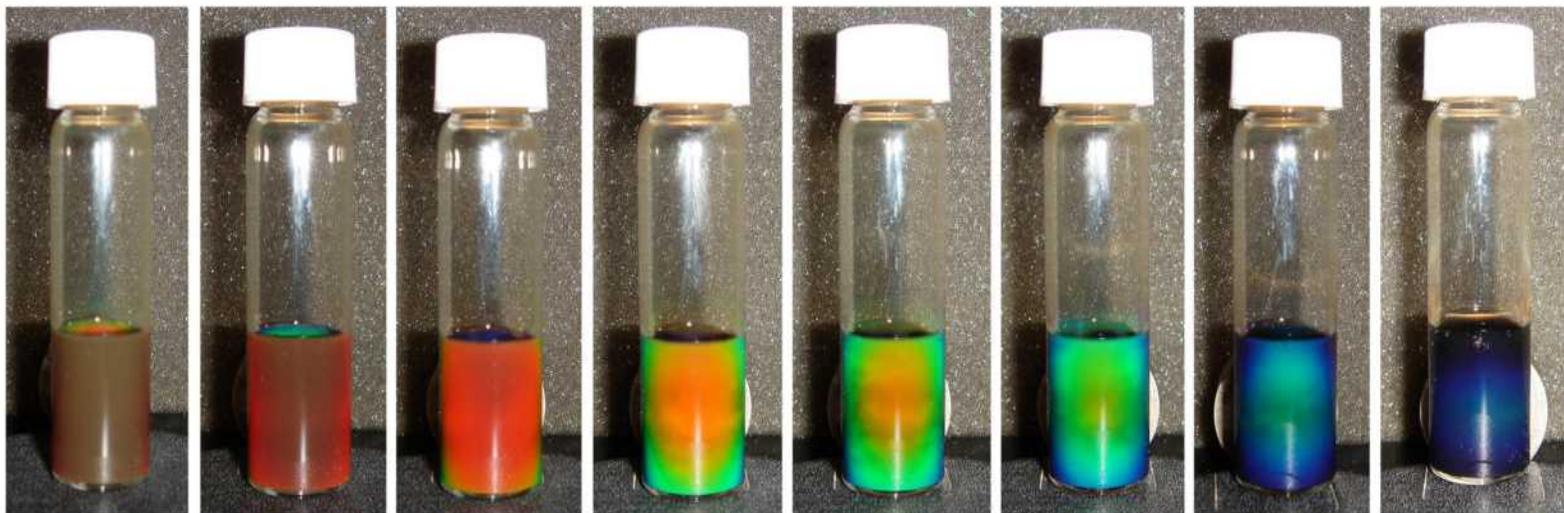


Department of Chemistry

NEWSLETTER



Welcome to Our Newest Faculty Member Ming Lee Tang

It is with a great sense of adventure and excitement that I join the Department of Chemistry at the UC Riverside. As a product of Californian higher education, I am thrilled to be able to teach at the most diverse UC in the Golden State, and reach out to an unprecedented number of first generation college attendees. I did my graduate research with Zhenan Bao at Stanford University and then my postdoctoral work with Paul Alivisatos and Jeff Long at the UC Berkeley. Before that, I came to the United States from Malaysia on a Justice Brandeis Scholarship and graduated with an economics and chemistry degree from Brandeis University.

Summers at Riverside remind me of the weather in my native country where it is hot and humid all year round. The weather this fall quarter has been very pleasant, and we look forward to getting to know the community well. At present, I am setting up my synthesis and spectroscopy laboratory, both of which are located in the new Materials Science and Engineering (MSE) building on campus. The MSE building houses laboratories from both the sciences and engineering, and is poised to be a hotbed of interdisciplinary research.

My own research lies at the interface of supramolecular chemistry, colloidal chemistry and single molecule spectroscopy. We intend to understand and therefore control the nanocrystal- ligand interface, with an eye towards nanomaterials with novel optoelectronic and catalytic applications.

