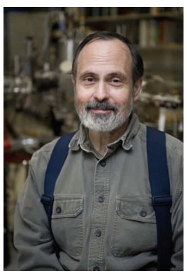
CHEMISTRY NOTATIONS

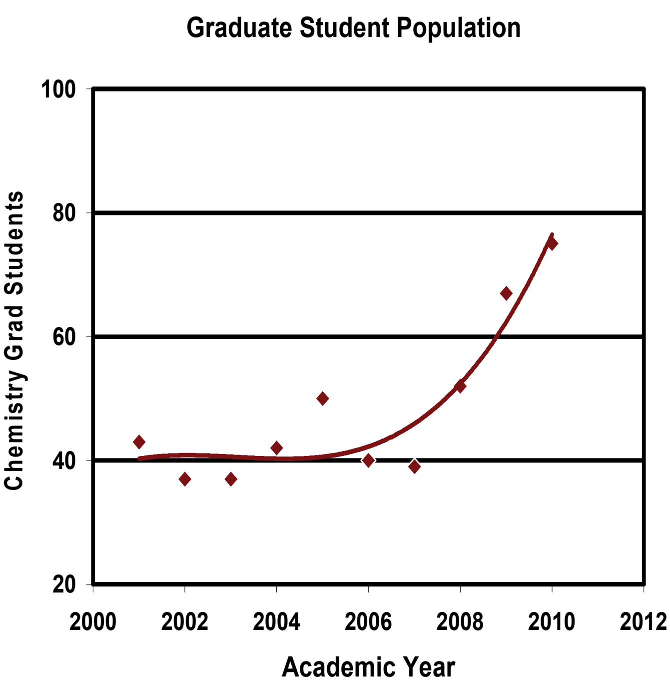
A publication of the Chemistry Department at Washington State University

Spring Semester, 2010

A Message from the Chair



Hello fellow Cougar Chemists, Materials Scientists, and Chemical Physicists! It's hard to believe that almost two years have passed since our last newsletter. Those years have been both rewarding and troubling. On the rewarding side, we have seen remarkable growth in our graduate student population. Thanks to my Associate Chair, Jim Brozik, and the graduate recruiting committee (Paul Benny, Ursula Mazur, Jeanne McHale, Ken Nash, and Ming Xian) we are quickly approaching our ideal size of about 90 graduate students. What's more, these are really good men and women.



It looks like we will be adding a new analytical chemist in the Fall. He is a specialist in Mass Spectrometry and I will share his story with you in our next news letter if all goes as expected.

On the down side, WSU has been hit with several budget cuts, the loss of staff in chemistry, and no salary raises for the last couple of years. But, there is always a silver lining! Our staff is working extra hard to keep everything running despite the reduction in numbers and our faculty are bringing in lots of external support that keeps out research productivity high.

Chemistry departments must recertify with the American Chemical Society every four years. I am pleased to announce that we just received our recertification! In addition to the ACS certified BS, we are considering offering a non-certified BA in Chemistry. Scot Wherland and the undergraduate curriculum committee are working on what this might look like and how many new students it might bring into the department. If all goes well, I will have some details to share in the next letter.

A number of you took part in a survey of our alumni to ascertain how we have prepared you for like. For those of you that replied, "**Thank you!**" and please continue to respond in the future. If the press of life kept you from replying, I hope you will do so when our second survey goes out later in the year. Your assessment of what we need to do (and we need to stop doing) is very important to us.

This year's letter has more meat than the last one, including a great article by Ken Nash on nuclear power; thus, I am going to keep my part short. I would like to remind you about two very special areas where your donations can make a big difference in the future of students, WSU, and the nation.

Undergraduate summer research support: Students make real progress when they can work on their project through the summer. Usually the chemicals, lab space, personal direction, and instruments are provided by one of our research faculty. The salary for these students is hard to find. The College of Sciences offers a few competitive summer research awards and we also have a National Science Foundation funded Research Experience for Undergraduate awards (about 12 this summer), but the number of students who want to do research in the summer exceeds the available funds.

Graduate Salary Supplements: Our peers are paying graduate students sever thousand dollars a year more than the current Graduate School standard TA and RA salary. The College of Sciences (COS) has managed to find funds to help us supplement the salary level, but that is still almost two thousand dollars short of our peer average. In order to save our graduate program, we have been supplementing this COS salary level out of the departmental operations budget. The good news is that this is clearly working to increase our graduate student body. It's great because we really need at least four students for each tenure track faculty member (about 90 graduate students overall). The bad news is we don't have enough to pay for all those supplements.

