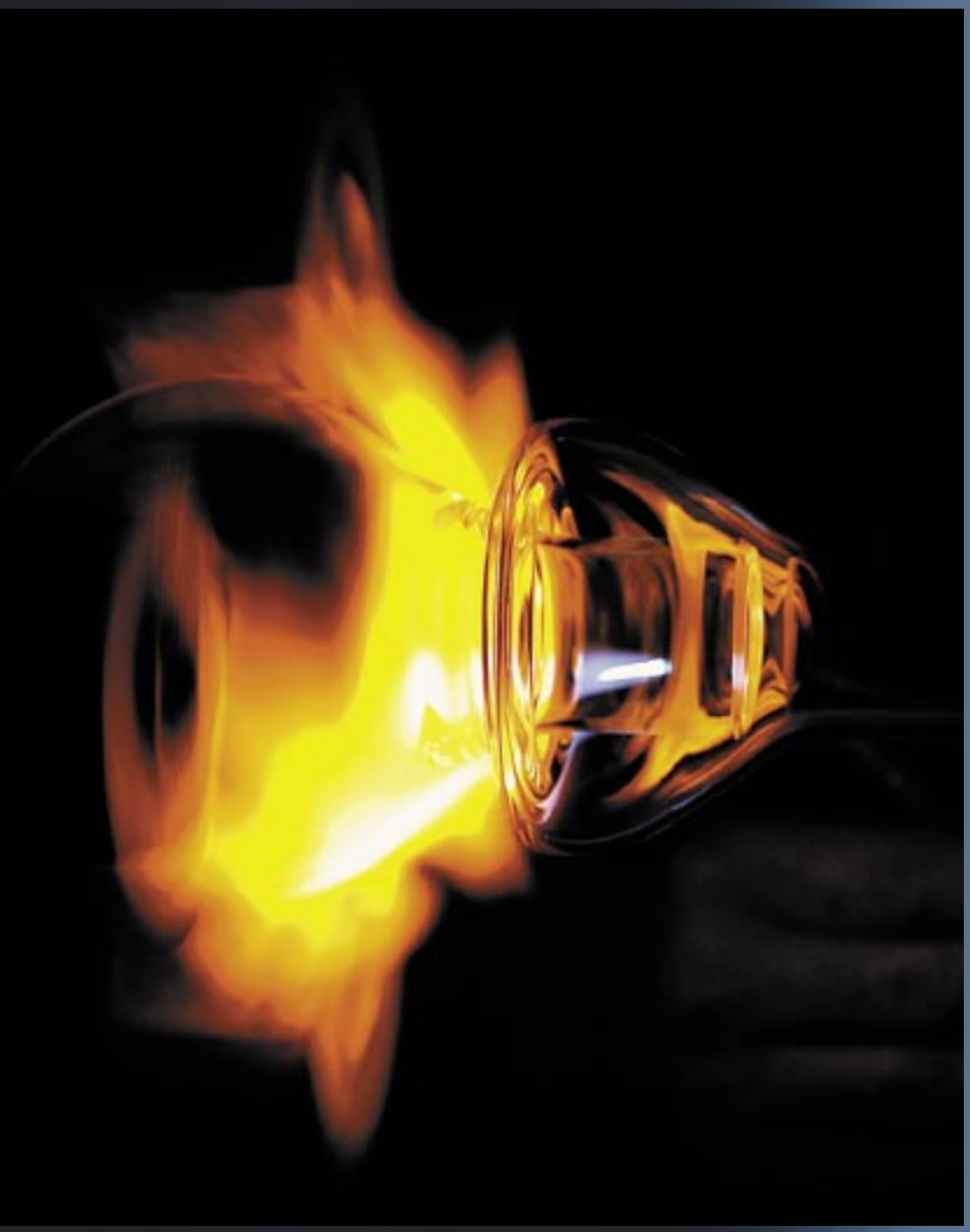
PENNSTATE

PENN STATE DEPARTMENT OF CHEMISTRY

Fall 2008 Newsletter



INSIDE

A LETTER FROM THE DEPARTMENT HEAD

Dear Friends:

This has been a busy year as Department head. Over the summer, four new tenure-track faculty members joined our Department: David Boehr, Gong Chen, Scott Phillips, and Scott Showalter. Gong Chen and Scott Phillips are organic chemists planning to work on problems ranging from drug design to new sensors and materials. Scott Phillips has received the Lou Martarano Career Development Professorship. David Boehr and Scott Showalter will use nuclear magnetic resonance techniques to study proteins and enzymes. You can learn more about their research programs by visiting our web site. The recruitment of the four young faculty members comes on top of eight new faculty members recruited last year.

I am also happy to report several well-deserved promotions. John Badding, Marty Bollinger, and Karl Mueller were promoted to Professor of Chemistry. Mike Green is now an Associate Professor of Chemistry. John Lintner, the NMR Facility's support engineer, has been promoted to Program Coordinator.

Our group of dedicated staff members also saw some changes. Larry Johns is the new Supervisor of Chemistry's Maintenance Shop. In addition to overseeing the shop, Larry is Facilities Manager for all chemistry space and will serve as Safety Coordinator. April Leiter joined the Department as a new Staff Assistant. April will work with the Bioinorganic Group (Booker, Bollinger, Green and Krebs) on the third floor of the Chemistry Building. Barry Auman, a long time member of the Chemistry Maintenance Shop, has retired.

There have been many exciting changes in the undergraduate program. A group of chemistry faculty members has started the Endowment for Enhancement of Undergraduate Chemical Education (EEUCE). This endowment has been structured to "provide for the enhancement of the undergraduate chemical education program in the Department of Chemistry. The fund is to be used to provide enhancements above and beyond those aspects of the undergraduate education program that are funded through normal budgeting."

Our graduate program, one of the core missions of our Department, continues to recruit and train excellent students. Our recruiting efforts brought us 58 new students this fall – one of the largest entering classes ever.

There have been several noteworthy improvements to our research facilities and space. Our NMR facility is on the way to becoming one of the best in the world. We are in the process of acquiring an 850 MHz NMR spectrometer and upgrading the 500 and 600 MHz NMR instruments. Several improvements have been made to the ventilation system of the Chemistry Building. The fume hoods will work in a variable air volume mode rather than the previous constant volume mode. Additionally, heat recovery coils have been installed in the exhaust air stream. These modifications will result in significant energy savings and reduction in carbon emissions.

