

The Barking Electron

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Fall 2011

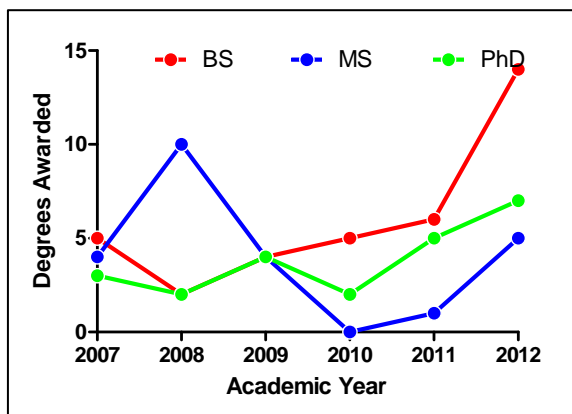
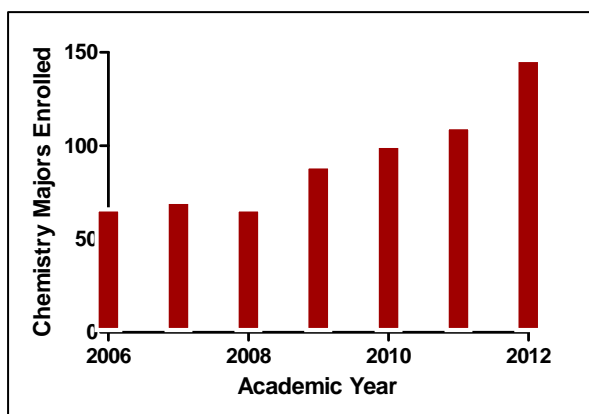


Greetings from the Head



Dear Friends,

Welcome to our second Department of Chemistry newsletter. Fall, 2011 was an exciting semester as we hosted a Chemistry Nobel Laureate (Sir Harold Kroto) and hired a new faculty member (Dr. Nick Fitzkee). We also want to congratulate Dr. Emily Rowland, faculty advisor for our SAACS Chapter, for leading our students to their first ever National ACS award. In addition, we're happy to mention that the number of chemistry majors and graduate students continues to climb each year, as illustrated below.



On an economic note, a challenge we currently face is raising enough money to establish the first endowed professorship or chair in MSU's Department of Chemistry. An endowed professorship is a distinguished academic position that is partially funded through an endowment and is established to recognize academic excellence. Endowed positions are powerful recruitment tools, i.e. an endowed professorship or chair would help us compete with other universities in attracting a real star to our faculty. An endowed professorship can be established by an individual, a corporation or a foundation to memorialize a loved one, to honor a colleague for their accomplishments or to declare one's commitment to Mississippi State University. A one-time gift of \$500,000 will establish an endowed professorship with the donor's choice of name. Many other giving opportunities are listed on our website and donations in any amount, especially to our 2020 and scholarship funds, are always appreciated.

Finally, I want to bring your attention to the upcoming events at the end of this newsletter. We're especially excited about our first annual scholarship golf tournament that we hope will become a tradition here at MSU. Please join us if you love golf and want to spend a fun Friday afternoon before Bulldog Bash Weekend!

With Warm Regards,
Ed Lewis, Professor & Head

Faculty & Staff

New Hire



Nicholas Fitzkee

B.S. Carnegie Mellon University
Ph.D. Johns Hopkins University

Before coming to MSU, Dr. Fitzkee was a postdoctoral fellow in Dr. Ad Bax's lab at NIH...THE Ad Bax, who is not only the number-one cited chemist (with a whopping 21,000 citations) but who also pioneered the use of nuclear magnetic resonance (NMR) to determine the structure of large proteins.

But we digress---research in the Fitzkee laboratory is focused on the Integrase protein (IN) from HIV-1. IN is responsible for inserting the reverse-transcribed viral cDNA into the host's genome. As such, it is an attractive drug target, and pharmaceutical companies are actively working on second generation IN inhibitors as part of a comprehensive AIDS treatment regimen. Students in the Fitzkee lab use a combination of biochemical approaches along with NMR spectroscopy to study protein structure and dynamics of not only IN but the mechanism of Pin1, peptidyl-prolyl isomerase, an enzyme that is heavily upregulated in tumor cells.

Dr. Peter Rabideau Garners Prestigious Awards

Our own Dr. Peter Rabideau has had an amazing fall semester. In August, Peter was elected to the 2011 class of **Fellows of the American Chemical Society** and honored at a special ceremony during the ACS National Meeting in Denver, CO. This award honors members who have demonstrated excellence in their contributions to chemistry and in service to the ACS and the chemistry community. While this year's class of fellows included 213 members, **Dr. Rabideau is the first person in the state of Mississippi to receive this prestigious award.** The ACS has 163,000 members, making it the largest scientific society in the world.