Write and tell me what your up to so I can share it in the next Newsletter. That goes for students, too! While I probably wont have room to write about everybody every time, I am always being asked, "What happened to so-and-so?" We are proud of all our past students, faculty, and staff and we want to know what you are doing these days. Please do write us or email to our alumni coordinator, Nikki Clark, at nikki_clark@wsu.edu. Also, we have a new Alumni page in our web site where you can enter your information and help create an alumni blog.

With my warmest regards,

K W Hipps, Professor and Chair

Climate Change and the Future of Nuclear Energy: How Will We Power the Future?

By Dr. Ken Nash

Most people living in North America, Europe, Australia, Japan and South Korea presently enjoy a rather comfortable existence, reaping the benefits of the Industrial Revolution and of the substantial exploitation of fossil carbon energy that has been developed during the past 150 years. As we progress into the 21st Century, these regions/countries will in all likelihood continue to prosper and lead the global economy, but the landscape is changing. The two most populous nations on Earth, China and India, are rapidly industrializing and are becoming increasingly important players on the energy exploitation stage. China has recently passed the U.S. as the top global emitter of CO_2. Russia and Brazil, representing another 5% of the global population base, are also rapidly increasing their pace of modernization (and so energy consumption). In the coming decades, demand for energy supplies will grow dramatically (and competition will increase for diminishing supplies) as these countries and others progress toward a more modern lifestyle. On top of this, it is reasonably projected that the population of the planet will increase by nearly 40% from the present 6.6 billion to more than 9 billion by 2050. The availability of the interrelated commodities of energy, food and water may well ultimately limit the rate of progress of the developing world. These factors may make it increasingly difficult for the developed world to maintain its present status. In truth, abundant energy with minimal environmental impact and the availability of strategic materials are the keys to the future.

Energy has always been the primary driver of progress toward a more modern society. The Industrial Revolution began in the middle of the 19th Century, with the introduction of steam powered machines powered by wood (95%). By 1885 the mix was about 50% wood, 50% coal. By 1910, this abundant high energy density resource (coal) represented about 95% of heat energy production. By the middle of the 20th Century, the energy options had diversified to 40% oil, 32% coal, about 25% gas with the balance primarily hydroelectric (the total power production from coal has remained surprisingly constant at 10.5 quadrillion BTUs per year in the U.S. for the past 60 years). Transportation had become a much more significant factor in energy consumption patterns, for which oil is particularly useful. At the beginning of the 21st Century, the global energy balance still includes 85% fossil fuels, complimented by about 8% nuclear, 5% hydroelectric and the remainder a balance of "renewable" sources of power. In the non-transportation sector, (i.e., primary power production - electricity), the blend in the U.S. at present is 49% coal, 19% nuclear, 20% gas, 7% hydroelectric, 3.5% renewable and about 1% oil.

At present, there is great buzz in the U.S. surrounding the increased development of renewable energy, particularly solar and wind power. But it is important to remember that there is no "free lunch" in power production (or in fact in conservation). Every source of energy has its issues and limitations:

- Fossil fuels emit CO_2 and a variety of other toxic and troublesome materials into the environment.
- Vast areas of land are permanently submerged when dams are built.
- Solar energy is abundant in some locations (the Tri-Cities) often scarce in others (Seattle), but difficult and expensive to capture (and store) in a usable form (except by Mother Nature in the many organisms that support photosynthesis) and of course is only available during daylight hours on sunny days.
- As mechanical devices, windmills require maintenance and are known to kill birds in flight.
- Both solar and wind are intermittent sources that demand the dedication of large tracts of land for adequate power production, backup supplies of other types of primary production, and storage strategies (batteries, dams or chemical fuels are all possible media) for times when the Sun doesn't shine and the wind doesn't blow.
- Nuclear power based on fission in light water reactors yields abundant power from comparatively small amounts of materials that have few other uses, but produces radioactive byproducts that are dangerous if not properly managed. Diversion of fissile materials to nuclear weapons production is also an un-

avoidable concern (though there are ways to minimize the possibility).

- Increased conservation will likely entail (perhaps unacceptable) adjustments in lifestyle and consumption patterns.