In 2009, alumni and friends will have a wonderful opportunity to connect with our current students and faculty members. Evan Pugh, a chemist and the first president of the Farmers' High School, arrived in State College in 1859. I invite all friends and alumni to join in celebrating 150 years of chemistry at Penn State. In April 2009 (before the Blue/White weekend), there will be a series of talks, social events and graduate student presentations highlighting the past, present and future of Penn State Chemistry. You will find a preliminary program for the celebration on the back cover of this Newsletter.

Our web site (www.chem.psu.edu) is undergoing a complete restoration and will contain the latest news about the Penn State Chemistry community. As I start my fifth year as Department head, I feel truly fortunate to be here. My one wish is that you share our pleasure and excitement by visiting us next time you are in the area. As the next best thing, please keep in touch through our website.

Sincerely,
Ayusman Sen

A NEW APPROACH TO IRON-CONTAINING ENZYMES

by LISA DOMINAK

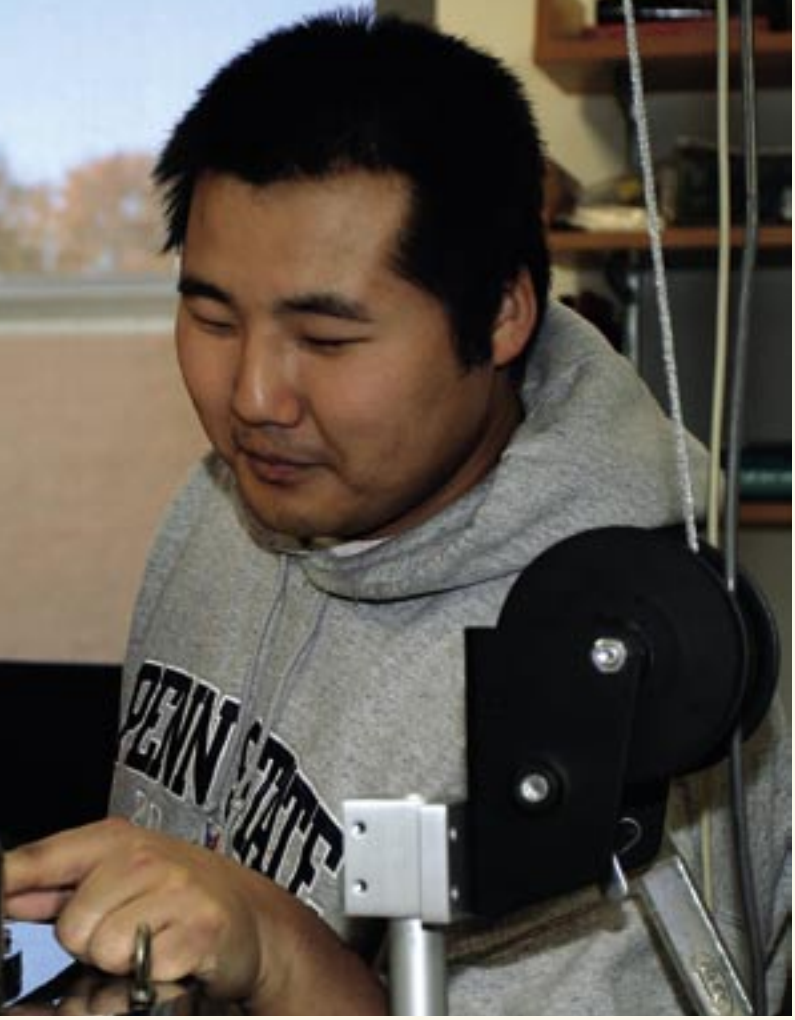
Last fall, Penn State's chemistry department not only gained three new faculty members, it gained a revolutionary way of doing graduate education. The new bioinorganic research cluster – comprised of four faculty members, over twenty graduate students, post-docs, technicians, and countless undergrads - has taken over a third floor wing of the chemistry building with a new way of doing research. Instead of the typical arrangement of a graduate student working with other students, technicians, and post-docs under one principal investigator (PI), this new collaboration, consisting of faculty members Marty Bollinger, Carsten Krebs, Mike Green, and Squire Booker, gives students something more: the ability to work in synergy with four faculty members who are each experts in their own field, along with the opportunity to share experiences, ideas, and instrumentation with a variety of students from different scientific backgrounds on a daily basis. Bollinger, Krebs, and Booker, formerly adjunct members of the Chemistry Department with full appointments in Biochemistry and Molecular Biology (BMB), moved their primary appointments to the Chemistry Department where they joined colleague Mike Green. "We wanted to have an environment where students train each other and talk about their research with each other, and we want the students to feel like their research is so cool, [that] they're obsessed with it!" says Bollinger. "Really, the main goal of this cluster is to make the students better than we [the faculty members] are. We are giving our students the opportunity to succeed at the highest level, so they can go out and win awards and then go on to get jobs with power and influence." Krebs added that it was a "great opportunity to move together on the same floor. Our students run into each other every day and talk about their research. It is clear that this has been a tremendous improvement, and I am sure that it will become more evident in the future."

So how do the students feel about the new arrangement? "It's great!" said Megan Matthews, a fourth year student in the Bollinger/Krebs group. "Being on the same floor allows us to fully benefit from a very unique opportunity. This arrangement provides a really diverse training because we can so easily collaborate. Being together, we can get feedback from each other and learn new and different ways of doing things on a daily basis. The professors are all open-minded, energetic, and they

"We wanted to have an environment where students train each other and talk about their research with each other, and we want the students to feel like their research is so cool, [that] they're obsessed with it!"

are excited about the science. Regardless of what group you're in, they are all very willing to help you." Courtney Krest, a third year student in Green's group added, "It's great to be able to run back and forth down the hall with questions. The thing I like best about this arrangement is that if I have a question about something I don't know, I can bounce ideas off of other people… it's really nice to be able to walk down the hall and get an expert opinion on something."

Inevitably, in every lab, a little rain must fall. When asked about the challenges of working so closely with three other colleagues, Bollinger stated, "…The hardest part is that … you want to let graduate students take their research wherever it leads, sometimes it takes them away from you [to another adviser]!