In November, Dr. Rabideau was named **2011 Mississippi ACS Chemist of the Year**. Peter was recognized during the 2011 ACS Awards Dinner held on the campus of the University of Southern Mississippi.

Peter has been an organic chemistry professor at MSU for eight years. He originally came to MSU in 2003 as provost and vice president for academic affairs as well as professor in the Department of Chemistry. Peter had already distinguished himself with his ground-breaking discovery of corannulene (C₂₀H₁₀), also known as a bucky bowl, a curved-surface, aromatic hydrocarbon. In 2009, he decided to leave the provost's office and become a full-time professor in the department. Professor Rabideau has over 130 publications including papers *Science* and *Nature*. Congratulations Peter!

Spotlight on...

Professor Keith Mead

Dr. Keith Mead is a Professor of Organic Chemistry who joined Mississippi State University in 1985. That English accent of his makes him sound very smart---and he IS smart! He received his Ph.D. degree in chemistry from the University of Southampton in England and was later a post-doctoral fellow at the University of Virginia. Dr Mead was also Head of the Department of Chemistry from 2002 - 2008. Since joining the chemistry faculty at MSU, Keith has published 30 papers in high impact journals, graduated 4 MS and 6 PhD students, and mentored 6 postdoctoral fellows. During his tenure at MSU, Keith has brought in more than \$1.28M in external research funding including several recent National Cancer Institute awards for the reverse synthesis of natural products having known anticancer activity.



Dr. Mead's research interests involve studying stereochemistry, which is the art of chemistry in 3-D. Most biologically-active compounds are able to exert their physiological response because



they have a specific 3-dimensional shape that allows them to fit into receptor sites on cell membranes. Constructing these molecules with precise configurations is therefore a challenge, and those who do this can be regarded as molecular architects. Dr. Mead has developed the total synthesis of several medicinally-active oxygen heterocycles including natural products having antibiotic and/or anticancer activity. Currently Dr. Mead is interested in a series of polyphenol antioxidants isolated from a Chinese plant

belonging to the species *Alpinia blepharocalyx*. These compounds have shown anti-cancer activity in two different cell lines, and his goal is to verify their structures through a total chemical synthesis.

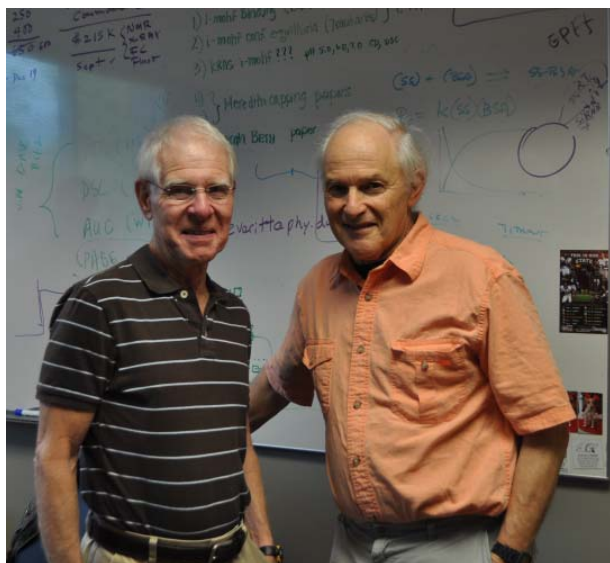
Keith is also “moonlighting” every other Thursday morning on the CBS-affiliated television station, WCBI, as the *Science Behind Your Health* expert. From prescriptions for your cholesterol to daily cosmetics, Keith lets you know the facts to help you make informed decisions and take charge of your health. But you’ll have to get up early to watch Keith---he’s on WCBI’s Morning Sunrise edition.



Chemistry Department Hosts Nobel Prize Winner Sir Harold Kroto

On October 26, 2011, the Chemistry Department, along with the College of Arts & Sciences, sponsored a lecture by Sir Harry Kroto, 1996 Nobel Chemistry prize winner. Over 1200 people attended including buses of students from Mississippi School of Mathematics and Science in Columbus, advisory board members from Atlanta and faculty from MUW. Sir Harry wowed the audience with a multi-media extravaganza that was both educational and humorous, touching not only on the story of the Nobel-winning discovery but also on his thoughts about science, politics and religion.

Two Bucky Ball Giants: Dr. Peter Rabideau with Sir Harry Kroto






Buckminster Fuller, who designed geodesic domes. The carbon balls are commonly referred to as "buckyballs". Their discovery has become the basis for next-generation nanomaterials that include drug-delivery vehicles for cancer therapy and ultra-hard coatings and military armor. Kroto is presently the Frances Epps Professor of Chemistry at Florida State University.

