

# Chemistry News

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Pittsburg State University

Spring 2006

Pittsburg, Kansas 66762

## New Equipment Added to Department

### Spectrometer System

The Chemistry Department recently acquired a DeltaNu Advantage 200A Raman spectrometer. Raman spectroscopy complements Infrared spectroscopy. Both instruments measure the natural vibrational frequencies of chemical bonds. Infrared instruments do this by passing beams of infrared radiation through compounds and determining what frequencies are absorbed by the sample.

Raman spectroscopy measures vibrational frequencies in a different and somewhat indirect manner. Monochromatic visible radiation is passed through a sample of a compound. When these photons are scattered by the molecules in the sample, energy is added to or subtracted from them by exciting or deexciting vibrational energy levels. Scattering is inversely proportional to the fourth power of wavelength, so Raman spectroscopy works best with fairly short wavelength electromagnetic energy--but too short of wavelength also results in photolysis of the compound being studied. Molecules absorb infrared radiation when the vibrational process results in a change in dipole moment. Raman scattering occurs when the vibrational process results in a change of polarisability. Thus Raman and Infrared spectra of the same compound tend to have very different appearances. Frequencies that are strong on one can be weak or missing entirely on the other. This instrument has use in organic, inorganic, and physical chemistry.

### Bomb Calorimeter

The Department also purchased a Parr 6772 precision thermometer/computer to upgrade its Parr bomb calorimeter. Anyone who has taken physical chemistry lab at PSU in the past 50 years has probably used this calorimeter. It has been used to

obtain the heat of combustion for everything from anthracene to cookies. The thermistor thermometer has a resolution of 0.0001oC and the computer automatically fires the bomb and plots the temperature changes. The experiment now has more satisfactory precision and a more modern look. Although the bomb itself is still old, the same bomb design is still sold today.

## Administrative Changes

Two PSU vice presidents have announced plans to retire this year. **Dr. Robert Ratzlaff**, Vice President for Academic Affairs, will retire from his administrative role at the close of the spring semester. **Dr. James AuBuchon** will retire in September 2006 as Vice President for University Advancement and Executive Director of the PSU Foundation, Inc.

**Dr. Steven Scott** accepted the position as the next Vice President for Academic Affairs. Dr. Scott joined the PSU family in 1989 as an Assistant Professor of Education in the Department of Curriculum and Instruction. In 1995, he was named Chairman of the College of Education's Department of Special Services and Leadership Studies. He held that post until 1999, when he was named Dean of the College of Education.

## Workshops, Seminars, Projects

Colloquium presentations during the academic year were coordinated by Professor **Peter Hamlet**. Participation was good with many students speaking about their chosen topics of interest. The topics and presenters may be viewed on the Chemistry website at [www.pittstate.edu/chem](http://www.pittstate.edu/chem)

Faculty members and students attended the 40th ACS Midwest Regional Meeting October 26-28, in Joplin, MO. Students participating were: **Chih-Ang (Owen) Chang, Nathan Elliott, Doo Pyo Hong, Michelle McCullough, Sasa Miladinovic, Grant Pierson, Brian Ray, and Jasminka Stojadinv.**

Professor **Dilip Paul** accompanied students to the ACS Pentasectional Meeting in ConocoPhillips Research Lab in Bartlesville, OK, April 1. Students attending were **Chih-Ang (Owen) Chang, Hisanori Kajiwara, Brian Ray, Maha Shrestha and Manishwar Singh**. Brian Ray received the award for Best Student Presenter. His research subject was “ Design, Synthesis and Characterization of Nano-engineered Biochemical Decontaminants.” The objective of this research was to synthesize chromium and antimony-chromium doped strontium titanate photoactive nanomaterial. The activity was judged carefully using different spectroscopic techniques to explore the mechanism of reactions. Brian also presented at the Global Plastics Environmental Conference (GPEC 2006) in Atlanta, February 28-March 2.