2011 - 2012
Volume 1 - Number 1

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Graduate Student Silver Awards

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Chair's Welcome



Dear Alumni and Friends,

We are pleased to have this opportunity to update you about recent events in the UCR Chemistry Department. As we prepare this newsletter, we are in the midst of searches for two new faculty members in Organic and Inorganic Chemistry and our students, faculty and staff are preparing for final exams – always a busy time. It has been two years since our last newsletter, my how time flies. Our New Year's resolution for 2013 is to be more active in communicating with you. One thing that is helping to make this possible is our talented new staff member Jaime Matute, who is largely responsible for this newsletter as well as our new and improved web portal www.chem.ucr.edu

(be sure to check it out). In this newsletter you will find some of the latest “happenings” in our department including an introduction to Dr. Ming Lee Tang, our newest faculty member, a summary of student and faculty awards, outreach activities, and the work of Dr. Jack Eichler to incorporate case studies into our general chemistry program. The Bryan Kohler Lecture fund supports a seminar visit to our department by a prominent scientist, and an article in this newsletter summarizes the 2012 Kohler lecture by Yale Professor William Jorgensen. We hope to be able to feature more articles about our alumni on our website and in future newsletters, so please write me at clarive@ucr.edu to share your news.

A major highlight of 2012 for our campus was the passage of Proposition 30 bringing us hope for a more stable budget over the next few years. The campus survived several years of budget cuts through a lot of belt tightening and substantial tuition increases which have created a strain on many of our students and their families. The financial support provided by our department's donors is critical to our pursuit of excellence, and we are pleased to recognize the 2011-2012 contributors to our program in this newsletter. We are especially grateful to Hemant and Jayshiri Kurani who have established a new endowed fund for our department and are pleased that momentum continues to build for the Donald T. Sawyer Award fund, which is a little more than half way to the \$25,000 needed to establish an endowment for this award. The department also benefits greatly from contributions to several current use funds. The Chemical Sciences Fund for Excellence provided funds this year to buy new LCD projectors to use in classes, seminars and research group meetings, and will help to purchase a new ATR FTIR instrument for one of the undergraduate organic chemistry laboratories. The Chemistry Alumni Scholarship Fund has now accumulated sufficient funds to award the first scholarship, and we hope to be able to tell you about the recipient in a future newsletter. This scholarship is in addition to the Moore-Gandolfo Memorial Scholarship, made possible by Mr. and Mrs. Rodney M. Moore. The Kuwana and Sawyer Undergraduate Award in Analytical Chemistry was established by Eddie and Alice Seo to foster undergraduate research and recognize two former UCR faculty – Ted Kuwana and Don Sawyer. In addition to Eddie and Alice's generous contributions, we are pleased to have received a substantial donation from John T. Precht to expand the impact of this fund. Many of our students need to work to finance their education and support from this fund allows the recipients to focus on their research over the summer.

In closing, we hope that you and your families enjoy this holiday season. We wish you all the best in 2013 and look forward to seeing you soon at UCR.

Sincerely,
Cynthia Larive, Ph.D.
Professor and Chair

Thanks to the 2011-2012

Donors to our Department

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Janet Takeuchi
Darcy Tarrant
Hugo Villar
Tram Vu
Charles Weir
Jeffrey Wyatt
Stanley Ziegler

Department of Chemistry Website

<http://www.chem.ucr.edu>

Awards



Huiwang Ai

2012 UCR Academic Senate
Regents Faculty Fellowship

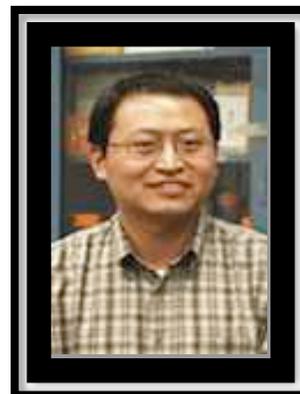
2012 Chinese American
Faculty Association Robert
T. Poe Faculty Development
Grant



