

The Department of Chemistry NEWSLETTER



Chemist Receives High Honor from ASMS

Yinsheng Wang, a professor of chemistry at the University of California, Riverside, has received the Biemann Medal, awarded by the American Society for Mass Spectrometry (ASMS) to an individual early in his or her career in recognition of significant achievement in basic or applied mass spectrometry.

Wang received the medal and gave an award lecture earlier this month at the annual conference of the ASMS in Minneapolis, Minn. The medal is accompanied by a cash prize of \$5,000. "I feel humbled to be the recipient of this year's Biemann Medal," Wang said. "This is a great recognition of our work by the mass spectrometry community. I appreciate very much the hard work of my graduate students and postdoctoral fellows, without which this would not have been possible."

The first person at UC Riverside to win the medal, Wang focuses his research on discovering the biological consequences of DNA damage and on unraveling mechanisms of action for anti-tumor drugs and environmental toxicants. His laboratory's use and development of mass spectrometry, synthetic organic chemistry, biochemistry and molecular biology enable us to understand, at the molecular level, how various DNA damage products are repaired, and how they perturb the efficiency and fidelity of the flow of genetic information during DNA replication and transcription.

Wang is the director of the Environmental Toxicology Graduate Program at UCR. He received his bachelor's degree from Shandong University and master's degree from the Chinese Academy of Sciences. He joined the UCR faculty in 2001, after earning his doctoral degree from Washington University in St. Louis.

He is the recipient of a 2005 Research Award from the American Society for Mass Spectrometry, as well as the inaugural Chemical Research in Toxicology Young Investigator Award from the American Chemical Society in 2012. He was named a Fellow of the American Association for the Advancement of Science in 2012. The Biemann Medal was established by contributions from students, postdoctoral associates and friends to honor Klaus Biemann, a biochemist at the Massachusetts Institute of Technology. Nominees for the award must be within the first 15 years of receiving the Ph.D. at the time of nomination.

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Chair's Welcome

The UCR Chemistry Department is abuzz with activity this summer. Our newest faculty member, Dr. W. Hill Harman, joined the department July 1 and already has students working hard in the lab. At the beginning of July we welcomed 15 new graduate students who are getting a jumpstart on their research and working on NSF graduate fellowship applications this summer while settling into life in Riverside. They will be joined by another 20 new graduate students in September – one of our biggest graduate classes yet! We also have a large number of undergraduates doing research this summer supported by a variety of programs. Many of these programs are funded by NSF and NIH to support students who are from groups traditionally underrepresented in science or families who are economically disadvantaged. Although the majority of our students fall into these two groups, there are never enough positions to support all of the talented students who want to do summer research. That is why we were so thrilled when chemistry alumni John Precht and Eddie Seo stepped forward to provide funding for the Kuwana-Sawyer award. This award is supporting three UCR undergraduate students to perform analytical chemistry research this summer.

All of UCR, including the Chemistry Department, is eagerly anticipating the arrival of our new chancellor Dr. Kim Wilcox. Chancellor Wilcox was most recently provost at Michigan State University, but prior to that he was Dean of the College of Liberal Arts and Sciences at the University of Kansas (another of many UCR – KU connections). It will be interesting to see what new ideas and programs Chancellor Wilcox brings to our campus!



Michael Tamsi



Noemi Garcia



Jonathan Lloyd



Yongsheng Xiao

Kuwana-Sawyer and Sawyer Award Funds Support Analytical Chemistry Students

Thanks to generous donations by UCR Chemistry alumni John Precht and Eddie Seo, three of our undergraduate students are working full-time in the laboratory this summer. The Kuwana-Sawyer Award honors Ted Kuwana and Donald T. Sawyer, well-known analytical chemists and former UCR professors, while providing support for undergraduate students doing research in analytical chemistry. This year's Kuwana-Sawyer Award recipients are Michael Tamsi (working with Prof. Wenwan Zhong), Noemi Garcia (working with Prof. Cindy Larive), and Jonathan Lloyd (working with Prof. Jason Cheng). The students are all very appreciative of the opportunity to work full-time in the lab this summer, doing cutting-edge science and building skills to use in their future careers. In addition to doing research, Michael, Noemi and Jonathan are joining about 30 other summer research students from all areas of science and engineering for seminars on searching the literature, scientific ethics, academic professionalism, applying to graduate school, interview skills and making successful poster and oral presentations.