Chih-Ang (Owen) Chang received the Best Student Poster award. His research subject was “ Infrared Studies of Photochemical Reactions of Acetaldehyde over Cr-incorporated A1-MCM 41.” This research involves the synthesis and characterization of a porous alumina-silica based nanomaterial which can be used for catalytic decomposition of toxic organic compounds. The synthesis of this nanomaterial was accomplished by using sol-gel technique and was characterized by UV spectroscopy and X-ray diffraction techniques. The chemical reaction of a simple aldehyde was followed by using in situ FT-IR and mass spectroscopy.

## Kansas Polymer Research Center

The Kansas Polymer Research Center located on campus continues to work closely with the Chemistry Department. At the KPRC, a research team of 11 scientists, led by **Dr. Zoren Petrovic**, is working with Cargill, Inc., a leading worldwide food, farm and financial services provider, to create products and materials from bio-based polymers for high-grade plastics.

PSU’ s effort to develop polymers from soybeans and other bio-based products is in line with a national priority to replace petrochemicals with bio-based materials thus reducing U.S. dependence on foreign oil. Additionally, it makes use of Kansas and Midwest agricultural products, and it has the potential to bring additional industry to the region.

The KPRC staff is currently housed in Shirk Hall, a former university residence hall. The university’ s vision is to further expand the research capabilities of the PSU polymer scientist with a larger facility to be built on south Rouse, in the city of Pittsburg’ s Research and Development Park. Construction should get under way later this spring on the \$5.7 million facility, which will be built with a combination of private and state funds.

## American Chemical Society

The American Chemical Society is an integral part of the PSU Chemistry Programs. The Option I Chemistry degree is ACS approved and graduates completing this degree meet the criteria for professional education and for membership.

The local ACS organization’ s continued support of Chemistry students is definitely appreciated. **Dr. Dilip Paul** served this past year as Chairman of the MOKANOK section. Professor Emeritus, **Dr. Alex Bednekoff**, again served as Secretary-Treasurer.

The local section celebrated its 75th year in 2005. The President of the ACS at that time, **Dr. William F. Carroll**, spoke at a special meeting commemorating the occasion. He also spoke to a Physics class at Pittsburg High School. **Nancy Seybold**, Physics and Advanced Placement Chemistry Instructor said that this was a wonderful opportunity for her students. “ It is great for them to actually meet someone of his stature who has accomplished so much with his life. To reach being President of the American Chemical Society, one has to have quite a resume.” Seybold said.

Other special presentations last year featured renowned chemist, Professor **John T. Yates, Jr.**, a graduate from MIT and a member of the National Academy of Sciences. Professor Yates has published over 635 publications. It was an honor to have him speak at the local ACS section meeting and to PSU students during Colloquium held on campus.

The MOKANOK section provides awards presented yearly to participants at Science Days (Chemistry Capers Contests).

The section again participated in the US National Chemistry Olympiad (USNCO). The primary goals of this program are to stimulate interest and achievement in Chemistry among high school students throughout the United States and to provide recognition of outstanding young Chemistry students, teachers, and schools. Students competing in the USNCO are eligible to be selected as members of the U.S. team for the International Chemistry Olympiad (IChO). For the past twenty-two years, the U.S. has sent a team of four students to compete with nations around the world at the IChO. The students participate in both theoretical and laboratory examinations over several days. The local 2006 event was held at PSU March 10 and the International event will be held July 2-11 in the Republic of Korea.

## Research Holds Promise for Chocolate Lovers

It’ s not exactly a guilt-free pleasure, but food researchers say cocoa beans could be good for you. Cocoa beans have natural compounds called flavanols, and a growing pile of scientific research suggests they do good things to blood vessels. Flavanols are found in other foods, such as red wine, grapes, apples and green tea, although cocoa beans are a particularly rich source. Mars Inc. developed the technology to visualize flavanols on a computer screen. Says Harold Schmitz, the company’ s chief science officer: “ Now we understand cocoa well enough to start to do new things with it.” The company is starting with Cocoa Via granola bars, made with a special cocoa powder that retains most of the flavanols. The bars also have plant sterols, which have been shown to help lower cholesterol. (**Peter Hamlet**, PSU Chemistry Professor, has been singing the praises of chocolate for years. He passes out chocolate morsels to faculty and

staff almost daily, keeping all of us up on our flavanols!)

