Message from the Chair

Greetings from the Clemson Chemistry Department! One of the most significant things I have learned in my first full year as chemistry department chair is the depth of dedication of the alumni and friends of the department in supporting our department mission to "...provide undergraduate and graduate education in chemistry and contribute to the body of knowledge in chemistry through research and scholarship that responds to the educational, technological and economic needs of South Carolina, the Southeast Region and the Nation." I offer my personal heartfelt thanks to all of you who have contributed to the department and to Clemson, in many ways.

This newsletter includes a story about Jeff Anker, our newest faculty member who comes to us from the University of Michigan, and Northwestern University. If your business brings you in contact with Jeff, please help make him feel welcome.

Despite the recent economic downturn, several significant things are happening on campus that could be good for chemistry. Clemson was recently cited as the 22nd best public university in the nation by US News & World Report. This is the closest we have come yet to achieving President Barker’s vision that Clemson will be one of the nation’s top 20 public universities. We recently started a minor renovation of our Chemistry library, which we expect will make the space more useful as a student and faculty study space. We are also planning an upgrade to our main lecture hall, Hunter 100. Clemson is in the early stages of what is hoped will ultimately be a wide-ranging building project on campus, and included in this project is a substantial expansion for Hunter Laboratory. Nobody knows for sure when a Hunter expansion will rise to the top of the project list, but even with this uncertainty, it is encouraging that we are under consideration. Some smaller renovation projects within Hunter are also under consideration, and I hope to be able to tell you more about them in future newsletters. Despite the recent hard economic times, we are doing our very best to keep the Clemson chemistry department strong and a Clemson education as valuable as it has always been.

If your travels bring you onto campus please feel free to stop by Hunter to visit. I also hope you will consider making a donation to help support the chemistry department. Alumni and other donations have always helped us to offer Clemson students the best education possible, by enhancing our seminar program, helping to underwrite undergraduate research and student travel to scientific meetings, and in a host of other ways. I know this is a personal decision that you make to share from your success, and I am most grateful for your financial support and for the moral support that it implies for the department’s activities.

Steve Creager, Department Chair
Focus on Faculty

Clemson University Department of Chemistry researchers Ken Christensen, Brian Dominy, and Dev Arya have teamed up with Harvard Medical School researchers Mike Rogers and Robert D’Amato (Children’s Hospital Boston Vascular Biology Program) to identify and develop new inhibitors of angiogenesis or pathological blood vessel growth. These inhibitors may eventually prove useful in the treatment of certain eye diseases that cause blindness and cancer. Dr. Christensen and Dr. Rogers are long time collaborators. Several years ago, they observed that a non-toxic portion of the anthrax toxin was a potent inhibitor of angiogenesis and reduced tumor growth in the lab. Their labs have been working to understand the mechanism and biochemistry behind this observation as well as using high-throughput screening of small molecules and natural products to identify other potential inhibitors. This project has recently received significant funding to continue this work by the NIH Eye Institute ($1,800,000) and the DOD Breast Cancer Research Program ($250,000). Together with the protein modeling expertise of Dr. Dominy and the synthetic chemistry expertise of Dr. Arya, this collaborative project will likely yield exciting results in the coming years.

Grant Info:
“Novel Angiogenesis Inhibitors Targeting the Anthrax Toxin Receptors”, National Institutes of Health, Eye Institute, $1,841,854, 2008-2013

Choi Kwang Do at Clemson

The faculty advisor/instructor of the Club and class, Suzanne Ellenberger, works full time for the Chemistry Department at Clemson University and teaches both General and Introductory chemistry classes. The Choi Kwang Do Club and class were offered for credit beginning in the fall semester. Club membership is open to students, faculty and staff of Clemson University and their families. The Choi Kwang Do Class is offered through the Leisure Skills department. In both the Club and the class, with good attendance and demonstrated proficiency, students can earn their black belts in 2 years.
Robert J. Gilliard Jr.