The Sawyer Graduate Award is an annual cash award recognizing a 3rd or 4th year analytical chemistry graduate student. The award is given based on the student's accomplishments, creativity and future potential as an analytical chemist. This 2013 Sawyer Award was presented in June to Yongsheng Xiao, a fourth year graduate student working in Prof. Yinsheng Wang's laboratory. The department has thus far raised \$15,000 towards the \$25,000 needed to endow the Sawyer Award. If you would like to contribute to the Sawyer Award fund or any of the Department's other activities, it is easy to make a gift through the link on our website www.chem.ucr.edu.

Student Awards



Pauline Olsen

Third-year undergraduate biochemistry-chemistry major, has been recognized as one of the 2013 UCR Chancellor's Research Fellows. Pauline's research, conducted under the guidance of Dr. Jack Eichler in the department of chemistry, generally aims to investigate the potential anticancer properties of gold(III) coordination complexes. Her previous research in the lab focused on investigating the serum albumin binding of a five-coordinate gold(III) complex, and her work revealed that binding with this protein may limit the in vivo antitumor efficacy of this compound. Pauline has presented her research at the Fall 2012 Southern California Undergraduate Research Conference, the Spring 2013 Southern California Undergraduate Chemistry Research Symposium, and most recently at the Spring 2013 UCR Undergraduate Research Symposium. Her findings are also included in a paper that has recently been submitted to the Journal of Inorganic Biochemistry. Pauline's proposal for the Chancellor's Research Fellowship described her plans to make new gold(III) coordination complexes that have weaker binding to serum albumin proteins, and potentially enhanced antitumor activity.



Qiao Zhang

PhD student recently graduated from Prof. Yadong Yin's group, has been selected by the International Union of Pure and Applied Chemistry (IUPAC) to receive one of the five 2013 IUPAC Prizes for Young Chemists. According to IUPAC, the prizes are given for the most outstanding Ph.D. theses in the general area of the chemical sciences. In addition to a cash prize of USD 1000, Qiao will be provided travel expenses to the 44th IUPAC World Chemistry Congress, 8-15 August 2013, in Istanbul, Turkey, where he will be invited to present a poster to describe his award-winning work. While in Prof. Yin's group, Qiao's research was mainly focused on the design and fabrication of nanomaterials and their applications in catalysis, including the mechanistic study of colloidal synthesis of metal nanoparticle catalysts, stabilization of metal nanoparticles to make reliable catalysts, and engineering the metal-based catalysts for significantly enhanced performance. Qiao is currently working as a postdoc at the University of California, Berkeley.



Andrew Carlson

UCR's recipient of the American Chemical Society Division of Organic Chemistry's Undergraduate Award in Organic Chemistry for 2013. The award is intended to recognize senior students who display a significant aptitude for organic chemistry and to encourage further interest in the field. Andrew is completing his research on novel luciferins in the laboratory of Prof. Michael Pirrung and will be enrolling in graduate school at UCLA in the Fall.



Le He

Fifth year graduate student of the Yin group won a Graduate Student Award and a Poster Award at the 2013 Materials Research Society spring meeting in San Francisco. The MRS Graduate Student Awards recognize students of exceptional ability who show promise for significant future achievement in materials research. Le presented his work on magnetic responsive photonic nanostructures in the meeting. Congratulations Le!



Mary Nguyen

Junior in Chemistry and a University Honors student at UC Riverside, has been selected as a 2013 Goldwater Scholarship recipient. The Goldwater Scholarship provides \$7500 for juniors to encourage outstanding students to pursue careers in mathematics, the natural sciences, or engineering, and to foster excellence in those fields. In interviewing Mary for campus endorsement, Vice Provost Steve Brint, found her academics, research experience, career goals, and passion for research to fit the qualities that the Goldwater Scholarship seeks in eligible candidates.



Fellowship Awards

three graduate students of the Bartels Lab received prestigious fellowships: MSE student Chen Wang and EE student Miguel Isarraraz received National Science Foundation graduate fellowships for studies on the catalytic and electronic properties, respectively, of molybdenum disulfide and related materials. Physics student Jon Wyrick received a National Research Council Postdoctoral fellowship for scanning tunneling microscopy studies at the National Institute of Science and Technology (NIST) to start after his graduation in Fall.



