CHEM Discovery

chemistry.clemson.edu Spring 2014

CHEMISTRY WELCOMES NEW FACULTY MEMBER DR. LEAH CASABIANCA

Professor Casabianca's research explores the interactions between nanomaterials and biological molecules. Leah received her B.S. in 2002 from Rice University, where she conducted undergraduate research in the lab of Professor Seiichi Matsuda on organic synthesis of modified cholesterol. In 2008, she completed her Ph.D. in physical chemistry under the mentorship of Professor Angel de Dios, where she elucidated the mechanism of antimalarial drug activity using a comprehensive battery of NMR spectroscopic methods including magnetic susceptibility and paramagnetic relaxation techniques. After graduation, she began her first postdoctoral research appointment (2008–2010) at the University of Illinois at Chicago working with Professor Yoshitaka Ishii exploring polymorphism in paramagnetic compounds. In 2010, Leah received two prestigious postdoctoral research awards: a Fulbright Postdoctoral Fellowship and an NSF International Research Fellowship. These enabled her second postdoctoral research appointment (2010–2013) at the Weizmann Institute of Science in Rehovot, Israel, under the mentorship of Professor Lucio Frydman. While there, she developed NMR spectroscopic methods for quadrupolar and other unconventional nuclei, which she used to probe the structure of nanodiamonds and hyperpolarized 7Li in vivo. Leah plans to begin work in early July but hopes to have some free time to engage in her hobbies of running, biking, swimming, playing roller derby, and spending time with her cat."

Message from the Chair

On behalf of the department, I send greetings to alumni and friends of the Chemistry Department. I hope that your spirits are blossoming as "Old Time Winter" has finally given way to Spring. We are preparing to welcome new faculty member, Dr. Leah Casabianca, who is eager to begin by July 1st. Her research focuses on the use of NMR spectroscopy to examine the structure and behavior of large molecules and complex systems. Searches are nearing completion for the hiring of two new Lecturers to teach General and Organic Chemistry.

Professor Jeffery Anker was promoted to Associate Professor with tenure and received the CoES Collaboration Award with Professor John DesJardins of Bioengineering. Professor Ken Marcus was selected to participate in a workshop on Nuclear Nonproliferation and Safeguards to be held this summer. Professor Brian Dominy provides a short synopsis of Professor Kolendenko's recently published book and I hope these short features of research being done in the department will be a regular feature of our newsletters.

It is with great pleasure that I congratulate our graduating students. At the December 2013 commencement 5 Ph.D., 1 M.S. and 3 B.A. degrees were awarded, while 6 Ph.D., 1 M.S., 19 B.S. and 4 B.A. degrees in chemistry were granted at the May 2014 ceremony. Our annual Honors and Awards Brunch was held March 29 at the Clemson Outdoor Laboratory's Kresge Hall where 18 awards were presented to our undergraduate and graduate students. Matthew Zimmerman received the Graduate Researcher Award and Lindsey Whitfield Cain received the Graduate Teaching Assistant Award. Michael Brady was awarded the Mark Bernhard Hardin Prize at the College Awards Ceremony for high scholastic achievement and leadership qualities.

In planning for the Department's future, I was delighted that Professors Anker, Brumaghim, Creager, Dominy, McNeill, Perahia, Taylor, Tennyson and Whitehead volunteered to serve on the Strategic Planning Committee. The committee is meeting every two weeks to develop a preliminary document from which the department will establish goals that will be pursued over the next few years. The chairs of Chemistry, Materials Science & Engineering, and Chemical and Biomolecular Engineering worked with an outside consulting firm to generate the Advanced Materials Innovation Complex Building Study. The facility is envisioned to support Advanced Materials Research across the three departments and to serve as a gateway to the University.

With new faculty hires, plans for a new facility, and the success of the faculty in obtaining competitive research funding during these difficult times, the future of the department looks bright. I am delighted to share news of the Department with our alumni and friends. We are most appreciative of your loyalty and support and wish you a safe and enjoyable summer.

R. KARL DIETER, CHAIR

Students

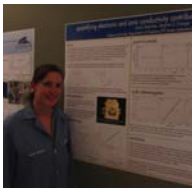
For the second year, Clemson's undergraduate chemistry organization **(SAACS)** provided volunteers to help with Messfest, which is a day of "over-the-top" science projects hosted by Greenville's Children's Museum of the Upstate. The volunteers had a great time providing guidance in participatory demonstrations that most parents won't allow at home, such as exploding soap monsters, muddy artist in residence and the rooftop gravity drop. It was an icky-gooey, messy fun-filled day.