It's hard to lose good graduate students, but in the end it's better for them and their careers. That's really what's important." When asked about the downfalls of being a graduate student in the cluster, Megan Matthews added "I actually think I'll learn more being part of a big group. It's helped me to learn how to manage my time, work with others, and troubleshoot problems. Because there are so many students, you need to learn to be more proactive with your research and speak up if you need help. And, so far, it's much more fun!" When asked if there are any concerns about who gets credit for all of this work, Krebs noted that "there have been concerns …about how such a close collaborative program may be perceived at promotion/tenure times. I think as long as this joint group is as successful as it has been in the past, there is nothing to be concerned about."

And successful they have been! The group has been published many times in top-ranked journals ranging from the *Journal of the American Chemical Society (JACS)* to the *Proceedings of the National Academy of Science USA (PNAS)* and *Science*, and they and their students have been the recipients of numerous awards. Some of the more notable awards include the Presidential Early Career Award for Scientists and Engineers won by Booker, Green's award of a Sloan Fellowship, Bollinger's Society for Biological Inorganic Chemistry Early Career Award, and the prestigious 2008 Pfizer Award in Enzyme Chemistry awarded to Krebs. Of Krebs's award, Bollinger said, "this award was very unexpected, because almost all previous winners have been enzymologists, and [Carsten] is more of a physical inorganic chemist/chemical physicist than an enzymologist. He's never purified an enzyme or measured an enzyme turnover number or Michaelis constant in his life! So, it's really unexpected that he still won this very prestigious award outside of his area of training. The reason he won is because he's such a gifted person, and people realize the uniqueness of his accomplishments." Bollinger attributes much of the success and recognition of the bioinorganic research cluster to synergy, saying, "we can do a lot better together than we can do separately."

So, just what is the research that all of these awards and publications are about? In a nutshell: enzymes. "We study the mechanisms of iron-containing enzymes," says Krebs. "We are interested in unraveling the mechanistic diversity of enzymes that activate oxygen at a reduced iron-containing active site." Booker added, "Nature has crafted a number of beautiful cofactors - most of which contain iron - that facilitate oxidation reactions, and the Bollinger, Krebs, and Green groups have taught the bioinorganic community how to manipulate reactions such that the key intermediates can be observed and characterized. By contrast, my laboratory is interested in understanding how nature carries out these difficult functionalizations in the absence of oxygen." An interesting new development found in these labs was recently published in Science. Bollinger explained that ribonuncleotide reductase, an enzyme necessary for all organisms to synthesize DNA, has two irons in the active site in most organisms. However, they found that in the bacterium *Chlamydia trachomatis*, this enzyme's active site has a manganese and an iron, rather than the normal two irons. "This finding opens up new applications for spectroscopy, so we are happy to have an expert in Mike Green right here to do it!" says Bollinger.

So what does this research mean to society? Krebs responded, "In the long run, a more thorough understanding of the reaction mechanisms of metalloenzyme-catalyzed reactions may help in the rational design of drugs, since many of these metalloenzymes play key roles in human health, and their dysfunction has been implicated in numerous diseases. Our research may also aid

Photo credit April Leiter

Carsten Krebs, Squire Booker, Mike Green and Marty Bollinger (left to right)

"Being on the same floor … provides a really diverse training because we can so easily collaborate. Being together, we can get feedback from each other and learn new and different ways of doing things on a daily basis."

in the design of more environmentally friendly catalysts that utilize dioxygen as an oxidant." Bollinger added, "Energy is all inorganic chemistry. Biological organisms are better inorganic chemists than we [scientists] are, so we learn our inorganic chemistry from biology. Because bioinorganic chemistry is the basis for energy, we might have something to do with fixing the energy crisis in the future. It is possible that we could make biomimetic, bioinspired energy-creating devices that can produce renewable energy. We're not in the energy field right now, but we could head there in the future."

So how does this research work on a day-to-day basis? "Our work is multidisciplinary, and the unique aspect of our set-up here on the third floor is that we have the instrumentation and expertise to carry out almost all experiments necessary to dissect the catalytic mechanism of metalloenzymes, especially those containing iron," said Booker. He also noted that being on the same floor helps to expedite experiments. "The train on the third floor moves quite fast; it only takes about a week to express, purify, and spectroscopically characterize an iron-sulfur enzyme." Bollinger said "It is important to realize that although the four faculty members write grants with each other, we are not really just focused on one project; there are many interesting projects going on among us." Green added, "Although we do work together and are always around to talk to students, not all of our projects are collaborative. We do have certain projects that we work on just amongst our own group."

When asked if there was anything else they'd like to add about the inorganic research cluster at Penn State, Krebs mentioned that "beyond this "group of four [faculty]", there are many great colleagues at Penn State with scientific overlap. For example, we have a collaboration and joint grant with [Chemistry faculty member] Sharon Hammes-Schiffer to study the enzyme isopenicillin N synthase. This is just one of several potential collaborations with other colleagues here at Penn State." Booker mentioned that "Our situation is recognized throughout the scientific community, and some of the best enzymologists in the country send students and postdocs to our labs to collect data on their systems…Almost every meeting I attend, at least one person remarks to me that Penn State is a powerhouse in enzymology." Bollinger added, "I believe that this cluster will help Penn State Chemistry improve in the rankings and give people an even better perception of this already tremendous department."

RUSS ROGERS

THE ARTIST IN RESIDENCE

by ERIN GOKEN

For fans of Van Gogh, a print of Starry Night is an economical way to own art. But for an art connoisseur, nothing compares to a Van Gogh original. In the same way, a chemist looking for specialized glassware wants an original piece, designed for their specific purposes. Though mass-produced test tubes and beakers costing only a few cents are miraculous for budget-crunched scientists, it is also vital for research departments to have the knowledge and experience of a glassblower who can produce unique glassware.

Russ Rogers has been repairing, designing and creating glassware for the Penn State Chemistry Department for over seventeen years. He attended Salem Community College in Carneys Point, New Jersey, and earned his certificate in glassblowing twenty-five years ago. His first industrial position, working for Monsanto with four experienced glassworkers, helped him gain experience and skill in what used to be an apprentice-based field. Russ admits that most glassblowing skills are learned on the job as self-taught techniques; fittingly, experience is a valuable tool.

Though Russ's standard work is repair of laboratory glassware, his passion is creating new masterpieces. His hands-on, problem-solving approach to designing glassware keeps his job interesting. He gets excited about working on something challenging, focusing his attention to get it just right. He skillfully repaired an eighteen inch diameter condenser though his equipment is designed for a much smaller scale. He is very much the artist when he says, "The best part of my job is watching a beautiful piece of glass go out the door."

