

CHEMISTRY

FALL 2013
www.chem.uga.edu

at UGA

Welcome from the Head

Greetings from the Department of Chemistry!

This year has seen the continued growth and prospering of our department. We have added new faculty, continued to excel in research, and provided high quality instruction to an ever-growing population of undergraduate and graduate students. My most important and rewarding task as Head is to promote and oversee the hiring of new faculty in Chemistry. In the past year, we successfully recruited a new Assistant Professor in Organic Chemistry, Dr. Ryan Hili. Ryan, a native of Canada, is a synthetic organic chemist with strong biological connections to his research. He has developed a new course in Chemical Biology that he is teaching to our graduate students this fall semester. You can learn more about Ryan and his research interests in this issue of the Chemistry Newsletter. We have just begun the search for a senior Organic Chemist, and I hope to have good news to report on this front in the next edition of the newsletter. We also have hired a new Coordinator for General Chemistry Laboratories, Dr. Daphne Norton. Daphne was recruited from Emory University, where she directed undergraduate laboratories. She comes with a great deal of experience, and we look forward to her innovations in laboratory instruction.



Jon Amster

Our faculty continues to receive recognition for their research achievements. This year, Greg Robinson received the Albert F. Cotton Award in Synthetic Inorganic Chemistry from the American Chemical Society. A symposium was organized to honor Greg at the spring ACS meeting in New Orleans, with presentations by many of his past and present research colleagues. In recognition of Greg's accomplishments, our university recently has named him a UGA Foundation Distinguished Professor. In April, Fritz Schaefer received the Chemical Pioneer Award from the American Institute of Chemists. This significant award previously has honored the likes of Nobel laureates Linus Pauling and Glen Seaborg. On the local level, the university has made John Stickney a Distinguished Research Professor in recognition of his contributions to the field of Electrochemistry. Butch Carreira was presented the Georgia BioBusiness Academic Entrepreneur of the Year Award. Butch "retired" in 2007 but remains active in research, and can be found in his office almost every day.

Research funding has held steady, despite the challenge of the sequester on federal agencies. All of our assistant professors have been able to obtain federal grants within two years of their arrival, and several hold multiple grants, including young investigator awards. In the past five years, NSF Career Awards have gone to Jason Locklin, Todd Harrop, and Gary Doublerly,

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2012 Alumni Lecture and Banquet

The Alumni Lecture and Banquet were held on October 12, 2012 in the Chemistry Department and at the Georgia Center for Continuing Education. The afternoon lecture was given by Prof. Nate Lewis (Cal Tech) on the topic of "Sunlight-Driven Hydrogen Formation by Membrane-Supported Photoelectrochemical Water Splitting." The highlight in the evening was the presentation of the Distinguished Alumnus Award, which was given to Dr. Dudley Christie (B. S. 1969).



Dr. Dudley Christie and Prof. Nate Lewis

Prof. Lewis is the George L. Argyros Professor of Chemistry at Cal Tech, where he has been on the faculty since 1988. He has been the Principal Investigator of the Beckman Institute Molecular Materials Resource Center at Cal Tech since 1992, and is the Principal Investigator for the Joint Center for Artificial Photosynthesis, the Energy Innovation Hub in Fuels from Sunlight. He has won many awards for his research, and is also a renowned international speaker and authority on energy. He was a member of the Panel on Electricity from Renewable Resources as part of the America's Energy Future study led by the U.S. National Academies. He advises government representatives including members of several U.S. administrations as well as members of the House of Representatives and Senate. He also advises corporate sectors including venture capitalists and major energy companies (BP, Hess, Chevron) regarding clean energy technology and energy policy. In 2009 he was listed by Rolling Stone Magazine as number 17 in the top 100 "Agents of Change" in the United States.

Dr. Dudley Christie was born on January 16, 1947 and grew up in Griffin, GA. After receiving his UGA bachelor's degree in Chemistry in 1969, he graduated from the Southern College of Optometry in 1973. He has practiced in Middle Georgia under the corporate name of Christie Eye Care with locations in Dublin, Milledgeville, Fort Valley and Warner Robins. Dr. Christie practices general Optometry, does medical eye exams, treats eye disease and injuries and has a large glaucoma practice. He is a member of the American Optometric Association as well as the Georgia Optometric Association and is past president of the Georgia State Board of Optometry. Dr. Christie has been married for 41 years to his wife, Linda, and they have three children.

The next Chemistry Alumni Banquet will likely be scheduled for spring 2014. Watch for further announcements on the Chemistry web site. ●

WELCOME ...FROM PAGE 1

while DOE Early Career Awards went to Tina Salguero and Gary Douberly. We remain one of the leading grant receiving departments in the College of Arts & Sciences, while also being one of the leading producers of credit hours. The upper administration recognizes our two-pronged contributions to the central missions of the university and continues to reward us with new faculty lines, allowing us to maintain and grow our faculty numbers.

The university has begun to draw up plans for a Science Learning Center. This building would house teaching laboratories for a number of departments. Chemistry would occupy a majority of the space in this building, with General Chemistry and Organic Laboratories moving into the new facility. This will open up considerable laboratory space in the Chemistry building, which will be used to house new faculty who we hope to recruit in the future. I hope to be able to provide more concrete details about this project to you next year.

We are thankful for the generous financial support of our alumni and friends. These funds help us to recruit top graduate students, support special events and seminars, recognize the research accomplishments of our graduate students through cash awards and travel support to national meetings, and enhance the chemistry program in many significant ways. Thank you to those who have contributed this year. For those thinking about making a contribution, please know that we would be very grateful for your support. ●



Department of Chemistry
University of Georgia
Athens, Georgia 30602-2556

EDITOR

Michael A. Duncan
maduncan@uga.edu

WEBSITE

www.chem.uga.edu

PHONE

706-542-2626

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Photo Credit: Peter Cutts

Greg Robinson (center) is presented the 2013 F. Albert Cotton Award in Synthetic Inorganic Chemistry by ACS Board Member Bonnie A. Charpentier (right) and ACS President Miranda Li Wu.

Greg Robinson Named UGA Foundation Distinguished Professor

Prof. Gregory H. Robinson, Franklin Professor and Distinguished Research Professor of Chemistry in the College of Arts and Sciences, has been appointed the UGA Foundation Distinguished Professor in Chemistry. Approved by the Board of Regents of the University System of Georgia at its May meeting, the special appointment became effective in August.

During the past 25 years, Robinson and his team have published a series of findings that have reshaped how scientists view certain aspects of chemical bonding. In a widely cited 1995 paper, he demonstrated that metals can display electronic behavior previously thought possible only with carbon-based ring systems such as benzene - a phenomenon known as metalloaromaticity. In 2008, his research team stunned the scientific community by discovering a new base-stabilized, soluble allotrope of elemental silicon.

"Dr. Robinson's sterling international reputation brings great honor to the university and signals the impact of our research efforts at the highest levels," said Alan T. Dorsey, Dean of the Franklin College of Arts and Sciences. "A chemist whose creativity has challenged conventional thinking on the synthesis of new compounds, his work has the uniquely broad impact that both inspires colleagues around the world and students in the classroom."

In 2013, Robinson received the F. Albert Cotton Award from the American Chemical Society, which is presented to one person annually by the world's largest scientific society. An awards symposium was held in his honor at the New Orleans meeting of the ACS in April. In May 2012, Robinson joined a select group of international academics when he was named the recipient of a Humboldt Research Award from Germany's Alexander von Humboldt Foundation. The award is presented to academicians whose fundamental discoveries, new theories or insights have had a significant impact on their own discipline. ●

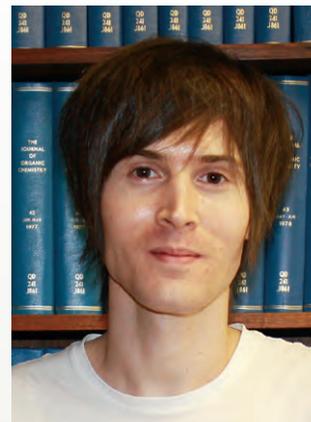
Join us for tailgating at homecoming on Saturday morning, November 9 in the front yard of the Chemistry Building!

Welcome New Faculty: Dr. Ryan Hili

Dr. Ryan Hili, who joined the faculty in August 2013, received his Ph.D. in Chemistry from the University of Toronto in 2010, where he developed a novel class of stable unprotected amino aldehydes under the guidance of Prof. Andrei K. Yudin. Following his doctoral studies, he joined the labs of Prof. David R. Liu at Harvard University as an NSERC Postdoctoral Fellow where he helped develop new technologies to translate DNA into modified biopolymers capable of Darwinian evolution.

At UGA, research in the Hili group will focus on developing new methods to harness the power of molecular evolution to solve complex problems ranging from catalyst design for organic synthesis to substrate and receptor design for medical therapeutics and diagnostics. Traditional methods for the *de novo* design of catalysts and receptors are typically low-throughput, while conventional high-throughput *in vitro* evolution technologies are restricted by the limited diversity of molecular architectures accommodated by the biochemical machineries they use. The Hili group's research will aim to overcome these limitations by developing general strategies

to implement DNA as a replicable blueprint to sequence-specifically encode a wide variety of synthetic oligomers/polymers for *in vitro* evolution, which should greatly facilitate the rapid discovery of high affinity receptors and catalysts. Their plan will be to use these high affinity receptors for a broad scope of applications, particularly those aimed at cell-surface profiling and biomarker discovery in disease, while further enhancing the understanding of molecular recognition by synthetic polymers. ●



Discovery in Johnson Group Could Have Major Medical Implications

The study of a bacterial regulatory protein by UGA Chemistry researchers has provided molecular insight into its oxygen-sensing mechanism, which could ultimately lead to a better understanding of the ageing process and new treatments for human diseases such as cancer, Parkinson's and Alzheimer's.