We are collectively excited about windmills and solar panels because these sources appear to be inexhaustible (*probably so*), their use is comparatively free of negative consequences (*at least partially true*) and because we are beginning to recognize the possible serious negative climate (and eventually economic) impacts of our present 85% dependence on fossil energy supplies (*increasingly accepted as an issue*). A fact lost in the discussion is that solar and wind are diffuse, dilute and intermittent resources that with present technologies cannot hope to replace the 85% of our energy supply represented by fossil carbon. Promoting the objective of 30% renewable energy by 2030 is noble, but most probably unrealistic in a highly energy-dependent society.

Far less visible in the ongoing debate about future energy supplies and reduction of CO_2 emissions is the 24 hours a day, seven days a week non-emitting resource that we know as nuclear energy. Though nuclear power plants have quietly produced CO_2-free electricity for about 50 years, this source of power receives very little "credit" for providing this important service to society. In fact, the 50% improvement in "capacity factors" (i.e., time spent generating power) for nuclear power plants that has been achieved in the past decade (from 60% in 1990 to 90% today) has in effect produced the electricity equivalent of 50 new nuclear power generating stations without having to build any new reactors. Nuclear power plants are compact, reliable, and efficient, and after 50 years a cornerstone of electricity production in the U.S. and around the world. Unfortunately, among the general population the greatest discomfort is generated on the subject of energy when the discussion turns toward nuclear energy. To a degree, the unease can be understood as resulting from a natural human tendency to fear "the unknown". After three generations, nuclear power remains relatively poorly understood by the general public. Most people derive whatever understanding they have of radiation and radioactivity from what they see in the popular media. Sadly, much of the information that is presented in the popular media is incomplete, sometimes mysterious and often presented with an antinuclear bias. And the truth is that the five senses for the most part cannot directly detect ionizing radiation – we cannot see, hear, smell, taste or feel radiation from radioactive materials! At very high levels, as <u>can</u> be seen in the "blue glow" of Cerenkov radiation near an operating nuclear reactor core (which we have on our campus), it is possible to see some effects of this radiation, but at lower doses it remains "invisible".

Perhaps our inability to sense ionizing radiation is a result of evolution; human life having developed in a radioactive world we might well have suffered sensory overload if humans had been equipped by Mother Nature with radiation detecting antennae. Natural radiation starts with the ultimate source of life on Earth, the Sun. Our star is a very large hydrogen- and helium-burning fusion reactor fortunately located 93,000,000 miles away. Its surface temperature of about 6000 K is similar to that at the core of the earth, but pales by comparison with the 15,000,000 K at its core, where most of the nuclear fusion reactions occur. As a result of these fusion reactions, the Sun (and all other stars in the universe) produce a steady stream of high energy particles (helium nuclei, electrons and protons traveling through the vacuum of space at high speed – the Solar Wind) that arrive at the Earth in a constant stream from all directions, but mainly from the direction of the Sun. Life on Earth (at least as we know it) is only possible because of the energy absorbing properties of our relatively thick atmosphere and the magnetosphere that deflects the solar wind away from us.

It is perhaps not widely known that the magnetosphere arises from the circulation of the Earth's molten Fe-Ni core; it is believed that the core is molten because of the perpetual heat contributed by the radioactive decay of naturally occurring elements like uranium, thorium, radium and potassium – without this naturally occurring radioactivity Earth would likely be quite similar to the Moon, i.e., lifeless. Of course, uranium, thorium, radium, potassium, radioactive isotopes of carbon and chlorine (made radioactive by nuclear reactions with components of the Solar Wind in the upper atmosphere) also surround us in our daily lives; the small fraction of naturally occurring ^{14}C and comparative abundance of ^{40}K in humans makes each inhabitant of the planet measurably radioactive – we irradiate ourselves and everyone around us constantly. Nevertheless, life goes on! It is also important to remember that it makes little difference whether radioactive isotopes are natural or man made – the energies, types of radiation emitted and the interactions of that radiation with matter are identical regardless of the source.