Doing work for five departments also ensures new challenges. Russ has made pieces for the chemical engineering, physics, biology and food science programs in addition to his chemistry work. Russ takes time to know exactly what his customers want. He consults with them, determining their needs and suggesting improvements upon existing designs. Recently he was granted approval to contract outside work; he has a small but growing clientele who send him projects.

Since they rarely require high turnover of custom glass, industrial labs are not hiring glassblowers. Academic labs, however, are often developing new methods which require unique glassware. Because of this, potential new professors see the presence of a glassblower on staff as one deciding factor in choosing which positions to pursue, both because of the production turn-around time and also the cost of specialty glassware.

"The best part of my job is watching a beautiful piece of glass go out the door."

Faculty member Scott Phillips, a recent addition to the Penn State Chemistry Department, admits that he noticed when departments didn't have a glassblower—comparing access to an expert glassblower to having excellent NMR and mass spectrometry facilities when assessing a position. Because his research requires glassware that is not commercially produced, Phillips has worked closely with Russ to design lab glassware. Phillips had this to say about Russ: "Russ does wonderful work. The glassware he prepares looks like items you'd buy from a vendor (in terms of uniform shape, lack of blemishes, standard sizes, etc.), but seems indestructible (as far as glass can be) because he uses heavy-walled glass."

Glassblowers bring a taste of art into chemistry labs. Chemists are just as fascinated by an extremely well-built manifold as artists are by the Mona Lisa. And just like any artist, Russ Rogers cares about each piece of glassware that moves through his workshop, whether it is a repaired vacuum flask or a specially designed fluid trap. Make sure to stop by the basement of Whitmore to see this artist at work.

PLEASE ALLOW US TO INTRODUCE… THE FUTURE FACES OF CHEMISTRY

by SHIKCHYA TANDUKAR / YIYING (EVE) HONG (Photos)

They all came to Penn State because of the prominent research program. They have traveled miles and they have crossed oceans to be here. For some, it's just a beginning of the blue and white while others are ready for their adieu. They love to hang out in Café 210 West. They are serious about their work. They are the faces of future chemistry.

Daniel Blumling
Hometown: Virginia Beach, VA
Years in chemistry at PSU: 6

You start a day with: Taking my puppies out. **Website you visit often:** Web of science. **What's your passion?** Balance in life. **One thing you want to see happen:** Resurgence in purchasing items that are made in America. **You just can not stand:** Sesquipedalianism. **Last book you read:** *Extreme Nonlinear Optics* by M. Wegener (for work) and *Good Owners, Great Dogs* by Brian Kilcommons. **Item you can not part with:** USB drive that has my thesis and experimental data. **Favorite hangout:** Allen Street Grille/Café 210. **In your free time, you like to:** Watch sports, read, tailgate, and cook. **How will the 2008 PSU football season end?** 10-2 with losses to Ohio State and Wisconsin. Hopefully, the Fiesta Bowl. **Why Penn State?** I came here for the opportunity to work with the world class researchers Penn State offers. **What's next?** I will be a post-doc at Florida State University.

Emil A. Hernandez
Hometown: Camuy, Puerto Rico
Years in chemistry at PSU: 3

You start a day with: A jelly sandwich. **You like to listen to:** Anything other than country and heavy metal. **When you are free, you like to:** Play or watch sports, salsa dancing, watch movies, and read. **You like to think yourself as:** An easy going person. **One thing you would like to see happen:** Puerto Rico solves the status issue or the Cubs win the world championship. **Website you visit often:** www.endi.com. **Last book you read:** *Veronika Decide Morir* by Paulo Coelho. **Favorite hangout:** Café 210. **How will the 2008 PSU football season end?** 11-1. **Why Penn State?** I wanted to work for Tom Mallouk, and if that had not happened, there were other faculty members doing great research, which I would have enjoyed. **What's next?** Finish my PhD in 2-3 years and move to somewhere 'warm' for a postdoc.

Melissa Mullen
Hometown: Green Township, NJ
Years in chemistry at PSU: 3

You start a day with: A strong cup of coffee. **Website you often visit:** phdcomics, www.people.com. **You like to think yourself as:** Optimistic and outgoing. **You like to listen to:** Eclectic mix of alternative, rock, pop and European dance tunes. **What's your passion?** Traveling. **One thing that you want to see happen:** Publish a paper in *Science* or *Nature* at some point in my career and I'd love to win my fantasy football league this year. **In your free time, you like to:** Go for a run, hang out with friends, play piano or hike. **Last book you read:** *Cloud Atlas* by David Mitchell. **How will the 2008 PSU football season end?** Hopefully as a Big Ten Champs playing in a bowl game! **Why Penn State?** When I came to visit, I was impressed with the large variety of research, unique collaborations, and the positive outlook of grad students. **What's next?** Post-doc then teaching at a small university or a liberal arts college.

Christin Palombo Morrow
Hometown: Linwood, NJ
Years in chemistry at PSU: 4

You like to think yourself as: Outgoing, enthusiastic, and hard working. **You start a day with:** E-mails first thing in the morning then catching up on calculations that finished overnight. **Website you visit often:** Gmail to stay in touch with family and msnbc.com for world news. **One thing you would like to see happen:** I would like to see the economy improve dramatically. **I just can not stand:** How depleted our local food banks are! **Last book you read:** *The Broker* by John Gisham. **Item you can not part with:** My first pair of pointe shoes. **You like to listen to:** Rock n' roll, non-mainstream ethnic or rock. **Favorite hangout:** The Deli. **How will the 2008 PSU football season end?** With an improved sense of team morale and a championship of some kind. **Why Penn State?** I chose Penn State for the prestigious chemistry department, the varied student life, and of course, football. **What's next?** I am hoping to work with science policy organizations like Congress or the Union of Concerned Scientists or work in science publishing with a major journal in one of the East Coast cities.

Samudra Sengupta
Hometown: Kolkata, India
Years in chemistry at PSU: 1

Website you visit often: Espnstar and cricinfo. **You like to listen to:** Indian melody. **Item you can not part with:** My iPhone. **One thing you want to see happen:** 'Black hole' created at the Hadron collider. **You just can not stand:** Experiments not working. **Last book you read:** *The Last Lecture* by Randy Pausch. **What's your passion?** Soccer. **You like to think yourself as:** A fun loving person, yet very serious about my work. **Favorite hangout in State College:** Bowling alley. **How will the 2008 PSU football season end?** 10-2 **Why Penn State?** Primarily because of the eminent chemistry faculty. **What's next?** Maybe a post-doc, and then industry.