Michael Johnson, a Distinguished Research Professor of Chemistry, and **Bo Zhang**, doctoral candidate, have discovered that the fumarate and nitrate reduction regulatory protein, or FNR, in *E. coli* senses oxygen by a new type of reversible structural change in an iron-sulfur cluster. The work was carried out in collaboration with Nick Le Brun and coworkers from the University of East Anglia, and published in the *Proceedings of the National Academy of Sciences*.

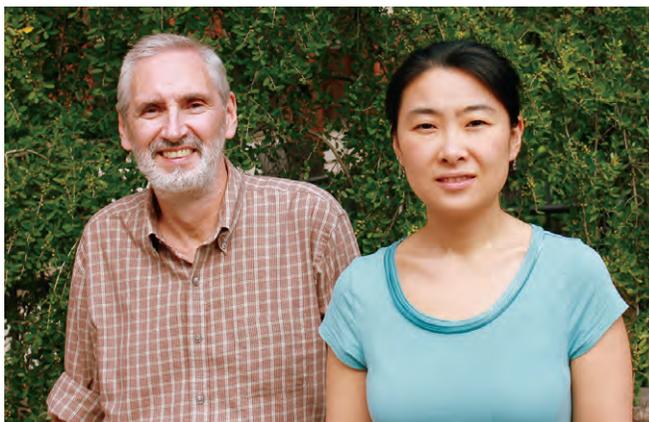
Iron-sulfur clusters are abundant biological cofactors that play crucial roles in almost all of fundamental life processes, including respiration, photosynthesis, nitrogen fixation, DNA

replication and repair. "Everyone has trillions of iron-sulfur clusters associated with enzymes and proteins in their bodies," Johnson said. "The problem is that they readily degrade in the presence of oxygen and other species that are associated with oxidative stress, leading to loss of protein function."

The research conducted at UGA and UEA focused on FNR, which senses the presence of oxygen in the environment and "switches" off and on specific genes in pathogens, such as *E. coli*, when there is no oxygen present – conditions often found in the human intestinal tract. Oxygen is sensed by FNR via an iron-sulfur cluster that undergoes conversion from one form to a smaller one, thereby causing the protein to change shape, and this leads to the turning off of genes associated with growth without oxygen.

"*E. coli* can decide what lifestyle to live, with or without oxygen," said Johnson. "We can't decide to change our need for oxygen, but understanding the mechanisms for reassembly and repair of iron-sulfur clusters in response to oxidative stress is crucial for understanding a host of human diseases as well as the ageing process."

By revealing the structure of the oxygen-damaged cluster in FNR and showing that it can be readily repaired by the addition of iron, this research has discovered a major mechanism for the repair of iron-sulfur clusters. Moreover, preliminary results on other iron-sulfur cluster containing enzymes suggest that this type of iron-sulfur cluster oxygen-damage and repair mechanism is widespread in biology. The next step is to discover how the repair process works in the cell. Johnson and Zhang are currently working on *in vitro* models to mimic this biological repair process. ●



Prof. Michael Johnson and Bo Zhang

Fritz Schaefer Receives Chemical Pioneer Award



Prof. Henry F. "Fritz" Schaefer, III

Prof. Fritz Schaefer, Graham Perdue Professor of Chemistry in the Franklin College of Arts and Sciences, received the Chemical Pioneer Award from the American Institute of Chemists at its annual meeting in April. The award recognizes researchers whose work has had a major influence on advances in Chemistry. Past recipients include Nobel laureates Linus Pauling and Glenn T. Seaborg, among others. Schaefer is the second UGA researcher to win the distinction.

Norman L. Allinger, Distinguished

Research Professor Emeritus of Chemistry, received the award in 1994.

"His work has had a deep impact on a variety of fields in chemistry," said Steven Wheeler, Assistant Professor of Chemistry at Texas A&M, in a nomination letter. Schaefer "was the first scientist to show that state-of-the-art computational quantum chemistry can provide results that may challenge experimental conclusions," added Wheeler, "including those reported by some of the most distinguished scientists in the world."

When Schaefer entered the field in the 1960s, most chemists distrusted purely theoretical calculations and preferred to study molecules using physical experiments. Schaefer proved that mathematical models based on quantum mechanics could accurately describe particles and their behavior under different conditions. In 1970, he successfully calculated the structure of methylene, a molecule so unstable that it only exists for a few millionths of a second. After researchers confirmed his findings with physical experiments, the field of computational chemistry became more widely accepted. Schaefer, who now directs UGA's Center for Computational Quantum Chemistry, went on to determine the structures and mechanisms of many other molecules and chemical reactions. Today, the use of quantum calculations for chemical research is commonplace.

Schaefer's work has broad implications in diverse areas of chemical research, including drug discovery, materials science and combustion. In addition to developing ways to predict the interactions of energy and matter on a molecular level, Schaefer is known for his early adoption of computers for research in the physical sciences. In 1973, Schaefer was the first person to use minicomputers for large-scale calculations. With his graduate student Michael Colvin, Schaefer also pioneered the use of massively parallel computers in molecular quantum mechanics.

Schaefer has published more than 1,400 papers. From 1981 to 1997, he was the sixth most highly cited chemist in the world, out of a total of 628,000 chemists whose research was cited. His many awards include the American Chemical Society's Award in Pure Chemistry (1979), the Schrödinger Medal (1990), the Centenary Medal of the Royal Society (1992), the ACS Award in Theoretical Chemistry (2003) and most recently, the Southeastern Universities Research Association Distinguished Scientist Award. ●

Butch Carreira Receives 2013 Creative Research Award



Prof. Emeritus Lionel "Butch" Carreira was awarded the Georgia BioBusiness Academic Entrepreneur of the Year Award by the University of Georgia Research Foundation for his successes as a spirited entrepreneur and for his longstanding commitment to education and research. Established in 2010, the Georgia BioBusiness Academic Entrepreneur of the Year award recognizes a faculty member who has started a

company within the past four years based on research originated at UGA. Carreira is the founder and chief executive officer of ARChem, an Athens-based company that provides a unique computational chemical modeling software program used widely in academic, government and industrial laboratories.

Carreira developed ARChem's physicochemical calculator, SPARC, over a period of 15 years. SPARC uses advanced mathematical algorithms based on real-world chemical structures to estimate how different chemical substances will react in various conditions. For example, the software can accurately predict vapor pressure, boiling points and density at different temperatures and pressures. These capabilities cross numerous chemical family boundaries and cover a range of organic compounds commonly used in labs throughout the world. The software allows researchers to access critical information without ever entering the laboratory, which ultimately provides more experimental freedom for researchers working on chemistry's cutting edge. ●

John Stickney Named Distinguished Research Professor

Prof. John L. Stickney has been recognized as one of three 2013 Distinguished Research Professors. The title Distinguished Research Professor is bestowed upon faculty who are internationally recognized for their original contributions to knowledge and whose work promises to foster continued creativity in their discipline.



Stickney has received worldwide recognition for his contributions to the field of electrochemistry and thin-film semiconductor materials. He invented a method of producing extraordinarily thin semiconductor films formed one atomic layer at a time through a process he calls electrochemical atomic layer epitaxy, or EC-ALE. He patented this approach and has founded a successful company to market equipment for making materials by this process. The materials produced by EC-ALE are of a quality previously unmatched through traditional methods of electrodeposition, and they have great potential in a number of technological applications, including solar energy conversion, as specialty sensors, and for catalysis.

More recently, Stickney has been investigating the electrodeposition of the semiconductor germanium. Germanium is in many respects superior to silicon, which is presently used by industries to manufacture microprocessor chips and transistors. ●



Jenna Bilbrey Awarded the Beverly Hirsh Frank Graduate Fellowship for Women in Science

Jenna Bilbrey, a doctoral student in Chemistry, is the 2013 recipient of the Beverly Hirsh Frank Graduate Fellowship for Women in Science. This university-wide award is made to one graduate student annually, and is meant “to recruit, support, and encourage exceptional graduate-level study and research in all fields of life and physical sciences with emphasis in interdisciplinary and emerging fields.”

Jenna is pursuing her Ph. D. with Profs. Jason Locklin and Wesley Allen. Consistent with expectations for Frank Fellowship awardees, her research is truly interdisciplinary, using both experimental and computational/theoretical approaches to understand metal-mediated cross-coupling reactions. Jenna’s research has resulted in several research articles, and an upcoming book chapter. She also is active as a freelance writer, contributing articles to Materials360 Online, sponsored by the Materials Research Society, which highlights recent advances in materials science. Additionally, she participates in departmental and community activities focused on chemistry

education. Jenna’s accomplishments are certainly worthy of recognition, according to her research advisors. Dr. Allen said, “It is a joy to work with Jenna; she is a most highly productive and exemplary graduate student, displaying an excellent vision for scientific research and the communication of it to broader audiences.” These sentiments are echoed by Dr. Locklin, who said, “Jenna is one of the most creative students I have ever had the pleasure of working with. I cannot think of anyone more deserving of this fellowship.”

Jenna earned her B.S. from the University of West Florida in 2009, where she performed polymer research with Prof. Tim Royappa. After graduation, she accepted a staff research position at UC-Santa Barbara with Prof. Thuc-Quyen Nguyen, where she studied conjugated polyelectrolytes and their use in LED devices. She joined the UGA Chemistry Department in the fall of 2010.