Dr. Robert Haddon

UC Riverside Scientists Discovering New Uses for Tiny Carbon Nanotubes

The atom-sized world of carbon nanotubes holds great promise for a future demanding smaller and faster electronic components. Nanotubes are stronger than steel and smaller than any element of silicon-based electronics—the ubiquitous component of today’s electrical devices—and have better conductivity, which means they can potentially process information faster while using less energy.

The challenge has been figuring out how to incorporate all those great properties into useful electronic devices. A new discovery by four scientists at the University of California, Riverside has brought us closer to the goal. They discovered that by adding ionic liquid—a kind of liquid salt—they can modify the optical transparency of single-walled carbon nanotube films in a controlled pattern.

“It was a discovery, not something we were looking for,” said Robert Haddon, director of UC Riverside’s Center for Nanoscale Science and Engineering. He has a joint appointment in the College of Natural and Agricultural Sciences and the Bourns College of Engineering.

Scientists Feihu Wang, Mikhail Itkis and Elena Bekyarova worked with him to try to improve the electrical behavior of carbon nanotubes, and as part of their research they also looked at whether they could modulate the transparency of the films. An article about their findings was published online in April in *Nature Photonics*.

The scientists spent some time trying to affect the optical properties of carbon nanotube films with an electric field, with little success, said Itkis, a research scientist at the Center for Nanoscale Science and Engineering. “But when we applied a thin layer of an ionic liquid on top of the nanotube film we noticed that the change of transparency is amplified 100 times and that the change in transparency occurs in the vicinity of one of the electrodes, so we started studying what causes these drastic changes and how to create transparency in controlled patterns.”

An ionic liquid contains negative and positive ions which can interact with the nanotubes, dramatically influencing their ability to store an electrical charge. That increases or decreases their transparency, similar to the way that glasses darken in sunlight. By learning how to manipulate the transparency, scientists may be able to start incorporating nanotube films into products that now rely on slower or heavier components, such as metal oxide.

For instance, using nanotube films meshed with a film of ionic liquid, scientists could create more cost effective Smart Windows, that darken when it’s hot outside and become lighter when it’s cold.

“Smart Windows are a new industry that has been shown to save 50 percent of your energy costs,” said Itkis. “On a very hot day you can shade your window just by turning a switch, so you don’t have to use as much air conditioning. And on a winter day, you can make a window more transparent to let in more light.”

The scientists still need to study the economic viability of using nanotube film, but Bekyarova said one possible advantage would be that carbon nanotubes are ultra thin—about 1,000 times smaller than a single strand of hair—so you would need very little to cover a large area, such as the windows of a large building. Itkis said nanotube films also hold great promise in building lighter and more compact analytical instruments such as spectrometers, which are used to analyze the properties of light. In this application, a nanotube film with an array of electrodes can be used as an electrically configurable diffraction grating for an infrared spectrometer, allowing the wavelength of light to be scanned without moving parts.

Furthermore, by using addressable electrodes, the spatial pattern of the induced transparency in the nanotube film can be modified in a controlled way and used as an electrically configurable optical media for storage and transfer of information via patterns of light. Carbon nanotubes have great potential, but there is still plenty of work to be done to make them useful in electronics and optoelectronics, Haddon said. “The challenge is to harness their outstanding properties,” he said. “They won’t be available at Home Depot next week, but there is continuing progress in the field.”



Assistant Professor Richard Hooley has been awarded the 2013 Chancellor's Award for Fostering Excellence in Undergraduate Research and Creative Achievement. This award is intended to recognize his contributions to mentoring undergraduate research students in a laboratory setting. Professor Hooley's research interests lie in the synthesis of nanoscale molecular receptors, the study of their properties and applicability to a variety of processes, including novel materials, biosensing and selective catalysis. He has mentored twelve undergraduate students during his time at UC Riverside, and these students have been a core component of his research team, contributing significantly to published research papers and projects. Students from Prof Hooley's lab have gone on to places in medical schools and chemistry graduate programs, and this award is a testament to their commitment and dedication to research at UC Riverside.