Gregory Beran

2012 Outstanding Junior
Faculty Award

2011 University Honors
Professor of the Year



Jason Cheng

2011 Undergraduate
Research Mentoring Award



Pingyun Feng

2012 AAAS Fellow



Richard Hooley

2012 NSF CAREER Award



Cynthia Larive

2011 Fellow of the American
Chemical Society

2011 Innovative Teaching
Award

Awards



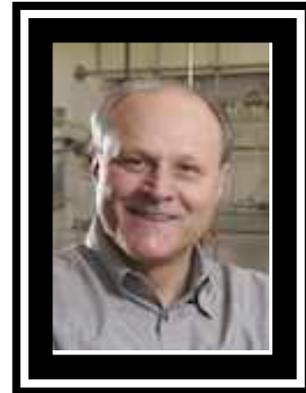
Leonard Mueller

2011-2012 Distinguished
Teaching Award



Chris Reed

2012 ACS F. Albert Cotton
Award



Michael Pirrung

2012 Distinguished
Professor



Yinsheng Wang

2012 Chemical Research in
Toxicology Young
Investigator Award

2011 AAAS Fellow



Yadong Yin

2009-12 Cottrell Scholar
Award

2010-15 NSF Career Award

2010-13 DuPont Young
Professor Grant Award



Wenwan Zhong

2011 NSF CAREER Award

Student News

Chemistry Graduate Students Honored for Their Research



Two Ph.D. graduate students at the University of California, Riverside have won Silver Awards given out by the Materials Research Society (MRS) “for their academic achievements and current materials research, which exhibit a high level of excellence and distinction.”

Zhenda Lu and Qiao Zhang, who both work in the lab of Yadong Yin, an associate professor of chemistry, received the awards on April 11 during the 2012 MRS Spring Meeting in San Francisco. They were honored for their oral presentations given at the meeting the previous day.

Lu developed a number of general self-assembly processes for the synthesis of multi-functional nanoscale composites which show superior performance in various applications including bioseparation, catalysis and energy harvesting.

Zhang’s research was focused on the development of highly efficient titanium dioxide (TiO_2)-based nanostructured materials for harvesting solar energy. By controlling the composition, geometric configuration, doping, and interface, he was able to produce photocatalysts with significantly enhanced efficiency in solar-assisted wastewater treatment and hydrogen production by splitting water.



Ciba Travel Award in GREEN Chemistry

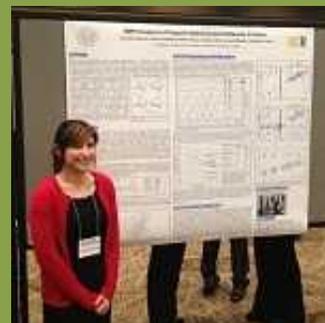
Katherine Djernes

will be receiving the 2012 ACS Ciba Student Travel Award. Only 4 students in the nation were selected to receive this award. This award recognizes research that has a significant green chemistry or sustainability component. Katherine will present her results at the Spring 2013 ACS meeting.

Consuelo Beecher Attends



Chemistry graduate student **Consuelo Beecher** was among the nearly 4000 attendees at the SACNAS national conference held Oct. 11-14 (2012) in Seattle. Consuelo received a SACNAS travel award to attend the meeting and present a poster on her research.



Student News

Inaugural Chancellor's Research Fellowship Recipient

Neil Quebbemann (Chemistry) – Radical Migration in the Gas Phase

Faculty Mentor: Ryan Julian (Chemistry) The study will identify residues that are susceptible to radical attacks in amino acid chains.

Twelve University of California, Riverside undergraduate students have been named the inaugural recipients of the Chancellor's Research Fellowship (CRF) Vice Provost of Undergraduate Education Steven Brint announced.