Beverly Hirsh Frank earned her AB in 1954 from UGA, and was a well-known student leader, active in many campus activities. She enrolled in Radcliffe College in the Management Training Program after graduating from UGA. She is a staunch UGA advocate, as evidenced by her support of women in the sciences at UGA through this fellowship. ●

Robert Gilliard Attends 63rd Lindau Meeting of Nobel Laureates

Robert J. Gilliard Jr., graduate student in Chemistry, has received an award to attend the 63rd Lindau Meeting of Nobel Laureates funded by Oak Ridge National Laboratories. This is a globally recognized forum to “educate, inspire, and connect the world’s international best talents.” Applicants must first win their institution’s internal competition, and then a select group of these is chosen to represent the U.S. Finally, the International Council for Lindau Meeting Reviewers chooses worldwide finalists. Graduate students must demonstrate professional success through awards and honors, a strong commitment to their principal field of study, and significant achievements in research. As a member of the 2013 U.S. delegation, Robert joined other young researchers from over 70 countries in lectures, meals, and discussions with some of the world’s most renowned scientists at the meeting in early July. The trip included an orientation at the U.S. Department of Energy Headquarters (Washington, DC), the 6-day Nobel Laureate Meeting (Lindau, Germany), and a side trip to Zurich, Switzerland.

David Lee, Vice President for Research and UGA’s ORAU representative, said “I view this as a fantastic, potentially formative, opportunity for our most accomplished graduate students. I am both delighted and proud to see UGA students like Robert selected for this very, very competitive honor. I am also appreciative to ORAU for helping to make this opportunity available.”

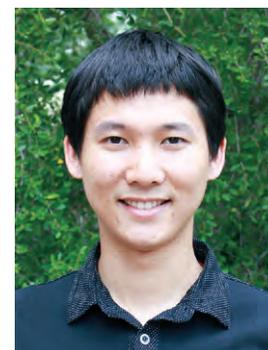
Commenting on his trip, Robert said, “I am blessed to be afforded such an invaluable opportunity. Receiving awards such as this speaks directly to the level of training I’ve received at the University of Georgia.”

Robert is a member of Prof. Greg Robinson’s research group, where his work involves utilizing N-heterocyclic carbenes to stabilize highly reactive main group molecules. Robert earned his B. S. degree in Chemistry from Clemson University. ●



Tao Liang Receives Coblentz Society Student Award

Graduate student **Tao Liang** has been awarded the Coblentz Society Student Award for outstanding graduate work in the area of vibrational spectroscopy. Tao is a fifth year Ph.D. student in Prof. Gary Douberly’s research group, and he has contributed to several exemplary papers on the infrared laser spectroscopy of reactive molecular species cooled to 0.4 Kelvin in liquid helium droplets. It is a great honor for Tao to be recognized by the Coblentz Society for his achievements in graduate research. Indeed, the Coblentz Student Award is awarded on an annual basis to only one student, and the competition is international. Tao has been invited to give a presentation at the SciX conference in Milwaukee this fall, where he will receive his award. Tao has also received a Dissertation Writing Award from the UGA Graduate School, and he will be receiving his Ph.D. this coming spring semester. His advisor, Prof. Douberly, expects these to be the first of many achievements and honors for Tao, who is clearly well deserving of this honor. ●



2013 Philbrook Scholars and Presidential Fellows

Four students in the incoming graduate class for the 2013-2014 academic year, Joseph Brice, Karson Brooks, Melanie Edlin and Yi Lei, have been designated Philbrook Scholars. The Philbrook Scholarship recognizes academic and research excellence in chemistry at the undergraduate level, and the potential for outstanding contributions at the graduate level and beyond. The Philbrook Scholarship program was established in 2010 with a generous gift from Dr. Ernest Drew. Dr. Drew earned his Bachelor of Science degree in Chemistry from UGA in 1958, and he went on to earn his Ph.D. in Chemistry from the University of Illinois in 1962. The program is named for Professor George E. Philbrook, Professor of Chemistry at UGA from 1946 to 1974. Since 2010, with continuing support from Dr. Drew, fourteen graduate students have been recognized as Philbrook Scholars and have received support through the program. The Graduate School at the University of Georgia has selected two first-year chemistry students as Presidential Graduate Fellows. They are Karson Brooks, from the University of Alabama, and Andreas Copan, from Bethel University (St. Paul, Minnesota). The prestigious Presidential Graduate Fellowship award is the highest honor that the University of Georgia can bestow on a student entering the UGA Graduate School.

Joseph Brice, Philbrook Scholar, earned B.S. degrees in both Chemistry and Mathematics from the University of West Florida. He performed undergraduate research with Professor Karen Molek synthesizing and characterizing zinc nanopowders. He also has a strong interest in laboratory instrumentation, and has been active in rebuilding and restoring laboratory instrumentation. In addition, he has performed computational studies of nanoparticles and interactions with surfaces. Joseph is a member of the American Chemical Society (ACS), and he has presented his research results at a number of scientific conferences including national meetings of the ACS in both 2012 and 2013.



Karson Brooks, Philbrook Scholar and Presidential Fellow, earned her B.S. degree in Chemistry, *summa cum laude*, from the University of Alabama where she accumulated a long list of academic honors and awards. She has broad scientific interests in the areas of physical chemistry, nanotechnology and materials science. Under the direction of Prof. Shanlin Pan, Karson pursued research projects using surface enhanced Raman spectroscopy (SERS) and single

molecule Raman methods to investigate molecular conformational changes and applications to photovoltaics. Her work resulted in several presentations at regional and national American Chemical Society meetings. In conjunction with an NSF REU program, Karson performed research in the summer of 2012 as a 3M Research Fellow with Prof. John Asbury at Penn State University where she studied ligand exchange processes in colloidal quantum dots. This summer, Karson was a participant in the Summer Bridge Research Program at UGA, performing research with Prof. Jason Locklin at UGA, who will also direct her graduate thesis research.



Melanie Edlin, Philbrook Scholar, earned her B.S. degree in Chemistry, *magna cum laude*, from the Missouri Western State University, where she developed a strong interest in carbohydrate chemistry and carbohydrate-based drug development. She was also a highly sought-after tutor for all levels of chemistry, physics and mathematics. As a research assistant with Prof.

Jonathan Rhoad she developed effective selective protecting group strategies and novel routes for challenging carbohydrate syntheses. Melanie has presented her research findings at two national ACS meetings and is a member of the ACS.

Yi Lei, Philbrook Scholar, earned her B.S. degree in Chemistry from the School of Chemistry and Materials Science at the prestigious University of Science and Technology of China, where she also earned many academic awards and honors. With Prof. Haojun Liang, in the Department of Polymer Science and Engineering at USTC, she performed research on DNA-based programming of quantum dot self-assembly and luminescence. More recently she has developed an interest in computational chemistry, and, in her spare time, she worked on her own to develop an understanding of the discipline. Yi is the first international student to be recognized as a Philbrook Scholar.



Andreas Copan, Presidential Fellow, earned B.A. degrees in both Chemistry and Physics from Bethel University in St. Paul, Minnesota. His scientific interests lie in computational and theoretical chemistry, as well as mathematics and programming, and he will be performing his graduate thesis research under the direction of Prof. Fritz Schaefer at the UGA Center for Computational Quantum Chemistry (CCQC). At Bethel, with Prof. Rollin King, Andreas worked on a number of projects in electronic structure theory, and he presented the results of his research at local and national scientific conferences. During the summer of 2012, Andreas was invited to participate as one of the research fellows in the Summer Undergraduate Research Program in the CCQC at UGA where he investigated the basis set dependence of metal-metal and metal-ligand bond distances in transition metal carbonyls. This work was published recently in the *Journal of Chemical Theory and Computation* with Andreas as co-author.





Oksana Korolchuk Receives Peggy Norman Award

Oksana Korolchuk was selected by the faculty and staff to receive this year's Peggy Norman Award for outstanding staff member in Chemistry. Oksana is originally from Korsun, Ukraine, where she was raised in a family of foresters before receiving herself a B.S. in Forestry with a minor in Landscape Architecture from the National Agricultural University of Ukraine. While attending the University, she met and married her husband, Tim Sydor, who was also pursuing

a degree in Forestry. Together they came to the U. S. in 1997 when Tim began graduate school at Purdue University, where he received a M.S. in Forest Economics. After graduate school the couple moved to Monticello, AR, where they lived for two years. In 2001 they relocated to Athens, where Tim enrolled in a Doctorate program in the Warnell School of Forestry and Natural Resources.

Oksana joined the Chemistry Department in September 2011

as an Assistant to the Department Head, Prof. Jon Amster, where she worked until July 2013. This July Oksana moved, yet again, to Spokane, WA, where her husband started a job at the forestry company Potlatch, as a Planning and Analysis Manager. Oksana was very sad to leave the Chemistry Department because of all the close friends she made with the staff and faculty. However, she is very excited about getting to hike in the mountains, grow cherry trees and attempt new snow sports in Washington. Oksana enjoys spending time with her husband, playing with her three year old twins Orest and Sofia, working in her vegetable and flower garden, taking care of her orchid collection, reading books, watching romantic comedies and working out. She is an avid runner, and also worked at the Omni Center as a group fitness instructor in spin, weight lifting and TRX Suspension Training classes.

This award is given in honor of Ms. Peggy Norman, who worked in various capacities within the department for 35 years before her retirement in 2004. Peggy was one of the most hard-working and well-loved staff members the Department has ever had. Her colleagues and friends were saddened at her untimely death from cancer in September 2007, just a short time after her retirement.

Congratulations Oksana for an outstanding job! ●

Undergraduate Chemistry Major Selected to Speak at National Conference for Undergraduate Research

Kasey Darley, a senior chemistry major from Macon and member of Prof. Shanta Dhar's NanoTherapeutics Research lab, was selected to present her work at the National Conference for Undergraduate Research in La Crosse, Wisconsin. The presentation, titled "A Therapeutic Nanoparticle Platform for Ischemic Brain Injury," was selected from more than 3,500 submissions and she is one of eight UGA students selected to attend and present at the conference. Darley's presentation was selected because her work demonstrated a unique contribution to her field of study.

The conference is hosted by the National Conference of Undergraduate Research (NCUR). The mission of NCUR is to promote undergraduate research scholarship and creative activity done in partnership with faculty or other mentors as a vital component of higher education.