Dr. Susan Srivatsa Class of 87'



The Founder and President of ElixinPharma, a pharmaceutical regulatory consulting firm that provides scientific and technical leadership in the area of Chemistry, Manufacturing and Controls (CMC) for a number of leading companies in various stages of clinical development. The firm specializes in supporting the development of novel technologies such as DNA and RNA therapeutics for which FDA regulatory guidance is currently unavailable.

Susan received a Ph.D. in Analytical Chemistry from UCR in 1987 under the mentorship of Prof. Donald T. Sawyer. Her graduate research focused on electrochemical and structural studies of transition metal complexes as models for oxygen binding and electron transfer hemoproteins. She pursued her post-doctoral research at UCR under Prof. Dallas L. Rabenstein on the biophysical applications of NMR spectroscopy.

Prior to founding ElixinPharma in 1999, Susan served as Senior Director at Isis Pharmaceuticals (1993-1999) where she was responsible for analytical development and quality control of oligonucleotide drug candidates from pre-clinical studies to approval and marketing. Susan also has broad experience in the development of small molecules, proteins and peptides, having held positions of increasing responsibility at the Procter and Gamble Company, Allergan Inc., Abbott Laboratories and Telios Pharmaceuticals.

Over the past twenty years, Susan has been part of many successful “firsts”, paving the way for the regulation of novel therapeutics in the US and Europe, including approval of the first antisense oligonucleotide drug, Vitravene™, approval of the first aptamer oligonucleotide drug Macugen™, first DNA decoy duplex to enter Phase 3, first siRNA to enter clinical trials, first combination oligonucleotide by pulmonary delivery; first regulatable antithrombotic aptamer/antidote combination, first siRNA by systemic delivery and the first siRNA to be delivered in nanoparticles.

In 1998, Susan was elected to the PhRMA Analytical R&D Steering Committee and in 1999 served on the Expert Committee along with FDA, European and Japanese regulators for development of the ICH Quality Guideline, Q6A: Specifications for New Drug Substances. Susan has served on the Scientific Advisory Board of the US Tides conference since 2000, the EuroTides conference since 2004 and AsiaTides conference since its inception in 2009. She continues to publish articles in peer-reviewed journals and recently co-edited a book entitled “Handbook of Analysis of Oligonucleotides and Related Products” published by CRC Press in 2011.

Dr. Xinzhao Grace Jiang Class of 06'



Grace received a Ph.D. in Analytical Chemistry from UCR in 2006 under the mentorship of Prof. Yinsheng Wang. Her thesis was on nucleosomal protein study using mass spectrometry and biochemical techniques. Dr. Grace Jiang joined Amgen in 2006 as a Scientist in Process and Product Development. Amgen is a leading biotechnology company dedicated to deliver innovative and effective therapeutics for patients with serious illness such as cancer, kidney disease, rheumatoid arthritis, bone disease. Since Grace joined Amgen, she has led a group of scientists working on developing new analytical techniques to investigate, understand and monitor the quality attributes of protein therapeutics. Her work has led to three innovation awards of Process and Product Development at Amgen, seven publications, and a promotion to Senior Scientist.

In 2011, Grace did a career switch within Amgen and moved to Drug Product and Process Development. She led technology development and transfer efforts with FDA regulatory oversight for a new fill/finish plant at Amgen Manufacture Limited in Puerto Rico. This new plant implemented industry-leading aseptic vial and syringe filling technology to better serve the drug supply for patients worldwide. In late 2012, Grace was recruited into International Regulatory at Amgen. She's currently a Senior Manager that manages the regulatory submission and expansion in China and Asia Pacific area.

Besides her work at Amgen, Grace has a passion to help young scientists develop their career. She is serving on the board of Association for Women in Science, Los Angeles and Ventura County chapter (AWIS LAVC). AWIS LAVC is a local chapter of the national non-profit organization AWIS. AWIS LAVC was founded in 2007 with the sponsorship of several women executives at Amgen, and is dedicated to foster, support, promote and cultivate the personal and professional skills of women, so they can become leaders in their fields and realize their full potential both professionally and personally.