The fellowships are designed to enhance UC Riverside's already robust undergraduate research and creative activity program by providing up to \$5,000 to support faculty-mentored research opportunities. In total, the Office of Undergraduate Education distributed more than \$58,000 in awards.

Recipients were required to propose a research project that described their methodological approach, consisting of a research question or hypothesis, the data collection procedures and data analysis procedures. They will be required to write a quarterly report detailing the progress of their research and will be asked to present their results at the annual Undergraduate Research Symposium in the spring.

Student Awards

Rizi Ai:	2011-2012 Dissertation Year Program Fellowship
Jonathan Ashby:	2011 NSF Graduate Research Fellowship
Gregory A. Barding:	2012 Donald T. Sawyer Award for Excellence in Analytical Chemistry
Consuelo Beecher:	2012 SACNAS Travel Award
Katherine Djernes:	2012 ACS Ciba Travel Award in Green Chemistry
Nicole Godfrey:	2012 Moore-Gandolfo Memorial Scholarship
James Goebel:	2012-2013 Dissertation Year Program Fellowship
Josh Hartman:	2012 Outstanding TA Award
Le He:	2012-2013 Dissertation Year Program Fellowship
Yongxing Hu:	2011 Director's Postdoctoral Fellowship
Mindy Huang:	2012 Early C. Anthony Graduate Travel Award
Christopher J. Jones:	2011 Donald T. Sawyer Award for Excellence in Analytical Chemistry
Derek Langeslay:	2011 ENC Travel Grant
Zhenda Lu:	2011-2012 Dissertation Year Program Fellowship
Yin Luo:	2012 Outstanding TA Award
Michael Niechayev:	2012 Kuwana-Sawyer Award for Excellence in Undergrad. Research in Analytical Chemistry
Neil Quebbemann:	2012 Chancellor's Research Fellowship
Lei Ren:	2011-2012 Dissertation Year Program Fellowship
Sumukh Sathnur:	2012 Kuwana-Sawyer Award for Excellence in Undergrad. Research in Analytical Chemistry
Audrey Tu:	2012 Kuwana-Sawyer Award for Excellence in Undergrad. Research in Analytical Chemistry
Jimmy Vo:	2011 Kuwana-Sawyer Award for Excellence in Undergrad. Research in Analytical Chemistry

Research

Research on Nanocrystals to Move From Lab to Market



The University of California, Riverside has granted an exclusive license to The Idea Zoo, Inc., to commercialize nanotechnology research developed in the lab of Yadong Yin, an associate professor of chemistry.

The Idea Zoo, a leading developer and licensor of advanced materials and technologies headquartered in Santa Clara, Calif., was granted exclusive rights to seven patents that cover various aspects of advanced superparamagnetic colloidal nanocrystals (CNCs).

Specifically, the patents focus on magnetically tunable photonic crystals and the ability to commercialize them.

The Idea Zoo will undertake the development and commercialization of CNCs spanning several industries ranging from high-security applications to commercial applications for on-demand color-changing products. The agreement spans the life of the patents. UCR will receive royalties from products developed from these licensed technologies and will receive equity in The Idea Zoo, Inc.

Determining the Nature of Enzymes

Manufactured by all plant and animal cells, enzymes are proteins that work as catalysts in biochemical reactions, dramatically increasing the reaction rates. All cells require enzymes to survive and function. Without enzymes we would not be able to breathe, swallow, drink, eat, or digest our food. Yet, molecular-level details of enzyme mechanisms remain elusive.



Leonard J. Mueller, an associate professor of chemistry at the University of California, Riverside, has received a five-year \$1.43 million grant from the National Institutes of Health to establish a highly integrated, multidisciplinary approach to defining the structure and function of enzymes at the molecular level. He will be joined by faculty from the Departments of Chemistry and Biochemistry in the research project, and will use a synergistic combination of techniques, including X-ray crystallography, solid-state nuclear magnetic resonance, synthetic organic chemistry, and computational chemistry.