So, what about nuclear energy? In nuclear power plants as presently used in the U.S., the reactor is fueled by uranium that has been "isotopically enriched" from its natural 0.7% ^{235}U/99.3% ^{238}U to 3.5-5.0% ^{235}U/96.5-95.0% ^{238}U. This fuel typically remains in the reactor for 18 months then is removed and replaced by a fresh load of fuel. In the U.S. we use this fuel once then "throw it away" (we actually put it into storage facilities while we wait to decide how to dispose of it in the ground somewhere). Though the fuel entered the reactor as a pure uranium dioxide (UO_2) ceramic, it is changed to a mixture containing about 1/3 of the periodic table accumulated during 18 months of irradiation and power production. The byproducts of fission include most of the (un-reacted) uranium that fueled the reactor (only about 5% is consumed in a normal fuel load), about 1% by weight of plutonium isotopes that could be recycled back to current generation reactors to produce additional power, about 4% of "fission products" and a fraction of a percent of the other man-made transuranium elements neptunium, americium and curium. These byproducts of fission remain almost completely within the fuel – there are typically near zero emissions of any type of radioactive materials from the fuel elements, which are encased (clad) in a zirconium alloy. Plutonium, americium and neptunium are generally considered the most important contributor to the long-term radiotoxicity of used nuclear fuel. The fission product fraction includes a small number of isotopes that remain radioactive for many years, but also contains byproducts that are potentially useful like palladium and rhodium (that could be employed as catalysts or in solar energy applications). Most of the fission products are not radioactive after a few decades or less; ^{137}Cs and ^{90}Sr are the other important constituents of irradiated nuclear fuel, but 99.9% of their radioactivity has decayed away within 300 years. Isolation of transuranium elements from the environment is necessary in the single pass fuel cycle for 500,000 years (or longer).

In this so-called "single pass" or "open" operation of the nuclear fuel cycle, approximately 95% of the nuclear fuel value of the uranium that was extracted from the ground initially is not exploited.

Furthermore, the 1% or so of long-lived transuranium elements (plutonium, neptunium, americium and curium) will persist as a potential long-term radiotoxicity risk for thousands of years. Other countries, notably France, at present recycle the plutonium and separate the uranium from the transuranic elements. They thus recover at least a portion of the remaining nuclear energy potential of the irradiated fuel through the operation of a closed-loop nuclear fuel cycle and at the same time reduce the volume of high level waste requiring geologic disposal. In the French system (also practiced with variations in Russia, Japan, India and the United Kingdom and at some time in the future in China), the used fuel is dissolved and chemically processed to allow recycle of the plutonium in nuclear power reactors.

More advanced concepts for additional chemical processing and special reactors that will consume the transuranic elements are being investigated around the world, including some research being done by my research group at WSU. A description of the specifics of our research is a subject for some future communication, but our focus is on helping to develop a brighter future in which we will worry less about instability in the climate, the potential negative effects of man-made radioactivity on human health and simultaneously about the continuing emission of CO_2 into the air we breathe. At the same time, we are working with radioactive materials that most people would prefer to avoid, thus performing an important and useful function. Arguably, the most significant "product" of our research in Pullman is the human capital – a new generation of trained "isotope experts" that we seek to educate here at WSU. Our department has developed a program that includes seven full-time radiochemistry faculty members and an average population of 25-30 graduate students and postdoctoral researchers. We conduct our research in laboratories appropriately designed for the handling of radioactive materials on the Pullman campus. We also take significant advantage of the facilities, including a 1 MW research reactor, at the Nuclear Radiation Center, which is located near the Palouse Ridge golf course on our campus. Several of our graduates are at the moment working to address issues of interest to the state of Washington and to the country. We are doing our best to prepare for a bright future with abundant and safe nuclear energy.

Faculty Highlights

Funding

Cliff Berkman, National Science Foundation, "SGER: Self-Activating Amino Acids in Peptide Synthesis," $134,000, one year.

Cliff Berkman, **Paul Benny** and **Jeffrey Bryan** (Vet. Clinical Sciences), Department of Energy, Development of Prostate Specific Membrane Antigen (PSMA) Inhibitors Coupled to 99mTc(C0)3 for Enhanced Specific Activity for SPECT Imaging," $622,266, two years.

Cliff Berkman, National Institutes of Health, "Chemoaffinity Agents for Capturing Prostate Cancer Cells," $679,964, two years.

Cliff Berkman, National Institutes of Health, "Probe Optimization for Prostate Cancer," $1,993,630, four years.

James Brozik, University of New Mexico, "Controlling Controlling Biological Surface Adhesion and Release," $67,732, increase in funding.

James Brozik, Sandia Nat. Lab., "Smart Skin Components," $25,000, two years.