Parsons Sun, 8/19/05

## Thanks and Appreciation!

We again want to thank the following persons and organizations who have made monetary contributions to the Chemistry Department during the past year. Without their support many scholarships, special projects, purchases, and repairs to equipment would not be possible.

Ansell, Mr. and Mrs. Loren L.  
 Ardery, Mr. and Mrs. Ryan R.  
 Bednekoff, Dr. and Mrs. Alexander  
 Boeing Company  
 Cherokee County Arts Association  
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 Southeast Kansas American Chemical Society  
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 Sullivan, Dr. and Mrs. F. Victor  
 Thompson, Mr. and Mrs. Daniel J.  
 Wayenberg Sr., Mr. and Mrs. Gene A.  
 Weide Jr., Mr. and Mrs. John O.  
 Welker Jr., Mr. and Mrs. Waite  
 Wells, Mr. Robert A.  
 Zigmund, Mr. and Mrs. Francis

## Scholarship Recipients

Students receiving scholarships for the fall and spring semesters were:

**Lisa Douglass**

**Haley Ruther**

<b>Erin Floyd</b>	<b>Manal Siam</b>
<b>James Hardin</b>	<b>Semonti Sinharoy</b>
<b>Yury Kuz' Michev</b>	<b>Meryl Twarog</b>
<b>Jennifer Lipka</b>	<b>Justin Uhler</b>
<b>Adam Merando</b>	<b>Robert Walkenshaw</b>
<b>Grant Pierson</b>	<b>Seung Hi Yahng</b>
<b>Brian Ray</b>	<b>Elsie Zimucha</b>

## What Students Are Doing

Chemistry Department Graduate Assistants employed by the Department for the academic year are **Keith Alquist**, **Camren Ray** (fall semester), **Maha Shrestha** (spring semester) and **Manishwar Singh**. Graduate students were honored at the Annual Graduate Student Awards Banquet, April 6, in the Crimson and Gold Ballroom. Receiving teaching awards were **Keith Alquist** and **Manishwar Singh**. **Chih-Ang (Owen) Chang** and **Doo Pyo Hong** received awards for their research.

Undergraduate students working during the academic year as Graders, Tutors, Stockroom, Office and Lab Assistants are: **Jennifer Chronister**, **Prakash Dedge**, **Elizabeth Henderson**, **Lance Jepson**, **Tom Johnson**, **Stacy Jones**, **Ben Jordan**, **Yury Kuz' michev**, **Jennifer Lipka**, **Adam Merando**, **Brooke Napier**, **Grant Pierson**, **Chris Remmich**, **Manal Siam**, **Ashley Southern**, **Sally Tucker**, **Craig Walkenshaw**, and **Elsie Zimucha**. Thanks to each and everyone for your dedication to the Department!

**Meryl Twarog** and **Brent Cameron** were two of just 14 students nationally who were selected to participate in a biomedical research opportunity last summer at Washington University in St. Louis. Both say the research they have done at PSU and the research they were able to do in special programs such as this one have benefited them in many ways. Meryl has not yet decided where she will study for her MD. She has been accepted at Vanderbilt University-Nashville, Case Western School of Medicine-Cleveland and the University of Kansas. Brent has been accepted to Case Western where he plans to pursue his MSTP (MD/Ph.D)

**Stacy Jones**, Biology major and Chemistry Lab Assistant and Tutor, is going to Boston, MA in June to attend the 2006 Endocrinology National Meeting. A paper presented by **Dr. Virginia Rider**, Biology Professor, will include research done by Stacy along with **Brent Cameron** and **Meryl Twarog**.

Among recipients of the Golden Gorilla Student Leadership Award announced during the Apple Day Convocation were Chemistry majors **Brent Cameron** and **Adam Merando**. Apple Day is a celebration of Pittsburg State getting its first building in the 1900s. After the funding bill was passed, **Clarence Price**, then Mayor of Pittsburg, was fined a barrel of apples for lobbying on the floor of the legislature. Thus the tradition of Apple Day was established in 1907. Students receiving this honor are recognized for contributions made in academic excellence, campus involvement and community service.