“While each of these techniques applied in isolation offers a glimpse of the bigger picture, only when pieced together can they reveal the big picture at highest resolution,” said Mueller, the principal investigator of the grant. “The goal of our project is to bring these techniques together at atomic resolution. Our results should be useful to designers of new antibiotics and therapeutic agents.”

His lab focuses on characterizing the structure of molecules that range in size from small molecules in solution to larger biomolecules such as proteins, DNA, and carbohydrates.

Research

New Laboratory Test Assesses How DNA Damage Affects Protein Synthesis

Transcription is a cellular process by which genetic information from DNA is copied to messenger RNA for protein production. But anticancer drugs and environmental chemicals can sometimes interrupt this flow of genetic information by causing modifications in DNA.

Chemists at the University of California, Riverside have now developed a test in the lab to examine how such DNA modifications lead to aberrant transcription and ultimately a disruption in protein synthesis. The chemists report that the method, called “competitive transcription and adduct bypass” or CTAB, can help explain how DNA damage arising from environmental chemicals leads to cancer development.

Wang explained that the CTAB method can be used also to examine various proteins involved in the repair of DNA. One of his research group’s goals is to understand how DNA damage is repaired — knowledge that could result in the development of new and more effective drugs for cancer treatment. Next, the researchers plan to use CTAB to investigate how other types of DNA modifications compromise transcription and how they are repaired in human cells.



Outreach

Teaching Scientific Method to Elementary Students



When Kerry Hanson from the Department of Chemistry at the University of California, Riverside stepped to the front of a third grade classroom at Riverside’s Taft Elementary one day last month, automatically, the students paid attention. They listened, and many shot up their hands when she asked a question.

That day, Hanson and five Chemistry graduate students (Bethany Caulkins, Omar Hamdy, Josh Hartman, Valerie Nichols, and Kelly Theel) led a unique education outreach event for third and fourth graders at Taft. Their plan: use the popular

“Frankenweenie” movie to teach the Taft students the scientific method. In the movie, a young boy, Victor, devises an experiment he predicts will bring his dog—and best friend—back to life.

After learning the scientific method, the kids applied it to a bag of M&M’s. First, they made an observation: this bag has lots of red candy. Next, a hypothesis: there are more red M&M’s in this bag than any other color. And, the test: count the number of each color to see if the hypothesis is correct.

Campus News

General Chemistry Program Gets a Boost



A few years ago, the Department of Chemistry at the UC Riverside decided to increase the relevancy of its introductory chemistry courses and enhance student learning. One solution rose to the top: hire someone whose job would be to focus on the general chemistry program. So in 2010, Jack F. Eichler joined the Dept. of Chemistry.

Currently, Eichler is collaborating with Leonard Mueller, a professor of chemistry, and Richard Hooley, an assistant professor of chemistry, on a nearly \$200,000 three-year grant related to the science, technology, engineering and mathematics (STEM) fields. Called the National Science Foundation Transforming Undergraduate Education in STEM, it focuses on developing new case study educational materials for implementation in foundation freshman and sophomore chemistry courses.

Eichler is also the director of a project funded by a more than \$140,000 three-year U.S. Department of Agriculture Higher Education Challenge grant aimed at engaging freshmen and sophomores in the agricultural sciences. Marylynn Yates, the dean of CNAS, and Cynthia Larive, the chair of the Department of Chemistry, are the project's co-directors.

3 New Grants to Assist Graduate Students in Pursuing Doctoral Degrees

The University of California, Riverside has received three grants from the U.S. Department of Education to assist graduate students with excellent records who demonstrate financial need and plan to pursue the highest degree available in a field of national need. Called "Graduate Assistance in Areas of National Need" (GAANN), the national program will provide fellowships to graduate students who are U.S. citizens or permanent residents through academic departments at UC Riverside. One of the fields designated as areas of national need is chemistry. The grant to chemistry, totaling \$660,000 for three years, will support six graduate students.