James Brozik, National Science Foundation, "Chemical and Physical Characterization of Biological Systems," $226,926, three years.

James Brozik, Neon, Inc., "Biosensor Graduate Research Collaboration," $184,153, three years.

Aurora Clark, Med. Univ. of South Carolina/DOE, "Junior Faculty Award,", $75,000, increase in funding.

Aurora Clark, Murdock Foundation, "A Computational Chemistry Study of the Optical Properties of Organic Dye Aggregates," $7,500, increase in funding.

Aurora Clark, National Science Foundation, "Multiscale Chemistry of U, Np, and Pu Fission Products Under Acidic and Basic Conditions," $200,000, two years.

Aurora Clark, Department of Energy, "Origin of Actinide Ion Partitioning in Biphasic Systems," $600,000, three years.

Sue Clark, Department of Homeland Security, "Homeland Security Testing, Evaluation, and Demonstration," $175,480, one year.

Sue Clark and **Ken Nash**, DHS, DOD, DOE, "Nuclear Forensics Education Program at Washington State University," $300,000, three years.

Greg Helms, Texas Tech. Univ./USDA, "Reducing Fat Uptake in Coated Fried Food Using Multiscale Hybrid Mixture Theory Based Predictive Modeling and Experimental Validation," $62,000, three years.

Herbert Hill, ExcellIMS, "Fundamental Improvement of Ion Mobility Spectrometers for Explosive and Chemical Detection Using Structure Selective Ion-Molecular Interaction," $279,753, 20 months.

Herbert Hill and **James Schenk**, WSU-Office of Research, "Cocaine and the Neuronal Metabolomics of Tyrosine and Glucose by Ion Mobility Mass Spectrometry," $35,000, 18 months.

Herbert Hill, Savannah River National Lab/DOE, "Evaluation of the Electrospray Ionization ion Mobility Time-of-flight Mass Spectrometer," $75,000, one year.

Jeffrey Jones, National Institutes of Health, "Predicting Rates and Regioselectivity in Cytochrome P450 Mediated Reaction GM084546," $99,995, supplement. ARRA funds

Jeffrey Jones and **Matthew Hudelson** (Mathematics), National Institutes of Health, "Predicting Rates and Regioselectivity in Cytochrome P450 Mediated Reactions," $1.6 million, five years.

Jeanne McHale and **Ursula Mazur**, National Science Foundation, "Resonance Raman Spectroscopy and Scanning Probe Microscopy of Light-Harvesting Chromophore Aggregates," $22,645, supplement.

Ken Nash, DOE/Battelle PNNL, "Simplifying Spent Fuel Reprocessing Using Dissolution in a Carbonate-Peroxide Solution," $86,000, nine months.

John Wolff (SEES), **Sue Clark** and **Ken Nash** National Science Foundation, "Acquisition of an Inductively-coupled Plasma Mass Spectrometer," $130,828, one year.

Ming Xian, National Science Foundation, "CAREER: Novel Reductive Ligations of S-Nitrosothiols," $656,643, five years.

Ming Xian, American Heart Association, "New Chemical Probes for Nitric Oxide Research," $308,000, three years.

Other News

KW Hipps has been named a Fellow of the American Physical Society. The APS allows only half of one percent of its members to be named as Fellows. With a total membership of about 46,000, about 230 people worldwide are elected as Fellows each year. The previous WSU Chemistry faculty elected an APS fellow was Harold Dodgen, for whom the university's nuclear reactor is named.

In addition, Dr. Hipps was elected to join the rank of Fellow in the American Association for the Advancement of Science for his pioneering and innovative work in tunneling spectroscopy and in STM-based orbital mediated tunneling through molecular systems.

Ming Xian received a National Science Foundation CAREER award. "The Faculty Early Career Development (CAREER) Program is a Foundation-wide activity that offers the National Science Foundation's most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations."

Hill Group in Switzerland

Current and former members of the laboratory of Dr. Herbert Hill gather in Thun, Switzerland for the 18th International Conference on Ion Mobility Spectrometry organized by Dr. Hill.

There were 114 attendees from 15 different countries. Pictured above are (from left): Dr. Ching Wu (former graduate student and current CEO of Excellims), Dr. Herb Hill, Dr. David Atkinson (former graduate student and current senior research scientist at Pacific Northwest National Laboratories), and current graduate students Kristyn Roscioli (front) and Christina Crawford (rear).