Sir Harold Kroto, along with Rice University professors Richard Smalley and Robert Curl Jr, received the 1996 Nobel Chemistry prize for their joint discovery of fullerene carbon compounds. Kroto, Smalley and Curl discovered a soccer-ball-shaped hollow, spherical C_{60} molecule, naming it "buckminsterfullerene", after the architect R.

A photograph of Sir Harold Kroto sitting cross-legged, smiling, and holding a model of a buckyball (C60 molecule) in his hands. Several other buckyball models are floating in the air around him against a dark background.

CARBON IN NANO AND OUTERSPACE

The MSU Department of Chemistry presents 1996 Nobel Prize Winner
SIR HAROLD W. KROTO
Oct. 26, 7 p.m. • Bettersworth Auditorium • Lee Hall • Free to the public

Alumni

Alumni Spotlight

Rose M Stiffin, PhD (MS 1981) was raised and educated in Indianola, Mississippi. She received her Master of Science degree in Organic Chemistry from Mississippi State University (1981), and her PhD in biochemistry from the University of Tennessee, Memphis (1995). Dr. Stiffin continued her post-doctoral work at St. Jude Children's Research Hospital in Memphis, Tennessee where she studied the HIV-1 protein, Nef. Currently, she is the Chair of the College of Health and Natural Sciences at Florida Memorial University, a small historically black college (HBCU), located in Miami Gardens. Rose's research interests are targeted on drug stereochemistry as it relates to cancer and the expression of cellular markers in breast cancer. Most recently she has established a successful undergraduate research and training program in radiochemistry. Florida Memorial University is one of only a few HBCU's to have a radiochemistry program. Dr. Stiffin is also the coordinator of the *Florida-Georgia Louis Stokes Alliance for Minority Participation (FGLSAMP)* program. Rose has brought in over \$1M in funding with the latest being \$114K from the Nuclear Regulatory Commission for her radiochemistry program. Dr. Stiffin also has a creative side: she has written a novel, *Walk in Bethel* (available on Amazon), in addition to several short stories which have been published in *Imagine* and the *Algonquin Quarterly*.



Alumni Briefs



Joel Muirhead, MD (BS 1989) is a board certified ophthalmologist in Longview, TX. Before joining Heaton Eye Associates in the fall of 2003, Dr. Muirhead served as the Aeromedical Ophthalmology Consultant to the U.S. Army Aeromedical Center Commander at Fort Rucker, Alabama. There, he helped formulate policy on topics ranging from glaucoma care to laser vision correction protocols for all U.S. Army Aviation personnel. Presently, Joel specializes in cataract surgeries and laser vision corrections.

Chad Hopkins, PhD (BS 2001) is a senior staff scientist at OPKO Pharmaceuticals in Jupiter, FL. After receiving his PhD at the University of Kansas, Chad went on to post-doc at the University of Pittsburgh where his research centered on natural product chemistry as it relates to cancer.



Timothy Walker, PhD (BS 1998) is an Associate Research Professor at the Delta Research and Extension Center in Stoneville, MS. Dr. Walker manages the Mississippi Rice Breeding program. Last fall, Tim was selected by the Rice Foundation to visit Mexico and Cuba to see how other countries produce and process rice and how U.S. rice exports can meet their needs. FYI Mississippi ranks fourth in the nation in rice production.

Kong Shen, PhD (PhD 1997) serves as the Senior Scientist at Callaway Golf Company in Carlsbad, CA. Previously, Dr. Shen was an engineer at Taylormade-adidas Golf. Last year, Kong, as an agent of Callaway, filed a US patent for a formula that improves the polymer coating of golf balls.

Have any news about yourself or other alumni you would like to share? Please contact Reatha Linley at Reatha@chemistry.msstate.edu.

Students

Awards & Fellowships

Lydia Pickle - *Mary V. Simrall Undergraduate Research Scholarship*

Claudia Bennett - *L.C. Behr Scholarship*

Claudia Bennett - *William Peoples Scholarship*

Madeline Rupp, Shana McCormick - *Hach Scholarship*

Kyle Piner - *Donald Emerich Scholarship*

James Johnson - *Ian Chen Scholarship*

Kaitlyn Hennessey, Claire Taylor, Julie Waddle, Lydia Pickle - *Sheely Scholarship*

William Buchanan, Jeffrey Johnston - *George Kappler Scholarship*

David Fulton, Jeffrey Johnston - *Harry & Mary Simrall Scholarship*

SAACS Celebrates Chemistry Week at MSU

During the week of October 17th, Student Affiliates of the ACS at Mississippi State University celebrated National Chemistry Week with a Periodic Table Bingo/ Bake sale in front of the student union. "Exciting" chemical demonstrations also took place with no loss to life or limb.

In September, Drs. Todd and Deb Mlsna hosted SAACS at their "farm" for the 2011 Fall party. There was plenty of entertainment to go around--- good food, a zipline over their pond, and lots of faculty toddlers.



