 lines of code in the FORTRAN 66 and 77 standards into IDL to match the FORTRAN’s precision of 1 in $10^{12}$. This process took me over four weeks (and there are still a few bugs) but it was worth it because I was able to combine the FORTRAN and IDL codes into a single new bicubic spline interpolation algorithm with adaptive, interlaced knot-sequencing that satisfied the necessary precision requirements. Unfortunately, my internship ran out before I could test my code further on more cases, but I have been invited back to finish things up this January.

My summer experience, however, was much more than just my project (though there were many all night sessions of cod-
ing on the UNIX server from my dorm). I worked and lived with approximately twenty other students from the NUF program as well as the Student Undergraduate Laboratory Internship (SULI) program of the Department of Energy in one of the dorms on the Princeton University campus. As Melissa points out in her summer article, it’s fun to see what life is like in a “big” university and I certainly got that experience at Princeton. Not only is the campus gorgeous, but it is actually deceptively large. I thought the Drew library was sizable until I literally got lost in the Firestone library looking for a reference text. The funny thing was as I was walking down this hallway that was easily 300 feet long I kept thinking to myself that “This would be a great place to do a time-of-flight measurement of the speed of light – with no need to redirect the beam!”

My summer internship was a fantastic experience and I strongly encourage anyone who is looking for a summer project to apply for either the NUF program or the SULI program at PPPL. You will not regret it. If anyone is interested, please feel free to contact me or the director of the NUF program at PPPL, Mr. James Morgan.

Even though PPPL is a major research lab, the people there are always willing to help and you will certainly get a wonderful experience out of it. I am extremely grateful that I was granted this opportunity and I cannot thank Dr. Darrow and the NSTX team enough for sharing their knowledge and time with me.

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**GOT PRE-OWNED LAB EQUIPMENT/INSTRUMENTATION??**

The department asks that alums remember us and our continuing need for laboratory instrumentation and equipment. If you have a particular item that is no longer useful to you and could find a new home at Drew, we would be very happy to hear from you at any time. While not limited to these, some current needs include:

**General Lab Instrumentation**
- Digital scopes
- Function/pulse generators
- Meters

**Gas handling** – regulators

**Microscopes**

**Optomechanics** (e.g. Newport, Thorlabs, etc)

**Power Supplies**
- High voltage power supplies – 5 to 10 kV (e.g. Bertan)
- Low voltage, general-purpose

**Vacuum pumps** – general purpose roughing pumps and diaphragm/oil free pumps (for use with small vacuum ovens)

**More specific research equipment:**

**Electronics** – Stanford Research SR280 NIM bin, SR250 Integrator, SR645/535 digital delay

**Fiber optic equipment** – fiber cleaver, fiber optic switches

**LASERS** – NdYAG, Argon Ion, Diode-pumped solid state, fiber-coupled, HeNe

**Microscope hot stage**

**Nonlinear crystals** – e.g. BaTiO3, LiNbO3, BBO, etc

**Thin film surface profiler** – e.g. Dektak

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**Send The Physics Department Your Business Cards!**

Let the physics department know what you are up to and where you are working. Send us your business cards and we will display them in the department. Please send your card or cards to Dr. David McGee at the address listed above in the laboratory equipment announcement.
Inside...
Congratulations, Dr. Kouh!; Dr. Fenstermacher’s Retirement;
Drew SPS Activities; Summer Research

Contributors…
Dr. David J. McGee, Michael Jokubaitis, Melissa “Missy” Louie,
Ben Chmielinski, Aaron Loether, Bill Menges, Paul Becker

Don’t forget to visit the physics department website at:
http://depts.drew.edu/phys/

Upcoming Events:

April 17, 2010:
Spring Saturday Admissions Open House. Welcome prospective physics majors by joining
the physics department as we show our stuff with “phun” physics demos and tasty treats
(who doesn’t love liquid-nitrogen-frozen marshmallows?).

May 1st, 2010:
Dr. Fenstermacher’s retirement party. Come celebrate the legacy and work of the man, the
professor, and the friend who made the Drew Physics Department what it is today.

May 15th, 2010:
Commencement. Join us at the physics department table for fond farewells and a cham-
pagne toast following the ceremonies.