Darley graduated with an ACS certified B. S. degree in Chemistry last spring and started work in the Department of Chemistry's graduate program this Fall. ●



Jan Chandler Retires

Jan Chandler, who started working in the Department of Chemistry on June 17, 1985 as an Accounting Assistant, retired in the fall of 2012. During her twenty-seven years of service to the Department, she worked with many different faculty and staff and had many different duties within the Department. In her most recent position, she served as Accountant in the Chemistry Business Office until her retirement. Jan was a trustworthy and hardworking employee who always had a pleasant demeanor and was very loyal to the Department of Chemistry. She will be greatly missed!

Since retirement, Jan continues to stay busy. Her husband Buck also retired earlier this spring. They are enjoying their passion of gardening and flowers. They also are enjoying spending extra time with Jan's elderly mother who lives in South Georgia, and with her three sons and their families. Buck and Jan have six grandchildren.



(l-r) Umar Taskeen, Robert Alex Reese, John Perry, Huy Nhat Dinh, Brandon Savage, Kyle Stadele, Su Mi Kim, Eric Salgado, Virginia Judson, Dominic Giordano, Ashley Fraysure, Stephen Purser, Christopher Parsons, John Stevick, Alexandra Dodd, John Licata, Michael Espenship, Grant Moody, William Barclay Mitchell, Christopher Harrington, Victor Celis (back), Vuong Nguyen, Travis Brown, Eduardo Sanchez, Danielle Rosema, Kasey Darley, Zachary Carden, Megan Tierney, Richard Weimar, Nathan Usselman, Andrew Coleman Schwartz.

Spring Reception Honors 2013 Chemistry Graduates

38 seniors graduated with degrees in Chemistry at the end of spring semester 2013. The Chemistry Department honored these seniors with a reception on graduation day in the Miller Learning Center. Faculty, staff, seniors, their families and friends attended. Undergraduate Adviser, Prof. Gary Douberly recognized each of the graduates, noting their activities, accomplishments and awards throughout their academic careers. He also outlined future plans for additional education or employment for each student. Congratulations Seniors! Come back to visit whenever you can! ●

Northeast Georgia ACS Spring Awards

The N.E. Georgia Section of the ACS held its annual awards banquet on April 16 at the Georgia Center. Several of our professors and students were honored with awards from the local section this year. Prof. Geoff Smith received the George Philbrook Award for Outstanding Undergraduate Teaching, while Prof. Greg Robinson was recognized as the Chemist of the Year for Research. Graduate students Jay Agarwal and Sean Marrache were recognized as Outstanding Graduate Students of the Year, while three of the five Outstanding Undergraduate Students of the Year were from UGA: Lydia Babcock-Adams, Kasey Leigh Darley, and Richard Weimar.

In addition to the local ACS awards, Chemistry Department Award winners were also recognized. These included Callen Brownfield (Pamela Ann Henkel Award for most outstanding undergraduate in Organic Chemistry), Zach Schneiderman (Alfred W. Scott Award for most outstanding rising senior), Doug Jackson (L. B. "Buck" Rogers Award for outstanding research by a graduate student), Robert Gilliard (Martin Reynolds Smith Award for best research paper by a graduate student), and Maria Ledina, Jeremy Yatvin and Ellen Broering, who all won Kenneth Whitten Awards for Outstanding TAs. ●



Matthew Jones, Callan Brownfield, Zach Schneiderman, Lydia Babcock-Adams, Richard Weimar, Kasey Darley, and John Hayes



Prof. Geoff Smith and Greg Robinson



Jay Agarwal, Maria Ledina, Robert Gilliard and Ellen Broering

Surprise Discovery about “Ancient” Marble Relief

Last fall, a research team at UGA began the Orpheus Relief Project. Their initial major goal was to determine how a 2000-year-old marble relief was originally colored, based on an analysis of the pigment residues remaining on the surface. In antiquity, Greek and Roman marble sculpture was not pristine white but colorfully painted. A collaboration between UGA's Franklin College of Arts and Sciences and the University of Mississippi Museum brought the “Orpheus Relief” to the Georgia Museum of Art (GMOA) from Sept. 2012 to March 2013. After several months of both scientific and art historical investigations, however, the results came as a shock to everyone: the relief was not ancient. Rather, it was likely created between the 1880's and the 1920's as a historical reproduction intended to decorate a private home in Rome.

The collaborative research team included Prof. Tina Salguero (Chemistry), Prof. Mark Abbe (Art History, and project director), and Dr. Jeff Speakman (Center for Isotope Analysis). The analysis completed by Prof. Salguero and undergraduate researcher Richard Weimar included optical microscopy, scanning electron microscopy with energy dispersive spectroscopy, and micro-Raman spectroscopy (using an instrument in Prof. Rich Dluhy's laboratory). Additional scientific characterization by hyperspectral imaging, X-ray fluorescence spectroscopy, and marble isotope analysis was coordinated by Dr. Speakman.

The “smoking gun” was clear chemical evidence of modern pigments like titanium white and phthalocyanine blue, along with traces of other industrial byproducts. The conclusion about the relatively recent origins of the relief was further supported by traditional art connoisseurship, such as observations of a shallow carving style that is consistent with duplication from plaster casts from which detail and depth had been lost over time.

The Orpheus Relief piece was part of an important collection of Greek and Roman art donated to the University of Mississippi by the estate of famed art historian David Moore Robinson in 1960. The fragment survives from a three-figured composition depicting the Greek messenger god Hermes escorting Eurydice to the Underworld during her final parting from Orpheus. The larger, now lost, composition is one of the most celebrated examples of Greek sculpture believed to be from the High Classical period. ●

The complete results of the interdisciplinary study were disclosed during a public presentation in March 2013, “The Orpheus Relief: Object, Three Perspectives,” at the Georgia Museum of Art. The findings were further highlighted by *Archaeology* magazine, GPB News, and the Athens Banner-Herald.



Top: portion of the Orpheus Relief showing remnants of paint. **Bottom left:** the studied fragment in location within the original full panel. **Bottom right:** chemistry postdoc Chris Barrett examining the relief on display at the Georgia Museum of Art.

Other News Bytes

Prof. Todd Harrop, Inorganic Chemistry, was promoted to Associate Professor with tenure in Spring 2013.

Dr. Daphne Norton was recently hired as an Academic Professional to supervise the undergraduate General Chemistry lab program. She worked previously in this capacity at Emory University.

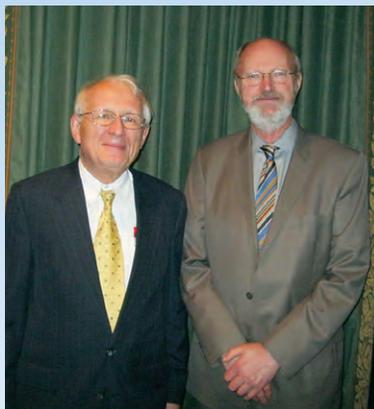
Two graduate students from the Chemistry Department, **Alexander Sokolov** and **Tao Liang**, won the 2013 Dissertation Completion Award. They will receive funding from the graduate school this coming academic year in order to complete their dissertations by next summer at the latest. Alex works for Prof. Fritz Schaefer, and Tao works for Prof. Gary Douberly.

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announcements on upcoming
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2012 R. B. King Lecture

The 2012 R. B. King Lecture was given on November 5 in the Chemistry Department by Nobel Laureate Prof. Robert H. Grubbs. The lecture title was "Organometallic Complexes as Selective Olefin Metathesis Catalysts." Grubbs was born on February 27, 1942 near Possum Trot, Kentucky and studied chemistry at the University of Florida (B.S. and M.S.) and at Columbia University, where he obtained his Ph.D. under Ronald Breslow in 1968.



Prof. R. B. King and Robert Grubbs

Following a one-year NIH postdoctoral fellowship with Prof. James Collman at Stanford University, he was appointed to the faculty of Michigan State University. In 1978 he moved to Cal Tech, where he is presently Victor and Elizabeth Atkins Professor of Chemistry. His research interests involve the design, synthesis, and mechanistic studies of complexes that catalyze useful organic transformations. Professor Grubbs received the 2005 Nobel Prize in Chemistry.

The research group of Professor Grubbs is involved in the design, synthesis and mechanistic studies of complexes that catalyze basic organic transformations. The major focus of the group over the past few years has been on the olefin metathesis reaction. To optimize the utility of this reaction, new catalysts have been developed that are extremely tolerant of organic functional groups. Due to their high activity, functional group tolerance, and ease of use, these ruthenium based catalysts have found wide applications in organic and polymer synthesis. Professor Grubbs has more than 500 publications and 100 patents based on his research. ●

2013 Schleyer Lecture

The 2013 Schleyer Lecture took place in the Chemistry Department on February 26. The speaker was Prof. Timothy R. Clark, a former colleague of Schleyer's, and his lecture was entitled "Directional Non-Covalent Interactions and Anisotropic Atoms." Clark was born in Droxford, Hampshire, England and studied chemistry at the University of Kent at Canterbury, where he was awarded a first class honors Bachelor of Science degree in 1969. He obtained his Ph.D. from the Queen's University Belfast in 1973 after working on the thermochemistry and solid phase properties of adamantane and diamantane derivatives. After two years as an Imperial Chemical Industries Postdoctoral Fellow in Belfast, he moved to Princeton University as a NATO Postdoctoral Fellow working for Paul Schleyer in 1975. He then followed Schleyer to the *Institut für Organische Chemie* of the *Universität Erlangen-Nürnberg* in 1976. He is currently Director of the *Computer-Chemie-Centrum* in Erlangen and Professor of Computational Chemistry at the University of Portsmouth, England, where he is also Director of the Centre for Molecular Design. He is the author of 340 articles in



Prof. Tim Clark

scientific journals and two books, and is the founding editor of the *Journal of Molecular Modeling*. In 2009, he was awarded the Klaus-Wilhelm von der Lieth Medal of the Molecular Graphics and Modeling Society.