Chemistry Degrees Granted December 2011

Bachelors Degrees	Hometown
Bradley Edmonds	Meridian, MS
Madeline Rupp	Ocean Springs, MS
Jadie Tom	Birmingham, AL

Masters Degrees	Advisor	Thesis Title
Pravindya Haputhanthri	Zhang	Fluorescence-based Molecular Sensors for Metal Ion Recognition.
Martin Mathews	Pittman	The Synthesis of Novel Carbon-encapsulated mono- and bimetallic core-shell Nanorods.

PhD Degrees	Advisor	Thesis Title
Nilantha Bandara	Henry	Studies on η^6 -dibenzo[a,e]cyclooctatetraene Complexes of Chromium and Manganese Tricarbonyl.
Susan Scherrer	Foster	Detection of Trace Environmental Contaminants Using Cavity Ringdown Spectroscopy.

Teaching & Research Infrastructure

Instrument Updates

The MSU NMR facility upgrade continues... The Bruker QCI quad cryoprobe (^1H , ^{13}C , ^{15}N , & ^{31}P) for the 600 MHz NMR is scheduled to be installed by the end of January. The new cryoprobe will provide us with "state of the art" facilities for the study of large molecules and support biophysics and structural biology faculty research.

The department has also added major mass spectrometry instrumentation starting with a Bruker Daltonics UHPLC-MicroQ-ToF MS/MS system with multiple ionization sources and high resolution capabilities and a Perkin Elmer ICP-MS. The ICP-MS is also equipped with a Microscope and YAG laser for laser ablation studies of solid materials like ceramics and glasses. We have also added a Helium cryostat to the EPR and a JY-Horriba Fluoromax-4 fluorimeter to the CURIE lab.



Classroom Update:

During the summer, the department added multimedia electronics and new desks and chairs to our 2nd floor classroom. This small lecture room holds 49 students and is used for teaching our majors.



Upcoming Events

- **44th Annual ACS Southeastern Undergraduate Research Conference**
April 12-13, 2012

Undergraduate students have an opportunity to give an oral presentation or a poster in addition to attending a Keynote Lecture and Awards Banquet. Monetary awards are given to the two best presentations and posters in each of the five areas of chemistry. Graduate recruiting booths are also available during the conference.

Keynote Speaker: Dr. Jeffrey Johnston

Professor Jeffrey N. Johnston is the Stevenson Professor of Chemistry at Vanderbilt University. Prof. Johnston completed his doctoral dissertation at The Ohio State University in 1997, where he made significant contributions toward understanding stereoselectivity in organic synthesis, which he applied to oxonium ion-initiated pinacol rearrangements, the synthesis of polycavernoside A, and the synthesis of taxol. Prof. Johnston was recruited by the Vanderbilt Institute of Chemical Biology as Professor of Chemistry in 2005, where he has continued his work on stereoselectivity in organic synthesis. Prof. Johnston is among the top of his peer group in organic chemistry, as evidenced by his various awards, including the Boehringer-Ingelheim New Investigator Award, an Amgen Young Investigator Award, and an Eli Lilly Grantee Award. He was recently elected as a Fellow of the American Association for the Advancement of Science (AAAS).



- **The 2nd Annual Lester S. Andrews Graduate Research Symposium**
May 14-15, 2012

Conference participants will include graduate students from regional universities who will present the results of their research projects. This symposium will not only provide students with the opportunity to showcase their research in a professional setting but it will also allow students to meet Professor Eric Jacobsen, an internationally known organic chemist from Harvard. Prizes will be awarded for best papers and posters. There is no registration fee for this symposium.

Keynote Speaker: Dr. Eric Jacobsen



Dr. Eric Jacobsen is the Sheldon Emery Professor of Organic Chemistry and Department Chair at Harvard University. He obtained his B.S. degree from NYU and his Ph.D. degree at Berkeley in the field of organometallic chemistry, under the direction of Bob Bergman. After completing an NIH postdoctoral fellowship at MIT, he moved to Harvard University in 1993. He currently directs a research group of 20 graduate students and postdocs in the discovery, mechanistic elucidation, and application of new reactions, with special emphasis on asymmetric catalytic processes. The awards Jacobsen has received include the NSF Presidential Young Investigator Award (1990), the Camille and Henry Dreyfus Teacher-Scholar Award (1992), the ACS Cope Scholar Award (1993), the Fluka "Reagent of the Year" Prize (1994), the Thieme-IUPAC Prize in Synthetic Organic Chemistry (1996), the Baekeland Medal (1999), the ACS Award for Creativity in Synthetic Organic Chemistry (2001), election to the American Academy of Arts & Sciences (2004), election to the National Academy of Sciences (2008), and the Janssen Prize (2010).