**Lisa Douglass**, senior, was one of three PSU pole vaulters to compete in the NCA Division II indoor National Track and Field Championships in March at Boston's Reggie Lewis Center. She had qualified by finishing first at the MIAA Championships February 24th with a season best of 12-5.50. She then placed sixth at the National Championships with a 12-3.50, enabling her to earn **All-American** status. We are very proud of Lisa and her accomplishments.

## Best Wishes 2005 Graduates!

### May 2005

**Mamiko Nishida**, BS  
**David Perry**, BS  
**Marissa Rainey**, BS  
**Monica Reed**, BS  
**Scott Rogers**, BS  
**Brian Shaw**, BS  
**Noah Smith**, BS  
**Stanley Wells**, BS  
**Jefferson Mabilia**, MS

### July 2005

**Kwon Ho Hong**, MS

Mile Lukic, MS

## December 2005

Karon Cassidy, BS  
Sasa Miladinovic, MS

## May 2006 Candidates

Brent Cameron, BS  
Jacob Cauble, BS  
Lisa Douglass, BS  
Thomas Johnson, BS  
Christopher Knabe, BS  
Sanae Masuda, BS  
Meryl Twarog, BS  
Elsie Zimucha, BS  
Cyril Wehella-Gamage, MS

## Faculty and Staff

**Dr. Charles Blatchley**, Chairman of the Departments of Chemistry and Physics, spent the fall semester on administrative leave performing research as an Adjunct Professor at the University of Nebraska Medical Center in Omaha in the Department of Orthopaedic Surgery and Rehabilitation. He is continuing his collaboration with Professors **Fereydoon Namavar** and **Hani Haider** at the Scott Technology Center at UNMC, developing and testing new wear resistant materials for biomedical implants. Two papers nearing completion on this work involve a new Ti-B-N super hard coating produced by Ion Beam Enhanced Deposition (IBAD).

Dr Blatchley also worked with a hydrophilic cubic ZrO<sub>2</sub> coating, stabilized by a nanocrystalline structure rather than by chemical additives, and with metal doped TiO<sub>2</sub> photocatalysts with unusual optical properties. Samples of these materials are now at PSU undergoing testing by students in the College of Technology under **Dr. Chris Ibeh** and in the Chemistry Department under **Dr. Dilip Paul**, respectively.

This collaboration also resulted in several grant proposals to the Veterans Administration and National Institutes of Health to develop in vivo wear testing based on the Surface Layer Activation process. Previous work with this method at UNMC and PSU has used activation bombardments performed at the KSU McDonald Accelerator in Manhattan on implant materials, including CoCrMo, Ti, and ZrO<sub>2</sub>. Other continuing research interests include collaboration with Professor **Adrian Melott**'s group at the University of Kansas, looking for radionuclide evidence of supernovas and gamma ray bursters in the geologic record.

**Dr. Peter Hamlet** arranged and presented at a symposium on Green Chemistry in October, 2005 at the Midwest Regional ACS Meeting in Joplin, MO. Presenters included **Dr. Terry Collins** of Carnegie Mellon University who has developed catalysts for hydrogen peroxide oxidations and **Dr. James Hutchison** of the University of Oregon who is a pioneer of Green Chemistry in university teaching labs.

Dr. Hamlet did summer research analyzing the soy polyol that the Kansas Polymer Research Center has licensed to Cargill, Inc. He used the PSU gas chromatograph/mass spectrometer and the liquid chromatograph/mass spectrometer at the University of Kansas. The LC/MS uses electrospray ionization, which ionizes the large polyol molecules without fragmenting them. In doing the work, Dr. Hamlet identified the structures present in the soy polyol and learned some things about mass spectrometry of large molecules.