Matteson Symposium

The 3rd annual Donald S. Matteson Symposium will be held on September 18th at WSU's new Compton Union Building.

This year's theme is *Chemistry and its Application to Biological Systems* and will feature lectures by the following distinguished presenters: Anna Mapp, University of Michigan; Linda Hsieh-Wilson, California Institute of Technology; Stephen Kent, University of Chicago; Stephen Hanessian, Université de Montréal & University of California, Irvine; and WSU alumni (PhD Biochemistry 1979 with Ralph Yount) James Wells, University of California San Francisco.

For more information, visit the website for the Symposium at http://organic.wsu.edu/symposium2010.

Graduate Program News

Nelmie Devarie, Xian Group, was awarded a travel grant by the American Chemical Society Division of Organic Chemistry to attend the American Chemical Society meetings in San Francisco.

Mihindra Dunuwille, Yoo Group, was awarded the Frank A. Fowler Scholarship, $1,000, one year.

Ben Friesen, Mazur Group, won the Best Poster Award at the American Vacuum Society meeting in Portland.

Jane Holly Hines, Nash Group, was awarded for the third year in a row the NASA Space Grant Science Opportunity Fellowship from the College of Sciences and College of Engineering, $2,500, one year.

Kim Kaplan, Hill Group, received the 2010 Outstanding Graduate Student Award for the College of Sciences.

Bryan Wiggins, Hipps Group, was awarded an NSF Graduate Fellowship Award, $122,500, three years.

2010 Chemistry Graduates

August 2009

Clarisa Carrizales, MS, Professor KW Hipps

Roberto Fernandez Maestre, PhD, Professor Herb Hill

Hye In Nam, MS, Professor Jim Bruce

Kajal Nandy, MS, Professor Ming Xian

Mark Ogden, PhD, Professor Ken Nash

Erica Zink, MS, Professor

December 2009

Chris Armstrong, PhD, Professor Sue Clark

Chris Hartshorn, PhD, Professor Jim Brozik

Stephanie Holbrook, MS, Professor Sue Clark

Andy Shaller, PhD, Professor Alex Li

May 2010

Tom Shehee, PhD, Professor Ken Nash

Natalia Zakharova, MS, Professor Sue Clark

Chad Weisbrod, MS, Professor Jim Bruce

Undergraduate Program News

The **Chemistry Club** was awarded a grant of $2,800 to develop an Undergraduate Program for the Regional American Chemical Society meeting to be held in Pullman this summer (June 20-23, 2010).

Science and Engineering Poster Competition

Chemistry major Sarah Miley walked away with the first place award for her poster titled, *Optimization of Nd(III) Pre-Concentration on a Rotating Disk Mercury Film electrode in Aqueous Solution.* Sarah worked with graduate student Ric Schumacher in both the Sue Clark Lab and the Schenk lab. For her efforts, Sarah received a $400 scholarship. Pictured below is Candace Claiborne, dean of the college

Undergrad Spotlight

Carolyn Gonsky, one of the undergraduate students within the Department, presented an Honors Thesis this semester about her research in Prof. Phil Garner's organic chemistry lab. She was nominated for "Pass with Distinction," the highest honor a student can receive. Her thesis, *The Efficacious Preparation of Oppolzer's Glycylsultam via the Delepine Reaction*, was published research in which she assisted Dr. Alper Isleyen to complete.

Carolyn is a Chemistry major, who is also working on a math minor. She has been president of the WSU Chemistry Club (American Chemical Society Student Affiliates) for three years, working with other undergraduate students in outreach programs and tutoring. Carolyn will be graduating this May and plans to take a year off from school before applying for medical schools in the fall. The Department wishes Carolyn the best of luck in her future endeavors.

Chemistry 495 Poster Presentations

Five chemistry majors presented their final research posters during dead week. Pictured above is Carolyn Gonsky explaining her poster to Professor Scot Wherland. Each student is given a final grade based on their research and poster presentation.

Graduating with Honors

Five Chemistry major are graduating with honors this spring, and as graduates with a 3.5 or higher gpa, they have earned the right to wear honor cords provided by the College of Sciences. These students are:

Carolyn Gonsky

Tylan Watkins

Katy Wisuri

Megan Wolff

Search for a New Dean

Dr. Michael Griswold, current Dean of the College of Sciences, will be stepping down as of July 1, 2010, and the search is on for his replacement. In the interim, our very own Dr. Sue B. Clark has accepted the post of Interim Dean of the College of Sciences and will serve in that position beginning July 1, 2010, in the event that a new permanent dean is not on site by that date.