Robert J. Gilliard Jr. is coming back to Clemson University for his senior year armed with knowledge about how to attack the energy crisis. The chemistry major studied last summer at Case Western Reserve University in Cleveland on a fellowship provided by the Petroleum Research Division of the American Chemical Society. He worked with Dr. John D. Protasiewicz making catalysts for developing efficient ways to make simple hydrocarbons into materials that can be used for fuel. Gilliard said this method has become popular in the last decade under research teams led by experts at the University of North Carolina at Chapel Hill, The State University of New Jersey and the University of Hawaii at Manoa. “This summer, I synthesized novel iridium pincer complexes that will soon be examined for effective catalytic activity,” Gilliard said. “Hopefully, these materials will solve some of the problems that other research teams have experienced, such as selectivity and the severity of the conditions that these reactions require to occur. Soon these materials will be published.”

Gilliard received 13 scholarships to attend Clemson, where he is working with Dr. Rhett C. Smith. Gilliard received the Merck Index and the American Chemical Society awards this spring.

The former is for school work and research combined, while the latter is from Clemson’s Department of Chemistry for outstanding undergraduate work. He also was inducted into the National Scholars Honors Society.

When he graduates from Clemson, Gilliard will have written five scholarly articles for publication in chemical journals. He plans to study organic chemistry in graduate school.

Gilliard said he became interested in chemistry while attending Hartsville High School. He credits chemistry teacher Charlotte Godwin for this interest.

Congratulations to Our December 2008 grads!

Seven students graduated from Clemson’s chemistry department in December of 2008 with graduate degrees. We extend our sincerest congratulations and wish them well as they embark on the next leg of their careers in chemistry.

Dahlia Haynes - PhD
Stephen Hudson - PhD
Mark Kinman - PhD
Suleiman Olajegbe - PhD
Sanjaya Ramnabhatti - PhD
Changfeng Wu - PhD
Beth Walls - MS

Congratulations to Our Spring and Summer 2008 Graduates

26 students graduated from Clemson’s Chemistry Department in May and August of 2008. We extend our sincerest congratulations and wish them well as they embark on the next leg of their careers in chemistry.

Bachelor of Science - May 2008
Sean Michael Deguire
Carla Charisse Heyward
Danielle Kimberly Payton
Jeremy Lee Glass
Robert Trenton Bostic
Fatimah Farhan Farouk
Justin Douglas Moody
Robert Alex Quinn

Masters – May 2008
Raul Santiago Hernandez Osori
Adam M. Siegfried

Doctorate of Philosophy – May 2008
Yunfei Jiang
Wei Wang
Ashwin Kudupi Rao
Jamie Christine Norton
Andrew Neilson
Scott Thomas Iacono

Bachelor of Science - August 2008
Hoke Stanley Shirley

Doctorate of Philosophy – August 2008
Guillermo Santiago Sandi Urena
Lingrong Gu
Lilin He
Erin Elizabeth Battin
Hadi D. Arman
Nathan Randall Perron
Bevan Craig Elliott
Gregory A. Becht
Valerie Jo Smith
NANOTECHNOLOGY'S GLOW MAY HELP DETECT CANCER

A STARTUP COMPANY TRYING TO COMMERCIALIZE NANOTECHNOLOGY INVENTED AT CLEMSON UNIVERSITY HAS TURNED TO THE UNIVERSITY OF SOUTH CAROLINA FOR HELP. SELAH TECHNOLOGIES LLC AND USC’S NANOCENTER SAID MONDAY THEY'RE WORKING TOGETHER TO INVESTIGATE THE POSSIBLE USE OF ONE OF SELAH’S ADVANCED MATERIALS IN CANCER DETECTION. THE STARTUP COMPANY’S ADVANCED MATERIALS CALLED CARBON-BASED QUANTUM DOTS AND CARBON SINGLE-WALLED NANOTUBES, WERE INVENTED BY CLEMSON CHEMISTRY PROFESSOR YA-PING SUN.