A FEW MOMENTS WITH TOM MALLOUK

by ERIN GOKEN

Penn State chemistry professor Tom Mallouk plans to install solar panels on his house. This is not the cheapest form of energy, nor will it have an immediate environmental effect. It will not promptly end America's oil dependence. However it does show Mallouk's belief in solar power as a viable energy source. Mallouk's research laboratory has several projects focused on improving solar panel technology to replace rapidly disappearing fossil fuels. He believes strongly in the development of solar power as a means to help the planet, reduce dependence on oil and make energy cheaper in the future.

Solar power is a sustainable and renewable energy source. This means we will not run out of solar power—unlike oil, biomass, or nuclear fuel sources. Solar power is produced when sunlight hits a photoactive material like silicon. The silicon absorbs part of that energy, exciting electrons in the silicon and producing an electrical current similar to that in a battery.

When asked about the feasibility of solar power, Mallouk said, "Solar power can cost around $3.50 per Watt, while most other forms of energy average $0.50 per Watt." Regardless of the environmental benefits solar power would have, solar energy must compete with other fuels in terms of cost to work on a global scale. To improve the chances of providing solar energy on this level, the industry needs to either produce cheaper materials or increase the current efficiency. "Basically, the goal is to double solar panel efficiency at roughly half the cost," Mallouk says. The technology needed to make solar power cost competitive is estimated within the scientific community to become available in five to thirty years.

The advances in technology necessary to utilize solar power on a broad scale are being made in laboratories worldwide. Here at Penn State, Mallouk is one of many contributing to solar technology. His research group is working on several projects aimed at improving the efficiency of materials in solar cells, one step toward making solar energy cheaper.

The innovations in solar technology being made in such laboratories as Tom Mallouk's have the promise of moving us closer to the goal of a global solar-based energy system.

One particular project in his lab uses new nanomaterials to make solar cells more efficient and cost-effective. Silicon, for example, can absorb most of the energy contained in sunlight, but only uses the infrared part of the spectrum efficiently. Other photoactive materials, including germanium and organic dyes, are able to absorb different portions of the energy in sunlight. Mallouk and his students are working with Joan Redwing (Materials Science and Engineering), Theresa Mayer (Electrical Engineering), and Greg Barber (Materials Research Institute) to make use of these other photoactive materials by making solar cells that couple silicon with different materials. Single cell silicon nanowires are grown on surfaces at a fraction of the cost of large single crystals used in conventional cells. When the silicon wires are surrounded by germanium, the two crystal structures line up perfectly on this very small scale, unlike on the bulk scale. The aligned crystal structures mean more effective mixing of the silicon and germanium in solar panels. The benefit of combining silicon with other photoactive materials is increased absorption of sunlight, meaning more is converted into energy that is collected and consumed.

Declining oil supplies, nuclear power safety fears, wind limitations, and low land availability for biomass production all indicate that solar is the best sustainable energy option. The innovations in solar technology being made in such laboratories as Tom Mallouk's have the promise of moving us closer to the goal of a global solar-based energy system.

AWARDS

Faculty

Marty Bollinger
Early Career Award from the Society of Biological Inorganic Chemistry

Sharon Hammes-Schiffer
ACS Akron Section Award

Tae-Hee Lee
Searle Scholar

Tom Mallouk
ACS Award in Chemistry of Materials
Excellence in Honors Teaching, Schreyer Honors College

Courtesy of ACS

Tom Mallouk (center)

Katie Masters
Priestley Prize for Outstanding Undergraduate Teaching in Chemistry

Scott Phillips
Camille and Henry Dreyfus New Faculty Award
Martarano Career Development Professorship

Katie Masters (right)

Steve Weinreb
George Buchi Memorial Lecturer at Oregon State University

Paul Weiss
Elected Fellow, American Vacuum Society-Science and Technology of Materials, Interfaces and Processing
J. Clarence Karcher Lecturer at the University of Oklahoma chemistry department

Staff

Connie Boob
George Gilbert Pond Award for Staff Excellence in Support of Undergraduate Education

Rod Kreuter
Eberly College of Science Research Technical Support Award

Connie Boob (center)

Students

Farah Dawood
ACS Division of Inorganic Chemistry, travel award

Laurie Heinicke
Award for best poster at the Rustbelt RNA meeting

Nate Homan and **Ajeet Kumar**
Award for best poster in the Surface and Colloid Division at the national meeting of the American Chemical Society in Philadelphia, PA

Amanda Moore
American Vacuum Society Dorothy M. and Earl S. Hoffman Travel Award

Jennifer Morehead
L. Peter Gold Award for undergraduate leadership and scholarship

T J Mullen
Schering-Plough Science and Innovation Award for Excellence in Analytical Chemistry
Dorothy M. and Earl S. Hoffman Award

Omkar Parajuli
The Rusrum and Della Roy Innovation in Materials Research Award

Kristi Potts
Barry M. Goldwater Scholarship

Hector Saavedra
American Vacuum Society Dorothy M. and Earl S. Hoffman Travel Award

The first annual Graduate Student Service and Leadership Award was presented to (l to r) TJ Mullen, Nate Siegfried, Andrew Latham, Becky Toroney and Josh Sokoloski.

UNDERGRADUATE PROGRAM

by MIKE IBELE

It has been another eventful year for Chemistry's undergraduate instructional program. Faculty members and graduate students traveled to Philadelphia, New Orleans and Bloomington (IN) to deliver talks on their work to develop new instructional methodologies. The undergraduate program welcomed a new instructor and purchased numerous state of the art instruments for the student physical chemistry laboratories. Also, Penn State was chosen to host a major chemistry education conference.

It's official! In 2012, Penn State will host the 22nd Biennial Conference on Chemical Education (BCCE). This conference series, sponsored by the American Chemical Society's Division of Chemical Education, is home to the largest gathering of chemical educators in the world. Chemistry instructors of every level, from middle school science teachers to university professors, will converge on Penn State's University Park campus to attend the series of workshops, talks, presentations and exhibits focusing on new and exciting ways to teach the subject of chemistry.