**Dr. William Shirley** was recognized and received his pin at the 2005 PSU Service Awards Ceremony for 15 years of service to PSU. **Dr. Charles Blatchley**, Chair of the Departments of Chemistry and Physics was on administrative leave during the fall semester. Dr. Shirley served as Acting Chairman of the Chemistry Department during that time.

**Dr. Khamis Siam** received a NSF Fellowship to pursue his research interests at Wichita State University. He has been on sabbatical starting in January and will be back on campus in mid August.

At Wichita State, Dr. Siam has been working in Professor **Rillema's** group. The research involves the synthesis and characterization of Pt complexes. Dr. Siam is contributing his expertise in computational chemistry to the group's efforts and produced enough results to present his findings at the National ACS Meeting in Atlanta in March.

Dr. Siam will be synthesizing carotene derivatives and has already started on the calculations for these systems. In addition, Dr. Siam continues to represent the local ACS section as Councilor and by his membership on the on Committee on Economic and Professional Affairs which meets concurrently with the National ACS meetings twice a year.

Professor **Robert Pavlis** received his 20 year service pen and Professor **Dilip Paul** his 10 year pen at the 2006 PSU Service Awards Ceremony. Keith Chadwick, Electronics Technologist, received his 15 year pen.

## News From Alumni

**Herbert Hau**, 1965 MS, was recently recognized for 25 years of teaching at the Restorative Department of the Tufts School of Dental Medicine. Dr. Hau is also in private practice in Dentistry in Boston, MA. In 2005, he was appointed consultant to NERB and will be doing licensing examination at the Northeast Regional Board (15 Northeastern states). Dr. Hau mentioned in recent correspondence his appreciation to **Dr. James Pauley** for being his Masters Degree thesis advisor 30 years ago.

**Jon R. Thompson**, 1972 MS, wrote that after he received his degree from PSU, he earned a Ph.D. in 1980 from the University of Wyoming in Science Education. He used the Chemistry degree for teaching high school and college Chemistry for 12 years in Colorado. He left teaching to be a consultant in science education and became heavily involved in teacher training, curriculum development and fund raising, traveling the US working for a non-profit educational organization. He ended his career in education with 10 years as an administrator/fund raiser at two science-mathematics high schools for high ability students in Michigan. He was the founding director of the Kalamazoo Area Math & Science Center and of the Oakland Science, Math & Technology School in Oakland County Michigan. At age 55, he took an early retirement from education and came back to Colorado. After a year of leisure, he and his wife bought a “The UPS Store” and are now small business owners. He says it is totally different from education, but they are enjoying the interactions with their customers. He remembers when he attended PSU, he didn't have time for much life outside of Chemistry. He recalls watching from the lab windows during summer afternoons as the Social Science NSF Institute students frequently boarded buses to go on field trips while he and his fellow Chemistry students spent long days (and nights) in the lab. He wrote, “It didn't seem fair at the time, but I know my Chemistry degree from PSU was one that carried a lot of respect because there were no shortcuts. It also gave me confidence to do whatever I wanted and, as a result, I've had quite a wide and varied career to look back upon.”

**Jeri (Lott) Milleman**, 1994 BS, was on campus recently for Spring Career Day. Jeri is employed by Hospira Pharmaceuticals in Hutchinson, KS. Hospira is a specialty pharmaceuticals and medication delivery company that is focused on developing, manufacturing and marketing products that improve the safety and efficiency of patient care.

**Hyriam Fleming**, 1999 BS, wrote that he is working on his Pharmacy Degree at the University of Kansas. His wife, Giselle, passed away in November of 04 of complications subsequent to removal of a brain tumor. He says he is doing the best he can for his beautiful daughters, Livia, age four and McKena, age two. Our best wishes are with him as he completes his degree and raises his daughters.

**Young-Jin Cho**, 2000 MS, emailed **Dr. Zegar** and **Dr. McAfee** in March. He thanked them for believing in him and for introducing him to Vanderbilt. Due to their encouragement, he applied and was accepted there. He recently defended his Ph.D. At the time of writing he was preparing to attend his brother's wedding in Korea. After a vacation, he will be looking for employment.