The **CGSO** banquet was held at 356 Restaurant in downtown Clemson on April 23. CGSO sponsors the banquet every year and this year we changed things up a bit. Attendees came early to ensure they got their door prize - a CGSO 50mL beaker. Our dessert was a 'cake-boss' style chemistry-themed-cake, which was both beautiful and delicious. DJ Sha provided the music throughout the night. Gold fish races also became very competitive. Each research group competed for a $100 bar tab to 356, which was ultimately claimed by the Brumaghim group! Of course everyone enjoyed the free food, drinks and great raffle prizes. We hope to see everyone next year!

CGSO Banquet

Students Win Poster Prizes

The Optical Society of America (OSA) and Material Research Society (MRS) student chapters teamed up to hold a poster session and competition March 26, 2014, at the Madren Conference Center. The poster session highlighted the diversity and interdisciplinary research that occurs throughout Clemson and the southeast. Approximately 60 graduate and undergraduate students attended and presented their research. Prizes and awards were given to the top three graduate students (1st-$500, 2nd-$250, 3rd-$100) and the top two undergraduate students (1st-$200, 2nd-$100). Two graduate students from the Chemistry Department placed in the top three. Third place was given to **Fenglin Wang** for her work on 'Mapping bacterial growth through tissue with functional X-ray luminescence tomography'. First prize was awarded to **Jamie Shetzline** who presented her work on 'Quantifying electronic and ionic conductivity contributions in polymeric thin films.



Graduations may, 2014

PhD
Ashley Ann Buelt
Barbara Jeanne Bull
Ramesh Chandra Dhakal
Benjamin T. Manard
Dulma Erangi Nugawela Pathiranalag
Yan Jean Wan

Masters
Riyadh Hamdan Alshammari

BA
Brittany Leighann Bolin
Mark Fritz Hendrickson
Emily Jeanne Smith
Michael Gar Sing Wong

BS
Bradley Vincent Blake
Michael Edward Brady
Clinton Bissell Butler III
Victor Anthony Callahan
Charles Edward Crane III
Lauren Michelle Drbohlav
Samantha Jo Elhomsi
Alex Andrew Kellum
Lauren Emily Lowery
Alexandra Victoria Maitland-Smith
Richard Garth Maree
Michael David Massey
Ryan Joe Murphy
David Alex Navarro
Chadwick Randolph Powell
Colby Scott Purvis
Early Thomas Ritchie
Mark Anthony Stanton
Shane Michael Williams

Congratulations to all our 2013 and 2014 graduates!

DEMYSTIFYING QUANTUM MECHANICS

Prof. Arkady Kholodenko's recently published book, "Applications of Contact Geometry and Topology in Physics", tackles the foundations of classical and quantum physics from the perspective of a modern mathematical field called contact geometry. The related geometric methods of symplectic and contact geometry are relatively modern mathematical approaches that can be used to describe classical mechanical systems, which obey Newton's equations of motion. Why develop these alternative and sophisticated mathematical descriptions of classical systems? It turns out that such geometric methods have a very interesting property: They naturally give rise to quantization. While the traditional development of quantum mechanics typically begins with postulating quantized energy, in a contact geometric description of classical physics the quantization emerges on its own. In other words, from the perspective of contact geometry, quantum phenomena are analogous to familiar classical phenomena. By making this connection to the familiar world of classical mechanics, contact geometry provides an opportunity for demystifying the often-strange microscopic world of quantum mechanics. Prof. Kholodenko's work, described in his recently published book, investigates a variety of systems to illustrate the elegant connection between quantum and classical physics as viewed through the lens of contact geometry. Prestigious academic libraries around the country and the world have already purchased this book, which is on its way to having a significant impact on modern physics research.

HONORS AND AWARDS DAY, MARCH 29, 2014

The Department of Chemistry Honors and Awards Day Luncheon was held on March 29, 2014 at the Clemson University Outdoor Lab-Kresge Hall. The following awards were presented at that time:

- Senior Research Award - Lauren Lowery
- Chemistry Faculty Award - Charles Crane
- American Institute of Chemists Award - Shane Williams
- Merck Index Award - Kayleigh Wall
- Houghton Mifflin/ICUC First Year Chemistry Award - Derrill Trey Schumpert
- Chemical Rubber Company Award - Ben Morgan
- Outstanding Student in General Chemistry - Hannah Hansen
- Outstanding Student in Introductory Chemistry - Joshua Arrage
- Outstanding Student in Organic Chemistry - Taylor Dennison
- Outstanding Sophomore Chemistry Major - Morgan Jasper
- Undergraduate Award in Analytical Chemistry - Laura Drbohlav
- Undergraduate Award in Inorganic Chemistry - Alex Kellum
- Undergraduate Award in Organic Chemistry - Balakrishnan Pillai
- Western Carolinas Section ACS Award for Outstanding Chemistry Senior - Matthew Wasilewski
- Graduate Teaching Assistant Award - Lindsey Cain
- Outstanding Graduate Researcher Award - Matthew Zimmerman
- Mark Bernhard Hardin Prize in Chemistry - Michael Brady
- Warwick Chemical Foundation Prize in Chemistry - Clayton Little