A leading researcher in her field, Dr. Clark's current work focuses on the environmental chemistry of plutonium and other actinides, and development of radioanalytical methods to measure actinide elements in environmental samples. Her research efforts are supported by grants from the U.S. Department of Energy's Office of Science, the National Nuclear Security Administration, and the Office of Nuclear Energy, Science and Technology. Prior to joining Washington State University in 1996, she was an Assistant Research Ecologist at the University of Georgia's Savannah River Ecology Laboratory (1992-1996), and Senior Scientist at Westinghouse Savannah River Company's Savannah River Technology Center (1989-1992).

Professor Clark is involved in numerous national and international service activities. She has served as a consultant to the Nuclear Energy Agency of France, the Korean Atomic Energy Research Institute, and the Battelle Memorial Institute. She is currently serving on the National Research Council's Nuclear and Radiation Studies Board. Professor Clark has received several awards, including the Westinghouse Professorship (2000 to present), Ford Lecturer at Minnesota State University (2003) the Edward R. Meyer Distinguished Professor of Chemistry (1998 – 2000), the Young Faculty Achievement Award (1998-1999) in the College of Sciences at Washington State University. She is a member of the American Chemical Society, the American Association for the Advancement of Science, and Sigma Xi, the Scientific Research Society.

Dr. Clark received her Ph.D. in Inorganic and Radiochemistry and her M.S. in Inorganic Chemistry from Florida State University, Tallahassee, Florida.

Emeritus Faculty

Yount Receives 2010 President's Distinguished Lifetime Service Award

Regents Professor Emeritus Ralph Yount, renowned for his research into how muscles work and for his heavy lifting in service to WSU, was awarded the 2010 President's Distinguished Lifetime Service Award at the Showcase Celebrating Excellence recognition banquet in March.

President Elson S. Floyd made the surprise presentation, saying Yount had been instrumental in raising the status of WSU to its positions as a preeminent public research university.

Yount, who joined the WSU faculty in 1960 as an assistant professor of chemistry, distinguished himself during his 44-year career as both a pioneering researcher and inspirational teacher, as well as a leader in professional organizations at WSU and in the international academic community.

College of Sciences Dean Michael Griswold said Yount's career at WSU has left an indelible mark on the institution. "Ralph has been my mentor, my friend and my role model," Griswold said. "He demanded excellence of everyone, including himself. "WSU is a better institution because he was here, and the impression he has made is lasting and important," he said. "His record of more than 40 years with the same NIH grant will probably never be matched at WSU."

Yount's research focused on the molecular basis of movement. In particular, his lab explored the relationship between myosin, a contractile protein in muscles, and ATP (adenosine triphosphate), the molecule involved in energy transfer. His synthesis of one particular analog of ATP was critical to work that eventually led to two Nobel prizes and has been cited in more than 4,000 papers.

The NIH funded his work for more than 40 years without interruption and awarded him a MERIT grant in 1986, the first year the grants were established. According to the NIH website, MERIT awards provide long-term funding to support "investigators whose research competence and productivity are distinctly superior and who are likely to continue to perform in an outstanding manner."

Glenn & Jane Crosby Receive American Chemical Society 2009 Charles Lathrop Parsons Award

The American Chemical Society (ACS) has named former WSU chemists Glenn A. Crosby and Jane L. Crosby the recipients of its 2009 award for service to chemistry education and the ACS.

The award was presented in Salt Lake City in March 2009, at the ACS annual meeting and marks the first time the Charles Lathrop Parsons Award has been given to more than one individual.

Alumni Updates

Tony Boitano, 2000, is working for Novartis as a research investigator. Tony is also an adjunct assistant professor at The Scripps Research Institute in San Diego.

David Hedden, 1983, was most recently the VP of Pharmaceutical Development at Cervelo and is now working with Cervelo colleagues to start a virtual Pharma Development company.

Jeff Johnson, 1969, PhD, is retired and living in Carmel, CA.

Matthew Wessel, 1991, is a computational chemist at Bend Research, Inc. in Bend, OR.

Graduate and undergraduate alumni, we'd like to hear from you! Please log onto http://chem.wsu.edu/alumnis/new and tell us what you've been doing since leaving Pullman!