It's no surprise that Penn State has been granted the honor of hosting the BCCE in 2012. For over seventeen years, a close-knit group of chemistry instructors at the University Park campus has been holding weekly meetings to hone their strategies and techniques for engaging students in learning. Last year these weekly meetings were expanded to include an annual meeting of chemistry instructors from throughout the Penn State system. The second of these annual statewide meetings was held in May 2008 and included 30 educators from seventeen campuses. During the meeting the University Park faculty members donated a number of instruments to the sister campuses including UV-vis spectrometers, gas chromatographs, and fluorometers.

One new face in the weekly meetings is Penn State alumna, Sheryl Rummel. Rummel recently received her doctorate under the supervision of Blake Peterson, who has since moved to a faculty position at the University of Kansas. Rummel's Ph D research was in the field of bioorganic chemistry and focused on the intracellular delivery of drugs (vancomycin) and proteins (VEGF) for potential medical applications. Although she admits that "it was bit of a stressful time" when Peterson announced his intention to leave just as she was finishing up her doctorate, "it was really just a blessing in disguise because I got to TA classes again, and that's when I learned that Penn State was hiring a new lab instructor." Rummel has been hired to be the new Director of Instrumentation and will be developing and implementing new interdisciplinary laboratories. These new instructional opportunities will incorporate HPLC and ATR-IR spectroscopy into the curriculum.

Rummel takes over the Director of Instrumentation duties from Jackie Bortiatynski, who will teach several sophomore-level organic chemistry laboratories and a freshman seminar.

"What's wonderful about these new instruments is that students can learn how to use and analyze data from the very same instruments they will be using in industry..."

Sheryl Rummel is Chemistry's new Director of Instrumentation.

Graduating Chemistry majors at the May 2008 reception.

In addition to this teaching change, Katie Masters, former Director Organic Instructional Laboratories is now teaching two lecture courses as well as two organic lab courses that she has supervised throughout her employment at Penn State.

In their continuing quest to provide access to cutting-edge information and facilities for the students, the undergraduate program ordered new state of the art instruments for the physical chemistry and analytical labs this year. Students now have access to a Q200 TA differential scanning calorimeter, a laser photolysis setup, a Cary 4000 UV-Vis spectrophotometer, a Horiba Fluorolog spectrofluorimeter, and a brand new 400Hz NMR. As Bratoljub Milosavljevic who runs the physical chemistry laboratories explains, "What's wonderful about these new instruments is that students can learn how to use and analyze data from the very same instruments they will be using in industry when they graduate." In addition to the innovative labs that Milosavljevic has developed—which include the mechanism of thermal denaturation of proteins in egg white, measurement of the degree of crystallinity in polypropylene, and the low pressure measurement of the second virial coefficient of CO_2 just to name a few—students are also required to develop an experiment of their very own. And Milosavljevic adds, "Many of these experiments will be submitted for publication in journals such as the *Journal of Chemical Education*."

The introductory chemistry course Chem 108 is another example of how the undergraduate program has been adjusted this year to better serve the students. Instructor Lori Stepan Van Der Sluys and Lecturer Mary Jo Bojan have been working in conjunction with Peggy Van Meter from the Department of Educational Psychology and graduate students Kelly Adams, Keith Krise, Christin Palumbo, Monica L. Wright and Tim Murphy to develop self-contained chemistry modules. These modules are targeted to the subjects that general chemistry students typically have the most difficulty learning: intermolecular forces, the Bohr model of the hydrogen atom, concentration, phase changes, and kinetic molecular theory. These modules were piloted in Chem 108 and the data collected from the students were presented at this past year's BCCE conference at Indiana University as well as the 235th National ACS Meeting in New Orleans.

Six undergraduate contestants participated in the Chemistry Department's third annual American Wizard Competition. This year's winner was Jessica Ahlum with her potassium iodide/ starch reaction demonstration. The judging panel included representatives from the Nittany Chemical Society, Science Lions, Alpha Chi Sigma, as well as the Chemical Education colloquium speaker, Judith Herzfeld, from Brandeis University. Herzfeld's talk earlier in the day was entitled "The Agendas of General Chemistry" and discussed how general chemistry could be taught by following how matter has changed throughout the history of the universe. After the colloquium, Professor Emeritus Roy Olofson was given the John Lowe Excellence in Service and Teaching Award in recognition of his outstanding contributions to chemical education over the past 43 years.

All said and done, Penn State's undergraduate chemistry program has had another busy academic year. Twenty-two chemistry majors received Teas Summer Research Scholarships. A total of 39 students (ten female and 29 male) graduated during the 2007-2008 academic year, five of them with honors from the Schreyer Honors College. At press time ten students had reported that they were going into industry, six were headed to graduate school, two opted for positions at national labs, one was going to medical school, one to dental school, and one to law school.

DOCTORAL DISSERTATIONS AND MASTER'S THESES

Aggarwal, Pooja
"Studies Directed towards Total Synthesis of Securine A and Securamine A" Ph D
(Supervised by Steven M. Weinreb)

Aungst, Ronald A.
"Stereoselective Synthesis of (Z)-2-ACYL-2-ENALS via Retrocycloadditions of 5-ACYL-4-AKYL-4H-1,3-Dioxins: Applications in Natural Product Synthesis" Ph D
(Supervised by Raymond L. Funk)

Behan, Rachel Koren
"Spectroscopic Characterization of High-Valent Intermediates in Cytochrome P450s and Other Heme Enzymes" Ph D
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Camp, Jason Eliot
"Chapter One: Studies Directed towards a Total Synthesis of the Chartellamides; Chapter Two: Studies Directed towards a Total Synthesis of the Chartellines" Ph D
(Supervised by Steven M. Weinreb)

Coca, Adiel
"Chemistry and Biology of Some Tannin Analogues and Studies toward the Synthesis of Lihouidine" Ph D
(Supervised by Ken Feldman)

Conner, Denise Anne
"Phosphazene Chemistry: Polymer Electrolytes, Advanced Drug Delivery Materials, and Mechanistic Investigations" M S
(Supervised by Harry R. Allcock)

Davis, Ronald Barton
"Structural Characterization of Peptide Fragments Derived from the Sequence of Cytochrome b5" Ph D
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DeGrazia, Michael James
"Design, Synthesis, and Evaluation of Fluorescent Small Molecule Probes of Biological Systems" Ph D
(Supervised by Blake R. Peterson)

Dillenback, Lisa Marie
"Self-Assembly and Controlled Assembly of Nanoparticles" Ph D
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"Studies of the "Intrinsic" Fluorescence of Room Temperature Ionic Liquids" M S
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Eves, Daniel Jacob
"Investigation of Phopholipid Membrane Properties using an Artificial Cell Model for Exocytosis and Membrane Disruption" Ph D (Supervised by Andrew G. Ewing)

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"Studies of Cluster-Assembled Materials: From Gas Phase to Condensed Phase" Ph D
(Supervised by A. Welford Castleman, Jr.)