"The grant program aims to increase the number of chemistry Ph.D. students from underrepresented populations and increase the proportion of these students entering the professoriate," said Eric Chronister, a professor of chemistry and a member of the GAANN committee in the Department of Chemistry. (Committee members also include: Christopher Bardeen, Michael Pirrung, Cynthia Larive and Catharine Larsen)

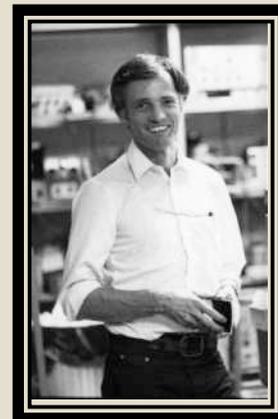
UCR is one of the most diverse research universities in the U.S. and one of the most successful at graduating underrepresented minorities. In 2011, UCR was ranked sixth nationally in the category of most diverse universities by U.S. News and World Report. The campus is one of only three UC campuses to be designated by the U.S. Department of Education as a Hispanic-Serving Institution.

Distinguished Lecture

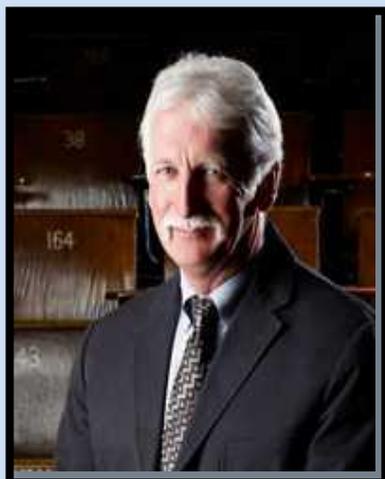
Bryan Earl Kohler (1940 – 1997)

The Bryan Earl Kohler Distinguished Lectureship was established in honor of our colleague for his professionalism, his dedication to the advancement of science, and for his uniquely human spirit that influenced so many of us as a mentor, peer, and true friend.

The family and friends of Bryan Kohler have established an endowed annual lectureship in memory of UC Riverside's distinguished colleague, Professor Kohler.



William L. Jorgensen



Bill Jorgensen is a graduate of Princeton and Harvard, spent 15 years on the faculty at Purdue, and in 1990 moved to Yale, where he is a Sterling Professor and was recently the Director of the Division of Physical Sciences and Engineering. Bill's research has combined quantum, statistical, and molecular mechanics to study chemistry in solution. He has been a leader in computational studies of organic and enzymatic reactions in solution, molecular recognition, protein-ligand binding, and molecular properties. His OPLS force fields and TIPnP water models are widely used. Bill's research group is also actively engaged in de novo drug design and synthesis, particularly for anti-infective, anti-proliferative, and anti-inflammatory agents. Among honors, Bill has received an ACS Cope Scholar Award, the ACS Award for Computers in Chemical and Pharmaceutical Research, the ACS Hildebrand Award, AAAS and ACS Fellowships, the ISQBP Award in Computational

Biology, the PSJ Sato International Award, and memberships in the International Academy of Quantum Molecular Science, American Academy of Arts & Sciences, and National Academy of Sciences. He is an Editor of two ACS journals, *Journal of Chemical Information and Modeling* and the *Journal of Chemical Theory and Computation*.

“Drug Discovery Accelerated by Computational Methods”

Abstract: Drug discovery is being pursued through computer-aided design, synthesis, biological assaying, and crystallography. Lead identification features de novo design or docking of commercial compound libraries. The focus of this lecture will be optimization of the resultant leads to yield potent inhibitors. Specifically, Monte Carlo/free-energy perturbation simulations are executed to identify the most promising choices for substituents on rings, heterocycles, and linking groups. Successful applications are illustrated for HIV reverse transcriptase and macrophage migration inhibitory factor (MIF).