Clayton Little

Lindsey Cain

Graduations December, 2013

PhD

Evy Colon-Garcia
Thusitha Nanda Bandara Etampawala
Tugba Gul Kucukkal
Jiyoung Park
Liurukara Duminda Sanjeewa

Masters

Aubrie Lynn Pfirman

BA/BS

Michelle Denyse Hilda Herridge
Joseph Frederick Murray
Constance Sophia Previti

STAFF NEWS

WELCOME

We welcome **STEFAN WUNDERLICH**, Lab Technician in the General Chemistry Stockroom. Stefan started with us in March, 2014. He graduated with a BS in Chemistry from Clemson in 2009 and has been working for the Home Depot for several years. Although born in upstate New York, he has lived in South Carolina for 22 years. His hobbies are playing tabletop games, traveling the world, playing electric guitar, and trying new activities and food.

We also extend a welcome to **DAVID DORSEY**, our new Organic Stockroom Manager. David is originally from Birmingham, AL and began work with us in May, 2014. His recent hobbies include singing and boxing and in the past has enjoyed writing and photography. David is spending the summer training and settling in to his new position before the Fall semester crush begins. He and his wife, Kirstin, live just outside of Pendleton.

CLEMSON UNIVERSITY

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RUDOLPH A. ABRAMOVITCH

Professor Emeritus of chemistry, Rudolph A. Abramovitch, 83, died on November 26, 2013 at his home in Clemson, SC. After obtaining his Ph.D at Kings College London (1953) and following a one-year stint at the Weizmann Institute in Israel, Rudy began his academic career at the University of Saskatchewan (1957) rising in seven years to the rank of full professor. In the late sixties he moved to the University of Alabama and in 1977 became Head of the Chemistry Department at Clemson University serving as head until 1981. Rudy was instrumental in generating momentum for building a new facility in what would become Hunter Laboratory, which the department moved into in 1987.

Over the years, Rudy taught sophomore organic, advanced organic, and occasionally a course in heterocyclic chemistry. His research pursuits at Clemson involved mechanistic studies on nitrenes, azides, nitrenium ions, oxenium ions, and substitution reactions of the pyridine ring. He also pursued research programs in microwave remediation and molecular recognition. Prolific in his research endeavors, Rudy published over 300 papers and books (7) in addition to serving on the editorial boards of Heterocycles, Organic Preparations and Procedures International and Advances in Heterocyclic Chemistry. He also edited a multivolume series Reactive Intermediates and Pyridine and its Derivatives in the Chemistry of Heterocyclic Compounds.

Professor Abramovitch's awards included the Clemson University Sigma Xi Award for Outstanding Research (1981), a Fulbright Fellow Grant (France, 1983), and the Alumni Award for Outstanding Achievement in Research (2006). In recognition of his research achievements, a commemorative issue of the Archive for Organic Chemistry was published in 2001 in honor of his 70th birthday.

Students and colleagues remember Rudy's care and precision in the use of language in chemical discussions and in the preparation and defense of dissertations. He was passionate about chemistry and eager to communicate his research in numerous publications and at national and international meetings, which he attended regularly. For relaxation, he enjoyed reading, classical music, fishing, tennis, and swimming as well as travel both professionally and for pleasure.

Professor Abramovitch is survived by his wife Dorota, son Daniel, daughters Paula Porter and Anna Holbrook and six grandsons.

Comments? We would love to hear from you. Please email your comments or questions to Mary Standeffer at standem@clemson.edu and be sure to visit us on the Web at chemistry.clemson.edu.

Your generous donations support our seminar program which brings world-class scientists and educators to campus for public lectures, and also allows for the flexibility to respond to opportunities and pursue initiatives to make Clemson's chemistry department the best it can be. If you do not already do so, please consider designating a gift specifically to the Chemistry Department. You may do so by writing "Chemistry Department" under "Other" on any donation form you receive from the University, or by indicating the same on the online "Giving to Clemson" form accessible from the Clemson home page. If you do choose to donate, we thank you in advance for your support, whether you choose to designate it to chemistry or not!