Heetderks, Julia Jeanne
"Lipid Bilayer Membrane Organization" Ph D
(Supervised by Paul S. Weiss)

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"The Significance of Morphology in Organic Photovoltaic Thin Films" M S
(Supervised by John B. Asbury)

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"Studies Directed towards a Total Synthesis of the Marine Alkaloid Hauoamine A" Ph D
(Supervised by Steven M. Weinreb)

Kobayashi, Yoji
"Functional Materials from Layered Oxides" Ph D
(Supervised by Thomas E. Mallouk)

Korboukh, Ilia
"Construction of Bridged and Fused Ring Systems via Intramolecular Michael Reactions of Vinylnitroso Compounds" M S
(Supervised by Steven M. Weinreb)

Kozole, Joseph John
"New Developments for Cluster Ion Beams in Secondary Ion Mass spectrometry Imaging Experiments" Ph D
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Kyoung, Minjoung
"Molecular Dynamics of Biomembranes as Probed by Multifaceted Biophotonics" Ph D
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"Magnetic Nanoparticles: Synthesis, Characterization and Applications" Ph D
(Supervised by Mary Elizabeth Williams)

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"Morphology Study of Organic Photovoltaic Materials and Electroactive Polymers" M S
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"Rational Design of Directed Energy Transfer Systems in Inorganic Metallopeptides" M S
(Supervised by Mary Elizabeth Williams)

Mottram, Laurie Frances
"Design, Synthesis and Biological Evaluation of Cell-Permeable Small Molecule Probes" Ph D
(Supervised by Blake R. Peterson)

Ngernmeesri, Paiboon
"Studies Directed toward the Total Synthesis of Dragmacidin E" Ph D
(Supervised by Ken Feldman)

Ohr, Kristi Lynn
"The Design, Synthesis and Redox Properties of Metallated Artificial Oligopeptides" Ph D
(Supervised by Mary Elizabeth Williams)

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"TOF-SIMS Imaging of Single-Cells in a Trehalose Matrix" Ph D
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Sambhy, Varun
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Shang, Gao
"The Development and Application of Electron-Rich Phosphorus-Containing Ligands in Asymmetric Hydrogenation" Ph D
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Sioss, James Andrew
"Synthesis and Characterization of Nanomaterials for Biosensing Applications" Ph D
(Supervised by Christine Keating)

Skone, Jonathan Henry
"Quantum Mechanical Methods for Calculating Proton Tunneling Splittings and Proton-Coupled Electron Transfer Vibronic Couplings" Ph D
(Supervised by Sharon Hammes-Schiffer)

Sohby, Mohamed Abdelmaboud
"Photoelectron Imaging of Metal Clusters and Theoretical Studies of Metallocarbohedrynes" Ph D
(Supervised by A. Welford Castleman, Jr.)

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(Supervised by Michael T. Green)

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"Utilization of Beta-Tosylethylazide in the Synthesis of N-Protected 1,2,3-Triazoles" M S
(Supervised by Steven M. Weinreb)

Zhang, Rong
"Atomic-Scale Studies of Molecules on Palladium{111} Surface" M S
(Supervised by Paul S. Weiss)

ALUMNI NOTES

'71 (Ph.D.) James E. Brown is retired from Bayer Pharmaceutical where he helped develop a recombinant technique for treating hemophilia. He continues to consult in the biotechnology field when not playing golf or tennis. Jim was the captain of a senior men's tennis team that played in the 2007 national championship. He won an award for senior golfer of the year at Moraga Country Club.

'71 (Ph.D.) Steven Valenty is President of ANALYZE, Inc. in Chandler Arizona. ANALYZE is an independent consulting laboratory specializing in chemical product manufacturing.

'72 (Ph.D.) Paul Adl has retired from IBM and now works for Micron Technology as manager of the analytical chemistry laboratory. Paul has two adult children and three grandchildren.

'74 (B.S.) Richard A. Gottscho has been Group Vice President and General Manager, Etch Products of Lam Research Corporation since March 1, 2007. He joined Lam Research in January 1996 and served at various Director and Vice President levels in support of Etch Products, CVD products, and corporate research. Prior to joining Lam Research, Richard was a member of Bell Laboratories for fifteen years where he started his career working in plasma processing. During his tenure at Bell, he headed research departments in electronics materials, electronics packaging, and flat panel displays. Gottscho serves on the Eberly College of Science Dean's Advisory Board.

'75 (Ph.D.) C. P. Wong is the Charles Smithgall Institute Endowed Chair and Regents' Professor in the School of Materials Science and Engineering at Georgia Tech. He received his B.S. in chemistry from Purdue University, and his Ph.D. in inorganic chemistry from the Pennsylvania State University. After his doctoral study, he was awarded a two-year postdoctoral fellowship with Nobel Laureate Professor Henry Taube at Stanford University where he conducted studies on electron transfer and reaction mechanism of metallocomplexes. He was the first person to synthesize the first known lanthanide and actinide porphyrin complexes, which represents a breakthrough in metalloporphyrin chemistry.

Prior to joining Georgia Tech in 1996, he was with AT&T Bell Labs where he was elected an AT&T Bell Labs Fellow in 1992 for his fundamental contributions to low-cost, high performance plastic packaging of semiconductors. Currently, his work is focused on nano, functional materials, advanced polymer composites, and polymers for electronic, photonic and MEMS applications.

'76 (B.S.) Robert Petcavich has been the Vice President and General Manager of Uni-Pixel since he joined the Company in January 2008. He was also the cofounder of Health Beacons Inc in Kirkland, Washington a company developing leading edge implantable RFID technology for the medical surgical cancer field. Robert was Senior Vice President and CTO of Lumera Corporation (NASDAQ:LMRA) in Bothell, Washington a publicly traded nanotechnology polymer platform bioscience and molecular photonics technology company. He has a Ph.D. degree in Polymer Science, a Master of Science Degree in Solid State Science, and a B.S. degree in Chemistry from the Pennsylvania State University, and completed the PMD executive management degree program at Harvard. Petcavich currently serves on the Eberly College of Science Dean's Advisory Board.