TWO-YEAR-OLD SELAH HAS A DEAL WITH CLEMSON TO MANUFACTURE THE MATERIALS IN BLACK POWDER FORM AND MARKET THEM AS A SPECIALTY CHEMICAL TO VARIOUS INDUSTRIES. RECENTLY, SELAH ANNOUNCED A DEAL WITH OSRAM SYLVANIA INC., THE MAKER OF SYLVANIA LIGHT BULBS, TO EXPLORE USE OF ITS MATERIALS IN THE LIGHTING INDUSTRY.

USC WILL TEST THE VIABILITY OF THE QUANTUM DOTS FOR CANCER DETECTION AND COULD OWN, ALONG WITH SELAH TECHNOLOGIES ANY NEW TECHNOLOGIES RESULTING FROM THE RESEARCH. USC CHEMISTRY PROFESSOR TOM VOGT, DIRECTOR OF THE NANOCENTER, SAID THE QUANTUM DOTS ARE AN "ALMOST PERFECT" MATCH WITH CHEMISTRY DEVELOPED BY QIAN WANG, A RESEARCHER AT THE NANOCENTER. WANG WILL LEAD AN INVESTIGATION INTO WHETHER THE QUANTUM DOTS CAN ATTACH TO CANCER CELLS INSIDE A HUMAN BODY AND THEN GLOW TO SHOW DOCTORS WHERE THE CANCER IS. HE’LL ALSO ATTEMPT TO PROVE THE QUANTUM DOTS ARE NOT TOXIC IN A BIOLOGICAL SYSTEM. VOGT SAID THE RESEARCH PARTNERSHIP SHOWS THE STATE’S RESEARCH UNIVERSITIES ARE WORKING TOGETHER WITH PRIVATE INDUSTRY TO HELP SOUTH CAROLINA.

"SELAH IS TAKING AN IMPORTANT CLEMSON DISCOVERY FROM THE LABORATORY TO THE MARKETPLACE, AND WE’RE HELPING THEM," HE SAID. "AND BY DOING THAT, WE'RE SHOWING THERE'S A COLLABORATION BETWEEN THE RESEARCH UNIVERSITIES AND THE PRIVATE SECTOR. I THINK THAT’S SOMETHING WE SHOULD BE PROUD OF IN SOUTH CAROLINA."

JOHN BALLATO, CLEMSON’S ASSOCIATE VICE PRESIDENT FOR RESEARCH AND ECONOMIC DEVELOPMENT, SAID CLEMSON ACCOMPLISHES ITS ECONOMIC DEVELOPMENT MISSION WHENEVER COMPANIES THAT SPIN OUT OF ITS RESEARCH SUCCEED.

USC AND ITS NANOCENTER ARE PART OF A LOOSE COALITION OF COMPANIES AND UNIVERSITIES PLANNING AN ANNUAL CONFERENCE ON ADVANCED MATERIALS AS A STEP IN DEVELOPING A WORLD-RENOwn ADVANCED MATERIALS INDUSTRY IN SOUTH CAROLINA.
THE WHITE HOUSE HONORS A CHEMISTRY ALUMNI AS ONE OF THE NATION’S LEADING MATH AND SCIENCE TEACHERS

LISA C. PEAKE received the annual Presidential Award for Excellence in Mathematics and Science Teaching for 2007. There were 99 teachers recognized in an awards ceremony as the nation’s best seventh through twelfth grade teachers. Award recipients were selected from mathematics and science teachers in all 50 states and the District of Columbia, with the competition alternating each year between kindergarten through sixth grade teachers and seventh through twelfth grade teachers. After an initial selection process at the state level, a national panel of distinguished scientists, mathematicians, and educators recommend teachers to receive the Presidential Awards. Each award recipient received a $10,000 educational grant to be used at his or her discretion over a three-year period, and an all expense paid trip for two to Washington D.C. to accept the certificate. The award was established in 1983.