Prof. Clark's research areas include the development and application of quantum mechanical methods in inorganic, organic and biological chemistry, electron-transfer theory and the simulation of organic and inorganic reaction mechanisms. More recently, he has used long time-scale classical molecular-dynamics simulations to investigate a number of proteins and protein-DNA complexes involved in the resistance mechanisms of bacteria to tetracycline antibiotics and control of the bacterial restriction-methylation defense mechanism. ●

2013 Allinger Lecture

The 2013 Allinger Lecture took place in the Chemistry Department on April 23. The speaker was Prof. James H. Prestegard, of the UGA Chemistry, Biochemistry and Molecular Biology Departments and the Complex Carbohydrate Research Center. Prestegard's topic was "Glycans in Immunoglobulin G: Structure and Dynamics from NMR." Prestegard was born in Minneapolis on January 27, 1944, and received his B.S. degree in Chemistry from the University of Minnesota in 1966. He then moved to California to attend graduate school at Cal Tech. While he intended to pursue research in physical organic chemistry, he quickly became fascinated with the biophysical chemistry going on in Prof. Sunney Chan's group and produced a thesis exploring applications of Nuclear Magnetic Resonance (NMR) to both nucleic acids and ion-transport antibiotics under Chan's direction. Although he intended to pursue postdoctoral studies involving the biophysics of membrane systems, a looming economic downturn dictated looking for a more permanent position. He joined the Chemistry Department at Yale University as an Assistant Professor in 1970. Some years after promotion at Yale to Full Professor, he moved to the University of Georgia in 1998. Prestegard is currently a Georgia Research Alliance Eminent Scholar at UGA.



Prof. Jim Prestegard

The Prestegard laboratory specializes in the development and application of NMR methods for the study of systems of biological interest. The focus has evolved from lipid membranes to proteins to carbohydrates, and now to combinations of these systems. Prestegard's lab produced its first NMR structure of a protein in 1988 (acyl carrier protein), a structure which stood as the only structure of a fatty acyl carrier protein until a crystal structure appeared in 2001. The lab has produced many protein structures since that time, including one of the first integral membrane protein systems, the glycophorin dimer, in 1997. In the course of this activity new methodology was developed, including the use of lipid bicelles as an orientable medium for characterizing glycolipids and residual dipolar couplings (RDCs) as a new source of information on protein structure. In 2002 Professor Prestegard, along with Aksel Bothner-By and Ad Bax, was recognized for the introduction of RDCs by the Laukien Prize for outstanding contributions to experimental NMR. Since joining the Complex Carbohydrate Research Center at the University of Georgia, Professor Prestegard's interest has turned to glycan-protein interactions and glycoprotein structures. ●

Prof. Rich Dluhy and Team Awarded \$1.1 Million to Detect Emerging Flu Strains

University of Georgia researchers are refining a nanotechnology-based method that uses lasers to more accurately predict emerging influenza strains – particularly strains with a risk of high mortality. The work is funded by the National Institutes of Health and totals \$1,124,914 over the next four years. **Richard Dluhy**, Professor of Chemistry in the Franklin College of Arts and Sciences, along with **Stephen Tompkins** and **Ralph Tripp**, Associate Professor and Professor of Infectious Diseases in the College of Veterinary Medicine, respectively, are improving a method used to identify virus strains so researchers can quickly detect components in viruses that affect influenza virulence.

Influenza kills thousands of people each year worldwide. The Centers for Disease Control and Prevention estimates that 3,000 to 49,000 flu-related deaths occurred annually in the United States alone from 1976 to 2007. Millions are immunized every year against influenza, but vaccines aren't always effective because it is difficult to predict the flu strain for a given year. Virulence – how easy or difficult it is for a disease to be passed along or to kill its host – is determined by the presence of molecules called virulence factors. Studies have shown that different types of influenza may contain the same virulence factors. The same protein, for example, was found in the different virus strains that caused both the 1997 Hong Kong bird flu and the 1918 pandemic known as the “Spanish flu” that killed nearly 50 million people. If certain proteins and other molecules within the viruses can be associated with particularly virulent strains of influenza, epidemiologists might be able to prevent the spread of those strains.

“Currently there is no way to screen for the biochemical markers of influenza virulence,” said Dluhy, principal investigator for the project. “The ability to routinely screen influenza isolates for virulence factors would be a highly significant advance.”

Employing a method he developed several years ago with UGA physics professor Yiping Zhao, Dluhy and his team will deposit a layer of microscopically thin silver nanorods on a glass plate so the wires project at an angle from the plate. Fragments of synthetic nucleic acids known as oligonucleotides, or oligos, are chemically attached to the nanorods. The oligos capture bits of the influenza genetic material from virus samples, creating an oligo-virus complex. The complex is then interrogated with a laser beam, which can penetrate the biological material without harming it, using the technique of surface-enhanced Raman spectroscopy, or SERS. The sensitivity of the technique relies on the amplification of the Raman signal by the silver nanorods. The SERS spectra are unique for different strains of viruses. The method, also known as nano-optical detection, has already proven viable for identifying whole viruses, but Dluhy, Tompkins and Tripp will take the process a step further by identifying virus components – the virulence factors – that survive from strain to strain.

“Nano-optical detection will help epidemiologists predict the appearance of deadlier flu strains with greater accuracy,” said Dluhy. “It will enable researchers to prepare the right types of vaccines far in advance of outbreaks.” The method, said Dluhy, may also entirely eliminate pandemics if potential outbreaks can be spotted early and controlled with regional vaccination programs. ●

Prof. Jin Xie and Group Develops Novel Drug Delivery Carrier

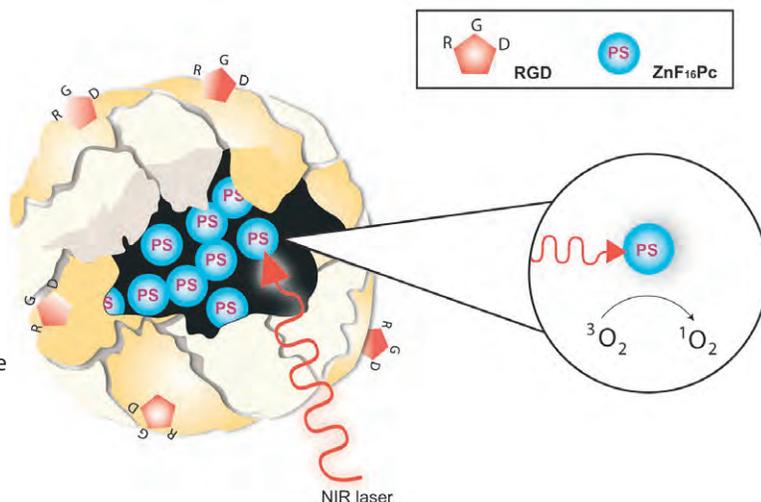
Professor **Jin Xie** and postdoctoral researcher **Zipeng Zhen** have recently developed a new strategy to deliver cancer drugs activated by light excitation directly to tumors using nanoparticles (*ACS Nano*, 7, 6988). Genetically modified ferritin nanoparticles have been used to selectively deliver a photosensitizer to tumors and prevent the traditional pitfalls of Photodynamic Therapy (PDT). Given the versatility of ferritin particles, this technique has exciting potential to treat a broad range of cancers.

Despite decades of research and vast sums of money, cancer remains one of the most significant causes of mortality worldwide. Powerful new therapeutics have been developed, but issues with biocompatibility, immunogenicity, and toxicity have prevented the widespread use of many of these drugs. While nanotechnology was purported to revolutionize drug delivery, it has failed to make many clinically significant gains over previous drugs.

In new developments, Xie and Zhen developed a ferritin-based PDT platform that can deliver large amounts of a hydrophobic PDT agent to tumors with minimal side effects. Ferritin is a nearly ubiquitous iron storage protein found in most living organisms. When grown in an iron-deficient environment, it has a hollow core that can be filled with therapeutics or imaging agents. Taking advantage of this cavity, the researchers were able to load much more PDT agent by weight into the ferritin particles compared with other reported nanocarriers.

Tumor-targeting molecules were bound onto the ferritin surface by genetic modification, allowing efficient delivery of the ferritin

particles to the tumor and limiting collateral damage from the PDT agent. With traditional PDT therapy, patients are required to avoid bright light for up to two months after the initial treatment. Failure to do so can result in serious toxicity to the skin. However, because of PDT encapsulation by the ferritin particles, no skin toxicity was observed, even with a high tumor inhibition rate. Given the favorable compatibility profiles of the ferritin particles and the excellent therapeutic results of PDT, there is potential for this targeted ferritin mediated delivery to be clinically evaluated. ●



UGA researchers boost efficacy of drugs by using nanoparticles to target 'powerhouse of cells'



Sean Marrache and Prof. Shanta Dhar

Nanoparticles have shown great promise in the targeted delivery of drugs to cells, but work in the group of Prof. Shanta Dhar has refined the process further by using nanoparticles to deliver drugs to a specific organelle within cells. By targeting mitochondria, often called “the powerhouse of cells,” the researchers increased the effectiveness of mitochondria-acting therapeutics used to treat cancer, Alzheimer’s disease and obesity in studies conducted with cultured cells.

“The mitochondrion is a complex organelle that is very difficult to reach, but these nanoparticles are engineered so that they do the right job in the right place,” said Dhar. Dhar and grad student Sean Marrache used a biodegradable FDA-approved polymer to fabricate their nanoparticles and then used the particles to encapsulate and test drugs that treat a variety of conditions. Their results were published in the *Proceedings of the National Academy of Sciences* (2012, 109, 16288).