**Christopher Farris**, 2001 BS, and Krista Gorman, were married October 29, 2005 at the Sacred Heart Catholic Church in Frontenac. Chris received his Master's Degree in 2005 in Justice Administration. He is employed by the State of Kansas and they are living in Pittsburg.

**Dmytro Demydov**, 2002 MS, now attending the University of Kansas, recently spent a week at PSU furthering work for his dissertation. His dissertation title is: “Synthesis, Characterization and Application of Aero gel Prepared Metal Mixed Oxides (MgTiO<sub>3</sub>, SrTiO<sub>3</sub>, BaTiO<sub>3</sub>).”

**Reed Oshel**, 2003 BS, was on campus April 21 to present at Colloquium. The title of his presentation was “Adding Value to Select Biorenewable Resources: Catalytic Transformations of Soybean Oil and Pretreatment of Distillers Grains.” Reed is completing his graduate work at Iowa State University. He also spoke earlier in the day to interested students about graduate school, and specific information about the Biorenewable Resources and Technology Graduate Program and Chemistry at ISU.

Reed and his wife Abby are proud parents of a baby daughter born in February.

**Krystal (Stuhlsatz) Klein**, 2004 BS, and husband Kevin announced the birth of a baby daughter, Alena Kay last fall. At the present time, Krystal is enjoying staying home with her.

**Zhili (Lily) Xu**, 2004 MS, married Fugang Wang during Christmas vacation in her homeland of China. Lily is currently working on her Ph.D at Iowa State University

**Richard (Brandon) Schartz**, 2004 BS, is a second year medical student at Johns Hopkins School of Medicine in Baltimore. While at PSU he majored in Biology and a Chemistry minor. He was employed by the Chemistry Department as a Tutor and was also a recipient of the Golden Gorilla Award, Spring 04.

**Stanley Wells**, 2005 BS, has accepted an active duty commission in the Quartermaster Branch of the Army. His OBC assignment is Fort Lee, VA. Wells previously served six years in the Navy and four years in the Kansas National Guard.

We are asking that alumni members fill out and return the form included in this newsletter. We would like to know in which area of Chemistry you are employed and if you continued your education after you left PSU. The information will be used to determine how we can best serve our students. Thank you in advance for your time and consideration.

## Additional News

The following students were recognized at the Chemistry Banquet held April 17 in the Overman Student Center. These students were chosen by the faculty for recognition of their performance in the following areas of Chemistry.

Analytical Award – **Brian Ray**

Organic Award – **Chad Stewart**

Physical Chemistry Award – **Karen Baker**

Biochemistry Award – **Meryl Twarog**

Research Awards – **Tera Cox, Michelle McCullough, Brian Ray, Randall Warren**

Freshman Awards – **Heidi Compton, Eddie Penner**

Outstanding High School Student Award – **Atanu (Rick) K. Paul**

**Dr. James McAfee** returned to work at the beginning of the Spring semester after having major heart surgery in November. He has resumed all activity and is busy working on the National Institutes of Health Academic Research Award in support of the Functional Analysis of an hnRNP C-Like Protein. Students who enroll in research classes assist him each semester. Those enrolled this semester are: **Tera Cox, Nathan Elliott, Kana Innami, Kelsey Lackey, Michelle McCullough, Eddie Penner, and Haley Ruther**. **Dr. Irene Zegar** also helps with the project. This fraction of the grant project began during the fall 2004 semester and will run continuously until July 2007. The award has enabled students to participate in a type of research that would not have been available otherwise. Dr. McAfee is Principal Investigator of the project, which was initially awarded in September 1999.

We want to know about you!

Name \_\_\_\_\_

Year of Graduation \_\_\_\_\_

Degree \_\_\_\_\_

Occupation \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

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Comments \_\_\_\_\_

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Please mail to:  
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 Jaunita Shepard, Newsletter Editor  
 1701 S. Broadway  
 Pittsburg, KS 66762  
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Contribution to Chemistry Department

Name \_\_\_\_\_

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City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Year of Graduation \_\_\_\_\_

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