BY THE EDUCATION FOR ECONOMIC SECURITY ACT AND IS GIVEN ANNUALLY TO MATH AND SCIENCE TEACHERS ACROSS THE UNITED STATES WHO MAKE OUTSTANDING CONTRIBUTIONS TO THEIR STUDENTS AND SCHOOLS.

LISA C. PEAKE, a chemistry teacher at Wesley Chapel High School in Wesley Chapel, FL, has been teaching chemistry since 2001. She began her career in South Carolina and began teaching in Florida in 2003. Ms. Peake teaches regular and AP chemistry. She participates in the University of Florida’s Summer Research Program for Teachers to enhance her teaching skills and better engage her students.

Ms. Peake inspires students to think for themselves and provides analytic, comparative, and synthesis skills to her students. Colleagues have noted that Ms. Peake’s former students return from college to thank her for the lessons they were taught in her classroom. She serves as a mentor to new teachers each year and has worked with individual students who need additional assistance in order to take the AP Chemistry course. Ms. Peake has a B.A. in Chemistry from Clemson University and an M.Ed. in Curriculum and Instruction, Chemistry Specialization, from the University of South Florida.

2008-2009 Chemistry Department Award

Winners

The graduate program is happy to announce this year winners of the Graduate Research Incentive Program (GRIP). The fellowship program is designed to recognize and reward the research accomplishments of our most successful graduate students. Several cash awards are given to those students who demonstrate outstanding productivity and progress in their research.

This year’s recipients are:

Manuel Chaur
Changfeng Wu
Joy Castro
Monica Vece
Xin Wang
Susan He
Anshuman Mangalam

Congratulations to all of our award winners!
SMALL CHEMICAL TECHNOLOGY FIRM GETS $200,000 BOOST

A chemical technology invented at Clemson University together with two former Milliken & Co. scientists and most importantly, $200,000 from S.C. Launch, the state-sponsored program that provides funding for startup companies and Upstate S.C. has another high-tech startup.

Although Invenca LLC, located in Greer, has only two employees, Joe Kolis, executive director of the Clemson University Research Foundation and professor in the chemistry department, has high hopes for the young firm. He recalled how two and a half years ago he licensed Invenca’s technology to Brian Morin, a former Milliken scientist who has also launched a different startup company, Innegrity LLC. For Invenca, Morin hired Elizabeth Cates, another former Milliken scientist, as chief science and technology officer.

Invenca makes a fiber that reduces the cost of a chemical process called high-performance liquid chromatography. Dr. Cates said the company hopes to have a prototype of its product on the market later this year.

Invenca is one of 12 Upstate startups to have received $200,000 in “seed capital” from S.C. Launch, a program of the South Carolina Research Authority. Two others have gotten $100,000 or more, said Greg Hillman, Upstate zone manager for S.C. Launch. Several of the startups are based on technology developed at Clemson. Dr. Kolis said three to four companies spin out of Clemson’s research each year now which is a high number for a university of its size.

ALUMNI NEWS

Josh Kearns

Aqueous Solutions Turns One Year Old

Josh Kearns (Clemson 2000, BS Chemistry, minor Environmental Engineering and Science, MS 2005 UC Berkeley, Earth and Planetary Science) founded Aqueous Solutions in 2007. Aqueous Solutions is a grassroots NGO whose mission is to enable households and communities to ensure the safety of their drinking water.

The contamination of drinking water by toxic agro-chemicals is a serious and growing problem, one that Aqueous Solutions addresses by providing communities with the technological know-how to construct and maintain simple and effective filtration systems.

Aqueous Solutions was recently awarded a prestigious grant from the Charles A. and Anne Morrow Lindbergh Foundation, which supports research projects that “will make important contributions toward improving the quality of life by balancing technological advancements and the preservation of our environment.”