To test the effectiveness of their drug targeting system against cancer, they encapsulated the drug lonidamine, which works by inhibiting energy production in the mitochondria, and separately, a form of the antioxidant vitamin E. They then treated cultured cancer cells and found that mitochondrial targeting increased the effectiveness of the drugs by more than 100 times when compared to the drugs alone and by five times when compared to the delivery of drugs with nanoparticles that target the outside of cells.

Similarly, the compound curcumin has shown promise in inhibiting formation of the amyloid plaques that are a hallmark of Alzheimer’s disease, but it quickly degrades in the presence of light and is broken down rapidly by the body. By encapsulating curcumin in the mitochondria-targeting nanoparticles, however,

the researchers were able to restore the ability of brain cells in culture to survive despite the presence of a compound that encourages plaque formation. Nearly 100 percent of the cells treated with the mitochondria-targeting nanoparticles survived in the presence of the plaque-inducing compound, compared to 67 percent of cells treated with free curcumin and 70 percent of cells treated with nanoparticles that target the outside of cells.

Finally, the researchers encapsulated the obesity drug 2,4-DNP—which works by making energy production in the mitochondria less efficient—in their nanoparticles and found that it reduced the production of fat by cultured cells known as preadipocytes by 67 percent compared to cells treated with the

drug alone and by 61 percent of cells treated with nanoparticles that target the outside of cells.

“A lot of diseases are associated with dysfunctional mitochondria, but many of the drugs that act on the mitochondria can’t get there,” Marrache said. “Rather than try to alter the drugs, which can reduce their effectiveness, we encapsulate them in these nanoparticles and precisely deliver them to the mitochondria.” Dhar said that getting drugs to the mitochondria is no simple feat. Upon entering cells, nanoparticles enter a sorting center known as the endosome. The first thing Dhar and Marrache had to demonstrate was that the nanoparticles escape from the endosome and don’t end up in the cells’ disposal center, the lysosome.

The mitochondria itself is protected by two membranes separated by an interstitial space. The outer membrane only permits molecules of a certain size to pass through, while the inner membrane only permits molecules of a given range of charges to pass. The researchers constructed a library of nanoparticles and tested them until they identified the optimum size range—64 to 80 nanometers, or approximately 1,000 times finer than the width of a human hair—and an optimum surface charge, plus 34 millivolts.

Dhar notes the components they used to create the nanoparticles are FDA approved and that their methods are highly reproducible and therefore have the potential to be translated into clinical settings. The researchers are currently testing their targeted delivery system in rodents and say that preliminary results are promising. “Mitochondrial dysfunctions cause many disorders in humans,” Dhar said, “so there are several potential applications for this delivery system.” ●

- 1978 Little, James**, Kingsport, TN. M.S. (w/ Hautala) James is a Research Fellow at Eastman Chemical Company in Kingsport, TN, specializing in the characterization of organic compounds in commercial samples using mass spectrometry and NMR. He and his wife, Sandra, have two sons, Jacob (26 years old) and Matthew (30 years old). His spare time is spent sailing on Watauga Lake and off the coast of Charleston, SC. See <http://littlesandsailing.wordpress.com/>
- 1986 Shawe, Thomas**, Lewisburg, PA. M.S. (w/ Majetich) Thomas T. Shawe, 53, died from cancer on Wednesday, July 10, 2013. Born in Savannah, Thomas earned a B. S. (1982) and M. S. degree in Chemistry (1986) working with George Majetich. He obtained a Ph.D. from Emory and did postdoctoral work at Colorado State University. He was an Associate Professor at Bucknell University in Lewisburg, PA, where he was a talented and insightful researcher and a highly effective instructor. Tom was an ardent fan of the Georgia Bulldogs, a scholar of the civil war, and a staunch conservative. He also loved the history and the importance of US railways, cycling, hiking, and most especially white water canoeing.
- 1990 Condon, Stephen**, Glenmoore, PA. M.S. (w/ Majetich) Stephen was featured in the April 22, 2013 issue of C & E News (Volume 91, Issue 16, pp. 15-16) about the development of a new cancer drug (birinapant, an apoptosis inhibitor) by a team at Tetralogic Pharmaceuticals, where he is the VP of Chemistry. After studying with Majetich, Stephen went on for his Ph.D. at the University of Pennsylvania with Prof. Amos Smith and has had a successful industrial career. Stephen presented a lecture on the work at the National ACS meeting in New Orleans in April.
- 1993 Gorman, Gregory**, Birmingham, AL. Ph.D. (w/ Amster) Gregory is currently an Associate Professor of Pharmacy, director of research, and vice chair of the Pharmaceutical, Social and Administrative Sciences Department in the McWhorter School of Pharmacy at Samford University. Greg is working to pay for his kids' college, and he will be an "empty nester" in August. Kristen (majoring in hospitality and event planning) is a sophomore at the Univ. of Alabama in Tuscaloosa, and Sara Anne (who is pre-vet) is a freshman at Auburn University. He and his wife Nancy just celebrated their 27th wedding anniversary.
- 1996 Scurlock, Chris**, Belcamp, MD. Postdoc (w/ Duncan) Chris is now working for Battelle on corrosion/materials degradation issues for the Department of Defense. This includes quite a broad range of topics such as electrochemistry, polymers/coatings (glassy state), and metallurgy.
- 1998 Buchanan, John**, Montana City, MT. M.S. (w/ Duncan) John is Chief Chemist at the Montana Department of Transportation. He has two children, a boy James and a girl Katherine (who is almost as tall as his wife Tammy now!).
- 2000 Faucher, Keith**, Milford, NH. Ph.D. (w/ Dluhy) Keith is the Research and Development Manager at Atrium Medical in Milford, NH.
- 2000 Leverette, Chad**, Aiken, SC. Ph.D. (w/ Dluhy) Chad is the Assistant Vice Chancellor for Academic Affairs at the University of South Carolina in Aiken, SC.
- 2000 Nee, Matthew**, Bowling Green, KY. B.S. After UGA, Matt received his Ph.D. at UC-Berkeley under Prof. Dan Neumark. He then went on to a postdoc position at the University of Michigan under Prof. Kevin Kubarych. Matt is now Assistant Professor at Western Kentucky University. He came back to UGA for a Physical Seminar on November 9, 2012 on "Ionic Strength and Symmetry Breaking in Aqueous Solutions: A Proxy for Local Electrical Fields."
- 2001 Elmore, Doug**, Minneapolis, MN. Ph.D. (w/ Dluhy) Doug is the Advanced Research Specialist at 3M Corporation in Minneapolis, MN.
- 2004 Jaeger, Todd**, Russell Gulch, CO. Ph.D. (w/ Duncan) Todd is currently the Advanced Development Sales Manager for Astronomy and Lasers at Schott Glass. He works with technical business development for astronomy projects in the Americas (large telescopes like GMT, ESO, Keck, etc.) and for lasers in the Americas and Europe. Todd travels extensively to see customers and work with Schott's factories worldwide. He's already been to several countries this year and has seen amazing research, dealing mainly with very large projects, national labs, and large companies. He currently resides at 9500 feet in Russell Gulch, Colorado, and loves to wake up with coffee and the sunrise glancing off the mountains.
- 2004 Whiteside, Tad**, Aiken, SC. Ph.D. (w/ Carreira) Tad and wife Morgan are pleased to report the arrival of a daughter, Eleanor Grace Whiteside, born on May 28, 2013. Eleanor is now sleeping through the night, and both parents and big brother Roland are all enjoying this. Tad is still working at the Savannah River Research Lab in Aiken, SC.
- 2005 Shanmukh, Sarat**, Bangalore, India. Ph.D. (w/ Dluhy) Sarat is the Manager of Materials Characterization Laboratory at GE Global Research in Bangalore, India.
- 2006 Barry (formerly Hernandez), Hilda**, M.S. (w/ Amster) After working for over three years at the Mass Spec facility at UCSF in proteomics research, Hilda has switched fields and now works as a Research Associate III at the Department of Toxic Substances Control at EPA. There she performs analysis of persistent organic pollutants in serum samples and works on development of methodologies for analysis by GC-MS/MS. Hilda is still running and finished her first 50 mile race a couple of months ago! She is now training for her next challenge: 100K!
- 2007 Hearn, John**, Cleveland, TN. Ph.D. (w/ Smith) John is starting a job as an Assistant Professor at Lee University in Cleveland, TN.
- 2007 Pillai, Dinesh**, Singapore. Ph.D. (w/ Duncan) Dinesh is Director for the local IDEX division and responsible for the Asia Distribution for Optics & Photonics at IDEX Optics and Photonics. He is responsible for all of Asia for IDEX Optics and Photonics, which acquired CVI Melles Griot in 2011. His family is doing well, and Dinesh continues to discover the joys...and the challenges...of parenting!
- 2007 Reddie, Khalilah G.**, MA. Ph.D. (w/ Dore) Khalilah is Lecturer in the Department of Chemistry at University of Massachusetts Lowell.
- 2008 Kim, Jay, Yongjin**, South Korea. Ph.D. (w/ Stickney) Jay is currently working in the chemical company in South Korea as a senior researcher. After his Ph.D., he moved to the University of Colorado and National Renewable Energy Laboratory and worked as a postdoctoral researcher. He moved back to Korea in 2011. His son, Alex, is enjoying kindergarten.
- 2008 Ticknor, Brian**, Oak Ridge, TN. Ph.D. (w/ Duncan) Brian and wife Peyton just moved from Aiken, SC to Oak Ridge. Brian was working at the Savannah River Research Lab, but joined the Mass Spec/Trace Element group at Oak Ridge National Lab in September.
- 2008 Zhu, Yue**, Jilin, China. Ph.D. (w/ Dore) Yue is a Research Scientist at the Center for Combinatorial Chemistry and Drug Discovery in Jilin, China.
- 2010 Harris, Kyle T.**, Atlanta, GA. M.S. (w/ Dore) Kyle is a Bioscience Applications Manager at Porex in the Atlanta, GA area.
- 2010 Kutlik, Robert A.**, St. Louis, MO. M.S. (w/ Dore) Robert is a Senior Associate Scientist at Pfizer in the St. Louis, MO area.
- 2010 Lynch, Tasaday**, Atlanta, GA. M.S. (w/ Dluhy) Tasaday is a M.D. Student at Morehouse University School of Medicine in Atlanta.
- 2011 Ard, Shaun**, Albuquerque, NM. Postdoc (w/ Duncan) Shaun is now NRC postdoc at the Air Force Research Lab at Kirtland AFB, working with Dr. Al Viggiano.
- 2011 Morrison, Daniel**, Atlanta, GA. B.S. Daniel began his Ph.D. program in Chemistry and Chemical Engineering at Georgia Tech this fall.
- 2011 Rea, Adam C.**, Athens, GA. M.S. (w/ Dore) Adam is a Research Biologist at Meril, A Sanofi Company in the Athens area.
- 2012 Bandyopadhyay, Biswajit**, Berkeley, CA. Ph.D. (w/ Duncan) Biswajit just completed a postdoc at the University of Alabama, working with Prof. Daniel Goebbert. He recently moved to a new postdoc at the Advanced Light Source at Lawrence Berkeley National Lab, working on the Chemical Dynamics Beam Line with Dr. Musa Ahmed.
- 2008-12 Barb, Adam**, Postdoc (w/ Prestegard) Adam, a former postdoc at the CCRC and winner of the 2011 UGA Postdoctoral Research Award, began a position in the Department of Chemistry at Iowa State University this past fall. He set up his research program there with a K22 Research Scholar Development Award from the NIH, working on molecular interactions of proteins in the immune system.