Dr. C. Patrick Dunne Class of 64'

UCR Chemistry Major Class of 1964 retired in Aug. 2012 after 31 years' service at the US Army Natick Soldier Center in Natick, Mass. Dr. Dunne's long standing role as the Senior Advisor for Nutritional Biochemistry & Advanced Processing in the Department of Defense Combat Feeding Directorate (CFD) brought wide recognition to himself and the CFD, both nationally and internationally, as the preeminent expert in the field of nutritional biochemistry and cutting edge novel processing initiatives. Dr. Dunne received the Commander's Award for Civilian Service at the retirement ceremony. Dr. Dunne went to graduate school at Brandeis University in Waltham, MA; he has a Ph.D. in Biochemistry for thesis research on the organometallic chemistry of Vitamin B12. Before coming to the U.S. Army Research Center in Natick, MA in 1979, he was on the faculty of the Chemistry Departments at the University of Detroit and CSU-Long Beach, and was a postdoctoral associate in biochemistry at Michigan State University.



Dr. Dunne led research efforts in food biochemistry and nutritional biochemistry that supported the development of improved rations for the military. He took a lead role in Dual Use Science and Technology collaborative projects involving academia and industry in advanced food processing technologies – pulsed electric field, high pressure and microwave processing. Dr. Dunne was a founding member of the new Nonthermal Processing Division of the Institute of Food Technology (IFT); he was elected the first Chair of that Division in 1999 and co-edited and wrote a chapter for the book, *Nonthermal Processing Technologies for Food*, published by Wiley-Blackwell in 2011. He was the IFT Solberg Award winner in 2005 for fostering collaborations among academia, industry and government researchers. He was named an IFT Fellow in 2009 and was one of the team of five who were given the IFT 2010 Research and Development Award for the microwave sterilization process. Dr. Dunne was awarded the Institute of Food Safety and Health Food Safety Award in 2011. Dr. Dunne maintains an active interest in science education and volunteers in this area now; he was an elected member of the Framingham, MA School Committee for twelve years.

Patrick Dunne has some personal memories of a much smaller UCR of the 1960s to share: I came in 1962 as a transfer student from Caltech and recall taking Physical Chemistry from David Kerns, Instrumental Analysis from Dr. Ted Kuwana, P.Chem. Lab from Jerry Bell and Advanced Inorganic from Fred Hawthorne. We appreciated the weekly senior chemistry seminar followed by beers at Shakey's Pizza. I was introduced to biological sciences in my senior year via an accelerated biology course taught by Dean Parker and a metabolism course with Carlton Bovell and then decided to apply to graduate programs in biochemistry. Many of my classmates also went on to graduate study at variety of leading research universities. UCR was able to attract some of the major music figures of the 60's to perform in the gym or auditorium. I remember concerts by Bob Dylan, Odetta, Peter Paul and Mary and the Jazz Crusaders. UCR did have a football team in those days but I played on the basketball team for my two years at UCR. Those of us at UCR in the early 60s may share my memories of the day in the fall of 1962 when the B-47 bombers at March Air Force Base over the hill all took off and flew right over the campus at the height of the Cuban missile crisis. Most of us can also recall where we were when we heard about the assassination of President John F. Kennedy on Nov. 22, 1963; I was in a comparative literature course when the distressed professor came in and dismissed the class saying the President has been shot.



Brooke Wilson Class of 11'

Brooke Wilson graduated from UCR in 2011 with a B.S. degree in Chemistry and moved to Houston, Texas soon thereafter. Her education and overall experiences obtained at UCR within the classroom, laboratory, and also during her tenure as an undergraduate researcher with Professor Paul Ziemann, provided her with ample knowledge to enter the competitive job market as a Chemist. Her chemistry background and laboratory experience enabled her to be a candidate for numerous laboratory positions in one of the largest thriving oil and gas markets in the world.

Brooke is currently employed by NuTech Energy Alliance/Porolabs, Inc. and works in their core analysis laboratory. Her position as a Laboratory Scientist involves the analysis of rock samples utilizing MICP (Mercury Intrusion Capillary Pressure) porosimetry, TOC (Total Organic Carbon) analysis, and X-Ray diffraction. Data obtained from these instruments provides various core analysis characteristics, including but not limited to, porosity, permeability, pore throat size, organic richness, and bulk mineralogy, utilized to assess reservoir potential and quality. Just as the energy industry continues to grow and thrive, so does Brooke's knowledge and proficiency in chemistry, as well as in other fields, including geology and petro-physics.



Congratulations Graduates



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