'83 (B.S.) Stephen L. Mayo is the Bren Professor of Biology and Chemistry, and Vice Provost at California Institute of Technology. Mayo also received a 2008 National Security Science and Engineering Fellowship. Mayo's research will focus on the topic of "Engineering Proteins for Anti-Viral Applications".

'89 (B.S.) Heather Rayle has been appointed Business Unit Director of Rohm and Haas Advanced Materials based in Woburn, MA. She serves as the vice president of the Eberly College of Science Alumni Board.

'89 (Ph.D.) Chad Mirken received a 2008 National Security Science and Engineering Fellowship on the research topic of "Functional One-Dimensional Structures Based On-Wire Lithography". Mirken is a professor of chemistry at Northwestern University. He also serves on the Dean's Advisory Board for the Eberly College of Science. Chad will deliver the 2009 Priestley Lectures at University Park in April 2009.

'95 (B.S.) Jeff Kindig married Julia Mann on March 3, 2007. Jeff recently began a new job as an Analytical Scientist at Liquidia Technologies, Inc. in Research Triangle Park, NC.

'96 (Ph.D.) David Nesting is a group leader at Philips Lighting in Fluorescent for GTD (Global Technology Development). David lives in central Kansas at the largest fluorescent facility in the world. He and his wife have three children: Aaron 8, Alora 6 and Reese 5.

'00 (Ph.D.) Bonnie Baker is a senior scientist at Rohm and Haas. Bonnie lives in Warrington, Pennsylvania.

'00 (Ph.D.) John Lean and his wife Marci had their first child, David Orland, on September 4, 2007. John is a Research Chemist at Cytec Industries.

'01 (Ph.D.) David Flosser and his wife Thuy Huong welcomed their first child, Nathaniel, into the world in September 2007. David is currently employed at Merichem in Houston.

'01 (B.S.) Julianne Wolfe is a project Manager at RJ Lee Group, Inc. In April 2007 Julie took her present position as project manager for the analysis of foreign particulate matter in pharmaceutical products using Raman and SEM techniques.

'02 (Ph.D.) Robert Morford lives in Medina Ohio and is a research chemist at M & G Polymers USA, Inc.

'03 (B.S.) Jennifer Lyon completed her Ph.D. in analytical chemistry at the University of Texas at Austin in 2007. Jennifer has accepted a position as assistant professor of Internal Medicine at the University of Texas Science Center in Houston.

'07 (Ph.D.) Andrea Szakal is a NRC/NIST post-doctoral fellow in John Marino's lab at CARB/UMBI.

IN MEMORIAM

'44 (Ph. D.) Robert Walter Schiessler, 89 of Fort Lee, NJ and formerly of Honesdale passed away June 23, 2008 in Englewood, NJ. Beloved husband of Florence (Cutler) Schiessler of Fort Lee, NJ. He was predeceased by his earlier wife, Betty Hartman. Born October 2, 1918 in Honesdale, he was the son of the late Walter and Josephine Herzog Schiessler.

Schiessler, an organic chemist, contributed much new learning in the scientific community, particularly in the area of combustion, lubricants, and petrochemicals. He was responsible for discovering and patenting a new method to create RDX, a super explosive used on a great scale by the Canadian and US Governments during World War II. After receiving his Ph.D. in Physical Chemistry at Penn State University in 1944, he taught Chemistry and oversaw research at Penn State until 1955, when he was employed by Mobil Oil Corporation. At Mobil, he led the Company's research organization during which time he was responsible for discoveries of improving the efficiency of petroleum refining and exploration, reducing automobile emissions, and discovering a synthetic lubricant later marketed as Mobil 1. In 1968, Schiessler led Mobil Long-Range Planning, which predicted global changes in supply and demand of energy needs through 2020. In 1972, he led Mobil Land Development Corporation that oversaw real estate development of properties globally.

Also surviving is his daughter Lynn Francis of San Antonio, TX, 4 grandchildren; 3 great grandchildren and nieces and nephews. He was preceded in death by his daughter Dale Ann Schiessler.

Gordon R. Johnston, a Pennsylvania State University assistant chemistry professor, died on Nov. 20, 2007.

Johnston earned bachelors and master's degrees in chemistry from the University of Portland by 1952 and a Ph.D. in organic chemistry from the University of Illinois, Urbana-Champaign, in 1956. He started his career as a research chemist with Dow Chemical, moving on to similar positions at Crown Zellerbach and Aerojet General. In 1963, he accepted a position as a postdoctoral fellow at California Institute of Technology. From 1964 until 1966, he was an assistant professor at San Diego College for Women. He then returned to a research chemist role at General Dynamics for a year before accepting an assistant professorship at Penn State University's Beaver campus, which he held until his retirement in 1991.

Johnston was active in the Kids & Chemistry Program of ACS, which he joined in 1950.

Johnston is survived by his wife, Irina; four children and their mother, Mary Ann; and a stepson.

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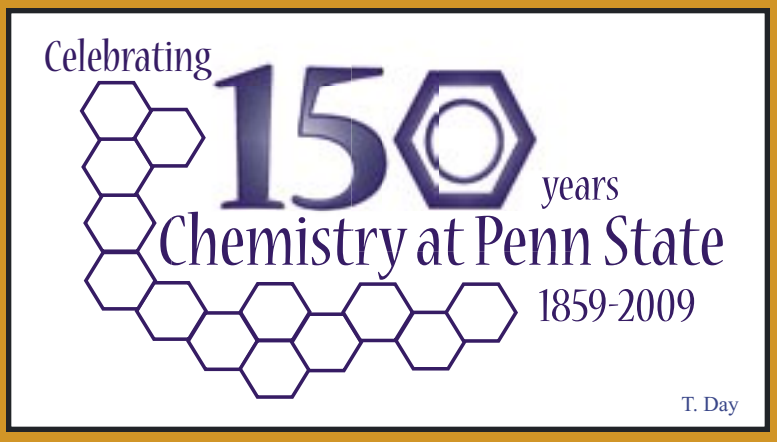

Thursday, April 23, 2009

- Priestley Lectures in Chemistry
  Chad Mirkin
  Northwestern University
- Celebration Banquet

Friday, April 24, 2009

- Lecture Series
  The Past, Present & Future of Chemistry
- Special Events in State College and at University Park
- Evening Poster Session and Informal Dinner

Saturday, April 25, 2009

- Breakfast Tailgate at Alpha Chi Sigma House
- Blue/White Football Game

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