- 2012 Cheng, Tim**, Columbia, MD. Ph.D. (w/ Duncan) Tim is working for Spectra Physics Lasers, a division of Newport Corporation, as a laser field service engineer.
- 2012 Gale, Eric**, Ph.D. (w/ Harrop) Eric is a post-doctoral fellow at Massachusetts General Hospital/Harvard Medical School where he is working on the design and construction of MRI contrast agents. He just published a new paper (Chem. Commun. 2013, 49, 8060).
- 2012 Marshall, Nicholas**, Ph.D. (w/ Locklin) Nicholas is now a visiting assistant professor in Chemistry at Berea College in Berea, KY.
- 2012 Negri, Pierre**, South Bend, IN. Ph.D. (w/ Dluhy) Pierre is a postdoc at Notre Dame.
- 2012 Nekongo, Emmanuel**, Boston, MA. Ph.D. (w/ Popik) Emmanuel joined his wife Khalilah (Dore Lab, 2007) in the Boston area and is currently a postdoc at MIT. Khalilah is currently Organic Chemistry Lecturer at the University of Massachusetts-Lowell. They recently celebrated the birth of their daughter, Ayanna, in March 2013.
- 2013 Brown, Travis**, Athens, GA. B.S. (w/ Stickney) Travis graduated Cum Laude and was one of the Top 100 Student Workers for his work in the UGA Soil Lab. He will work as a lab technician for the UGA Agricultural Extension until beginning graduate school in fall 2014.
- 2013 Carden, Zachary**, Augusta, GA. B.S. Zachary graduated Cum Laude on an Air Force Health Professionals Scholarship. He was also a member of Alpha Epsilon Delta, a pre-Med Honor Society and will be attending the Medical College of Georgia at the Georgia Regents University in Augusta, beginning fall of 2013.
- 2013 Celis, Victor**, B.S. (w/ Phillips) Victor received The One UGA Scholarship and did undergraduate research with Prof. Robert Phillips. Victor will apply to dental school this summer for the class of fall 2014, and during his year off, he will work with an oral surgeon in Atlanta.
- 2013 Darley, Kasey**, B.S. (w/ Dhar) Kasey was the 2012-2013 Outstanding Undergraduate Student of the Year for the Northeast Georgia Section of the American Chemical Society. She was also a participant in The Arch Society, Blue Key National Honor Society, Dean William Tate Honor Society, and Palladia Women's Society. Kasey participated in the 2012 CURO Symposium, the 2012 Southeastern Undergraduate Research Conference for the American Chemical Society in Starkville, MS, 2013 CURO Symposium, and the 2013 National Conference for Undergraduate Research in La Crosse, WI.
- 2013 Dibble, Collin**, Ph.D. (w/ Duncan) Collin graduated in August, and accepted a postdoc position at the Pacific Northwest National Lab, in Hanford, WA, working on the surface chemistry of ice films with Dr. Bruce Kay. He and Lisa just arrived there in late August, rented a house, and are settling in with children Nolan and Elsie.
- 2013 Dinh, Huy**, B.S. Huy graduated Magna Cum Laude and was a member of the Golden Key Club. Huy did undergraduate research with Dr. Chulsung Kim at Georgia Gwinnett College on "The effects of common pain control medicines and pH of sugar solution on the fatality rate of argentine ants." Huy presented his work at the Southeastern Regional Meeting of American Chemical Society in Richmond, VA (2011). He plans to attend pharmacy school.
- 2013 Do, Quang "Johnny"**, Griffin, GA. Ph.D. (w/ Phillips) Johnny has recently started with Osmose, Inc. (a company that makes wood preservatives) in Griffin, GA.
- 2013 Dodd, Alexandra**, Augusta, GA. B.S. Alex graduated Magna Cum Laude and with Honors from the UGA Honors program. She also participated in the Demosthenian Literary Society. She did undergraduate research with Dr. Debra Mohnen at the CCRC on "Analysis of the role of galacturonosyltransferase in the acetylation and methylation of homogalacturonan during pectin biosynthesis." Alex presented her research at the 2012 CURO Symposium. She will attend the Medical College of Georgia at the Georgia Regents University beginning fall 2013.
- 2013 Espenship, Michael**, B.S. (w/ Dluhy) Michael graduated Magna Cum Laude after doing undergraduate research with Prof. Richard Dluhy on "Surface enhanced Raman spectroscopy of bacteria coated with polymers and silver nanoparticles." He also studied Biology and Animal Behaviors abroad in New Zealand and Australia in May 2012. Michael is taking a year off before graduate school, and he is planning an RVing trip out west with his dad, followed by a trip to Europe.
- 2013 Ezeh, Vivian**, Ph.D. (w/ Harrop) Vivian was awarded the Marilyn Yarbrough Dissertation/Teaching Fellowship at Kenyon College (Gambier, OH) for the 2012-2013 academic year. Vivian is the first recipient of this highly competitive award in the Chemistry Department at Kenyon. This award is named in honor of the late Marilyn Yarbrough, Kenyon parent and trustee. A legal scholar and university administrator who was a former editor of the Black Law Journal and a member of the Pulitzer Prize Board, Marilyn Yarbrough often addressed gender and racial discrimination in her scholarship and teaching. Vivian completed her Ph.D. in July 2013 and has just started a teaching/research postdoc fellowship at Colgate University (Hamilton, NY).
- 2013 Fraysure, Ashley**, B.S. Ashley participated in Sigma Alpha Omega, and served the Athens community through her participation with the Baptist Collegiate and Prince Avenue College Ministries. Ashley plans to pursue a career in Medicinal Chemistry or Pharmacy.
- 2013 Giordano, Dominic**, B.S. Dominic graduated Cum Laude and with Honors from the UGA Honors program. He pursued undergraduate research with Prof. Jon Amster on "MALDI-FT-ICR of biological macromolecules" and with Prof. Sayed Hassan at the UGA Environmental Analysis Laboratory. Dominic is planning a bike tour down the California coast before he starts graduate school in the fall for a Masters in Environmental Chemistry.
- 2013 Harrington, Christopher**, B.S. Chris participated in undergraduate research projects with Profs. Vladimir Popik, William Lanzilotta and Gary Douberly. He will pursue a Ph.D. in Organic Chemistry at Texas A & M University.
- 2013 Judson, Virginia**, B.S. Virginia did undergraduate research with Prof. Vladimir Popik and with Dr. Michael Pichichero at Rochester General Hospital, in Rochester, NY. After this, she went on a mission trip to Panama with other pre-dental students from the US. Virginia will attend Dental School, beginning fall 2013, at Stony Brook University in Stony Brook, NY. One of her future goals is to get involved in pro bono dental work at home as well as abroad - specifically focusing on Latin American/South American countries.
- 2013 Kim, Su**, B.S. Su did undergraduate research with Prof. George Majetich on "Efficient, multi-step synthesis of triquinacene." She also volunteered in Tena, Ecuador through MEDLIFE. Su plans to pursue either an MBA or a degree in Pharmacy.
- 2013 Licata, John**, B.S. John was recognized as an "Outstanding Student" from the Franklin College of Arts and Sciences at the 2013 Presidential Honors Day Luncheon. He graduated with Honors from the UGA Honors program, and participated in the Summer 2011 Science Maymester - UGA Study Abroad Program in Cortona, Italy. John will attend the University of Louisville School of Medicine in Louisville, KY, beginning this fall.
- 2013 Mitchell, William**, B.S. William was the President of the UGA Student Affiliates of the American Chemical Society and a member of the Phi Gamma Delta Fraternity. He did undergraduate research with Prof. George Majetich. William plans to pursue a career in Hospital Administration and Disaster Management.
- 2013 Moody, Grant**, B.S. Grant graduated with High Honors from the UGA Honors program and was a member of Phi Beta Kappa National Honor Society. His Honors thesis was done under the supervision of Prof. Gary Douberly. Grant presented his research at the 2013 CURO symposium and is graduating with "research distinction." His future plans include medical school.
- 2013 Moody, John**, Athens, GA. Ph.D. (w/ Atwood) John is Lecturer in the Department of Chemistry and Physics at Indiana State University in Terre Haute, IN.
- 2013 Morrison, William**, B.S. William began his Ph.D. in Biochemistry and Molecular Biology at the University of Utah this fall.
- 2013 Nguyen Vuong**, B.S. After graduating, Vuong's immediate plans are to find a suitable research internship, apply to dental school, and vacation in Vietnam.