You can learn more about Aqueous Solutions’ ongoing projects by visiting www.aqsolutions.org.
Welcome Our Newest Faculty Member,

Jeffrey Anker

Dr. Anker received his B.S. from Yale University. His Ph.D. (2005) is from the University of Michigan where he worked with Dr. Raoul Kopelman on magnetically modulated fluorescence-based sensors. After graduation, he was an NIH Postdoctoral Fellow at Northwestern University with Dr. Richard Van Duyne, where he developed plasmonics-based nanosensors to measure chemical concentrations and study binding kinetics. He joined the Clemson faculty in 2008, and he is a member of the Center for Optical Materials Science and Engineering Technologies.

Dr. Anker’s research uses optical spectroscopy and microscopy to interrogate nanoparticle-based chemical and mechanical sensors. This interdisciplinary research involves development and bioanalytical application of plasmonic and fluorescent sensors and effectors. Individual nanoparticles are monitored to study local chemical and rheological environments. A combination of chemical synthesis and physical vapor deposition are used to fabricate nanoparticles and control their size, shape and composition. Multifunctional nanoparticles are fabricated with a combination of chemical, fluorescent, plasmonic and magnetic materials. For example, fluorescent polymer spheres are coated with metallic hemispheres to form moon-shaped particles with a fluorescence intensity that depends on their orientation. The particles blink when they rotate in response to magnetic torques, Brownian motion and intracellular biomechanical forces. The blinking rate provides information on the local rheological environment, while the blinking spectrum provides information on chemical concentrations. In addition, indicator dyes are adsorbed onto plasmonic silver and gold nanoparticles to study fundamental coupling mechanisms and develop novel sensors.

Staff News

Welcome BRIDGETT SLOAN
Bridgett Sloan joined the department in October 2007. Bridgett has taken on the position of Accountant for Chemistry, Engineering and Science Education and Administrative Research and Support. Her responsibilities include supporting multiple departments with budget needs, preparing monthly summaries of the department budget for the department chairs, reconciling and providing totals on budget amounts, expenditures, and balances for each faculty’s individual state projects. She also ensures our financial obligations are met. Currently she lives in Fair Play.

Congratulations to NICOLE HODGSON
Congratulations and best wishes to Graduate Student Coordinator Nicole Hodgson and her husband Justin on the birth of their baby boy Gavin Dale. Gavin was born August 11 and weighed 8 lbs. 7 oz.

Promotion for ROBIN WILMOTT
Congratulations to Robin Wilmott who was promoted from Organic Lab Manager to Stockroom Manager on November 14. Robin succeeds Chad Smith who recently accepted a position with SLED in Columbia. We are happy and grateful to have someone as qualified as Robin in the Department ready to assume this critical position.

Farewell to KAREN DIMAINA
Karen DiMaina recently left the Chemistry Department to accept the position of Office Manager in the Department of Engineering and Science Education (headed by Melanie Cooper). We wish Karen all the best with her new duties and promotion but will acutely feel her absence in Hunter.
Melanie Cooper, Alumni Distinguished Professor in chemistry, has been named by the College of Engineering and Science as the interim chair to the Department of Engineering and Science Education. Her appointment was effective August 15, 2008.

Cooper received her B.S., M.S. and Ph.D. from the University of Manchester, England. She carried out postdoctoral work in organic chemistry before turning to chemical education as her area of research. She has been a faculty member in the Clemson chemistry department since 1987, where she teaches general and organic chemistry and chemistry education courses. She will continue to teach classes in the chemistry department while heading the Engineering and Science Education Department.

The Engineering and Science Education Department is a newly formed department committed to establishing an academic community focused on excellence in engineering and science education at all levels. Former associate dean for undergraduate studies, Steve Melsheimer indicates that this new unit gives Clemson a leadership role in this field.