- 2013 Parsons, Christopher**, B.S. and M.S. Christopher graduated Magna Cum Laude and studied abroad in New Zealand and Fiji on "Sustaining human systems and the environment." He did undergraduate research with Prof. Jason Locklin and his M.S. with Prof. Marcus Lay. Chris is traveling to Oslo to be an Au Pair. He will then return to UGA to work with the CAIS, and probably pursue a Ph.D. in the near future.
- 2013 Perry, John**, B.S. John graduated Magna Cum Laude and was a member of Alpha Epsilon Delta pre-Med Honor Society. He did undergraduate research with Prof. Timothy Dore on "Two-photon excitation of photochemically active catecholamines." John will attend the Medical College of Georgia at the Georgia Regents University in Augusta, GA, beginning fall 2013.
- 2013 Purser, Stephen Aaron**, B.S. Aaron graduated Cum Laude and received the Resident Assistant Award (Myers Community, UGA). He did undergraduate research at the Complex Carbohydrate Research Center (CCRC). Aaron begins Medical School this fall as part of the 2017 class of the GRU/UGA Medical Partnership.
- 2013 Reese, Robert**, B.S. Alex did undergraduate research with Prof. Ying Xu in the Computational Systems Biology Lab on the topic of "Mathematical modeling of the metabolisms of biofuel-producing bacteria." He interned at the CDC, working with Dr. Jan Drobeniuc in the Division of Viral Hepatitis on a comprehensive study of Hepatitis E in the United States. Alex began his Ph.D. here at UGA (Chemistry) this fall.
- 2013 Rosema, Danielle**, B.S. Danielle graduated Summa Cum Laude and was a member of Alpha Epsilon Delta pre-Med Honor Society. She will attend the Medical College of Georgia at the Georgia Regents University in Augusta, GA, beginning fall 2013. She plans to pursue a career as a Pediatric Oncologist.
- 2013 Salgado, Eric**, B.S. Eric graduated Magna Cum Laude and received The One UGA Scholarship, a Wells-Fargo Scholarship, and was a Presidential Scholar in Spring 2010 and 2011. He did undergraduate research with Prof. George Majetich and Prof. Shelley Hooks (Pharmacy). Eric will pursue a Ph.D. in Molecular Systems and Pharmacology at Emory.
- 2013 Sanchez, Eduardo**, B.S. Eduardo graduated Cum Laude and was a recipient of the Coca-Cola First Generation Scholarship, a member of Peach State Louis Stokes Alliance for Minority Participation (LSAMP), a member of Alpha Lambda Delta National Honor Society, and he graduated with Honors from the UGA Honors program. Eduardo did undergraduate research with Prof. Robert Phillips. He will apply for graduate programs this upcoming fall, and in the meantime, he plans to seek a job in industry.
- 2013 Savage, Brandon**, B.S. Brandon was a member of Delta Epsilon Iota academic honor society. He did undergraduate research with Prof. Tina Salguero on the "Synthesis of novel iron oxide-based nanosheets." Brandon will pursue a career in medicine, and his immediate plans are to find a job in a hospital while applying to medical schools.
- 2013 Schwartz, Andrew Coleman**, B.S. Coleman graduated Cum Laude and with Honors from the UGA Honors program. He did undergraduate research with Prof. Geoff Smith on the "Methodology for atmospheric aerosol sampling" and participated in the Summer 2012 Study Abroad Program in New Zealand on the topic of "Sustainability of human society and the natural environment." He plans to travel through Europe this summer before beginning Ph.D. studies at the University of Washington in Seattle.
- 2013 Stadele, Kyle**, B.S. Kyle did undergraduate research with Prof. Tina Salguero working on the synthesis of "Nanocapacitors." He will pursue a career in pharmacy. His immediate plans are to find a job in a pharmacy while applying to PharmD programs.
- 2013 Stevick, John**, B.S. John graduated Cum Laude, was a member of the Redcoat Band, Beta Upsilon Chi: Brother Under Christ fraternity, and UGA Wesley Foundation Men's Leadership. He did undergraduate research with Prof. Robert Phillips on the "Synthesis of a new substrate to test the β -elimination reaction of tryptophanase, tyrosine phenol-lyase, and tryptophan synthase." He will attend the UGA College of Pharmacy beginning this fall. His goal is to work as a supervising IV lab pharmacist at a major hospital.
- 2013 Taskeen, Umar**, B.S. Umar did undergraduate research with Prof. Michael Duncan on the "IR laser spectroscopy of size-selected metal clusters." Umar plans to travel the world and apply to pharmacy school for the fall 2014.
- 2013 Tierney, Megan**, B.S. Megan did undergraduate research with Prof. Michael Duncan on "IR spectroscopy of $\text{Ni}(\text{CO})_n^+$ clusters." She plans to pursue post-baccalaureate studies for one year before applying to medical school or graduate school in Chemistry.
- 2013 Usselman, Nathan**, B.S. Nathan graduated Magna Cum Laude and was a recipient of the Alfred W. Scott, Sr. Award for most outstanding rising senior BSChEM major. He also participated in the Interdisciplinary Field Program in Summer 2010, won a CURO Summer Fellowship in 2011, and spent a Maymester in New Zealand in 2012. His undergraduate research was with Prof. Jason Locklin. Nathan begins his Ph.D. this fall at UC-Berkeley.
- 2013 Weimer, Richard**, B.S. Richard graduated Cum Laude and received the UGA Amazing Student Recognition and NEGSACS Outstanding Undergraduate Student of the Year. He did undergraduate research with Prof. Tina Salguero and presented his results at the 2013 UGA CURO symposium and the 2012 Fall ACS National Meeting in Philadelphia. Richard and his wife Sarah are moving to Portland Oregon "via an epic road trip" to pursue graduate studies, first in Nursing, then in Chemistry. ●

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In Memoriam

Prof. Charles H. Stammer, 88, passed away in Athens on August 7, 2013. A native of Indianapolis, IN, he was preceded in death by his wife, Shirley, in 2006.

Chuck was Professor Emeritus of Organic Chemistry and former Department Head of Chemistry. He received his B. S. degree from Indiana University in 1948, and his Ph.D. from Wisconsin in 1952. He was hired in Chemistry at UGA in 1962 and retired after 28 years of teaching and research in 1990. His achievements in research included the development of an artificial sweetener, which resulted in a patent, and the publication of over a hundred research articles.

Chuck was a veteran of the United States Army with honorable service during World War II. Shortly after arriving in Europe during the Battle of the Bulge, he was captured and spent the remainder of the war in a prisoner of war camp in Germany, for which he received the Purple Heart. After retirement from Chemistry, Chuck decided to begin non-scientific writing, taking several writing classes, and eventually publishing a semi-autobiographical novel about his experiences in WWII, entitled "Wilhelm's War."

Survivors include his son and daughter-in-law, David Stammer and Julia King of Dallas, TX and daughter and son-in-law, Nancy and Blaine Osborn of Athens, GA. ●



Prof. Melvin Gary Newton, Professor of Organic Chemistry, died at his home in Athens on Friday, February 22, 2013 after an extended battle with cancer. He was 74.

Gary's interests included a love of music, including classical and opera, Pink Floyd, R.E.M, and other rock and roll bands. Natural life in many forms fascinated Gary, whose riverside home was surrounded by acres of wild growth and who always kept animal companions, most recently his beloved dogs, Davy and Levi. From his extensive travels Gary would often return with photographs of the wildflowers he encountered. Gary kept up a multi-decade project on his family's genealogy, tracking the Newton name to pre-revolutionary America. He was an avid bridge player, a reader, a collector of depression glassware and crystal, a supporter of progressive politics, and an appreciator of wine and gourmet foods.

Gary was born on February 18, 1939 on a farm near Millen, GA, the youngest child of Math and Alice Newton. He studied Chemistry at Georgia Tech, earning a Ph.D. in 1966. After a postdoc at the University of Illinois, he joined the faculty at UGA in 1967. In 1995 he joined the protein crystallography group headed by Prof. B. C. Wang in the Department of Biochemistry and Molecular Biology.

He is predeceased by his parents, his brothers Hugh and Bob, his sister Frances Collins, and his niece Beth Newton Anderson. He is survived by his former wife Sue, nieces Melanie Williams, Patsy Collins, Julie Robertson, Nan Demsky, and Polly White, and nephews Matt Newton, Jr., Rodney Newton, Steve Newton, and Bill Collins. ●



Jonathan Anderson, Richard Hubbard, Richard Hubbard III, Mel Coontz

2013 Chemistry Golf Scramble

The 2013 Chemistry Golf Scramble took place at the UGA Golf Course on Saturday May 18. The afternoon golf was followed by a barbecue, sponsored by the Chemistry Department and Thermo-Fisher. Two teams tied for the lead with scores of 65, and so a put-off was necessary to break the tie. The team of Richard Hubbard, Richard Hubbard III, Jonathan Anderson and Mel Coontz won the put-off, edging out the team of Jon Amster, Ted Mayer, Jeff Sherman and Mark Cooney. Alumnus Dudley Christie won the putting competition that took place on the putting green after the round. Alumni players included John Brewer, Dudley Christie, Jeff Sherman, Jonathan Anderson, Sean Marrache, Mike Brooks, Todd Roper and Collin Dibble. ●

Send us your updates on new jobs, marriages, children, retirements, special trips, etc. to Lauren Kirby at head@chem.uga.edu, or call 706-542-1919. We are especially interested in receiving your email addresses, so that we can send out reminders about upcoming events.