SPRING 2013

CLEMSON
CHEMICAL AND BIOMOLECULAR ENGINEERING

Message from the Chair:

Dear Alumni and Friends of the Department:

Flux. The American Heritage College Dictionary (3rd ed.) defines flux as, "1a. A flow or flowing; b. A continued flow; a flood." As chemical engineers, we typically define it differently. Plumbers and physicians each define it differently still. However, the context here is embodied in the phrase, We are in a state of flux. Prof. Larry Dooley, who was serving as Interim Dean in the College of Engineering and Science, was promoted to the position of Interim VP for Research. Following a successful search the new Dean for the College was hired. President Barker announced recently that he is stepping down from his position and returning as a faculty member to the School of Architecture. Subsequently, Provost Helms announced her retirement effective this summer. All of this constitutes unprecedented change in the upper administration at CU in such a short timeframe.

At the same time, our Department is continuing to undergo change in facilities and personnel. We have completed a $1.7 million renovation of Earle Hall. The renovation has added five new research laboratories and consolidated the junior- and senior-level unit operations labs into one contiguous space. The consolidation also afforded us the opportunity to upgrade several of our UO experiments, including significant enhancements to our distillation and gas-absorption experiments.

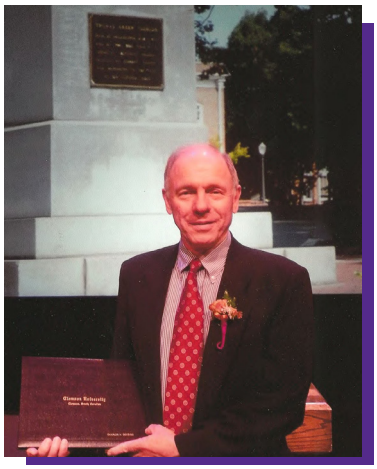
This past semester we have hired another new faculty member in the Department; he will begin his official appointment in August and we will introduce him in the Fall newsletter. He becomes our fifth new hire in the last four years.

After 33 years of service to Clemson, Prof. Charlie Gooding is retiring. Charlie has done wonderful things for our Department. He is an award-winning teacher and has been an outstanding mentor for many students and faculty – he will be sorely missed but we wish him all the best in his future endeavors.

Have a great summer.

Best regards,
Doug Hirt
Professor and Chair

The Retirement of
Dr. Charles Gooding



The Department of Chemical & Biomolecular Engineering celebrated Dr. Charles Gooding's 33 years of service to Clemson University with a retirement reception in his honor on Friday, June 7th. Professor Gooding joined our Department in 1980 as an Assistant Professor, and subsequently was promoted to Associate Professor and then to Full Professor. He served as Chair of our Department from 1996 through 2000. From 2000 through 2001, he took a sabbatical leave and spent that year at The Dow Chemical Company in Freeport, TX, working on process simulation and control, and subsequently re-vamping our process-control course. He also gave a large portion of his time by serving as President of the Faculty Senate in 2008-09.

Professor Gooding received his B.S. degree in Chemical Engineering from Clemson University in 1970 and his M.S. from Clemson in 1972. In 1979, he received his Ph.D. from North Carolina State University working with Prof. Rich Felder. Prior to his faculty position at Clemson, he worked at Duke Power Company, Research Triangle Institute, and was also an Adjunct Assistant Professor at North Carolina State.

During his career at Clemson, Prof. Gooding's research interests were in membrane science and engineering and chemical process design, analysis, optimization, and control. His most recent research activities have related primarily to alternative energy sources, environmentally sustainable process operations, and life-cycle analyses.

He has authored numerous research and technical publications, been a consultant with several companies, and presented his work at many conferences and international meetings.

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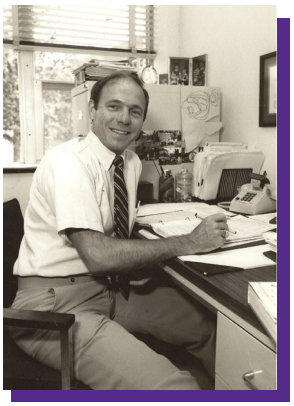
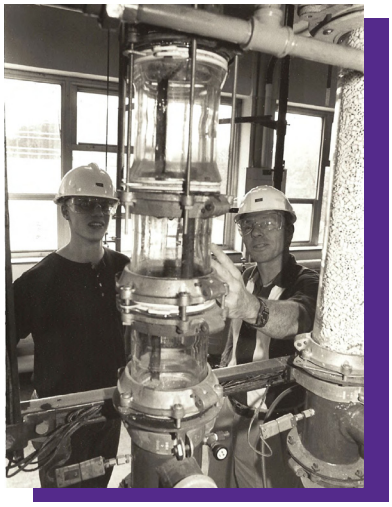
DR. CHARLES GOODING RETIRES

(continued from page 1)

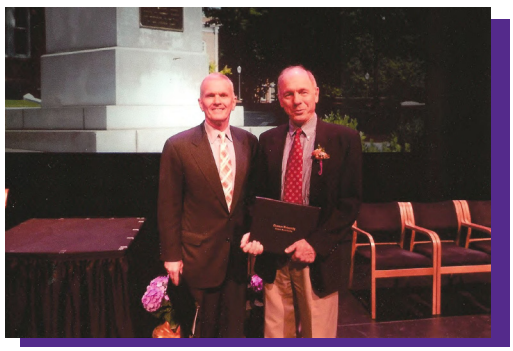
In 2010, Prof. Gooding received the Murray Stokely Award for Excellence in Teaching from the College of Engineering and Science. He was selected for this award based on his outstanding teaching abilities, his enormous contributions to the educational mission of the Department, and his dedication to our students and their personal and professional development. Many alumni speak highly of Dr. Gooding, not only for his teaching ability but also as an advisor, helping them work through our challenging curriculum.





Dr. Gooding has also been our Undergraduate Coordinator and our Assessment Coordinator for many years. He is the go-to person for any questions regarding our undergraduate curriculum and a great help to all current and prospective undergraduates. In addition, he has been in charge of Senior Design, which involves engineering economics and an open-ended capstone design project. The capstone project is considered by many graduating seniors to be the most valuable element of our undergraduate curriculum.

Professor Charlie Gooding's teaching and research expertise will be sorely missed, as he has been an integral and invaluable member of our Department. We wish him a long and very happy retirement!!

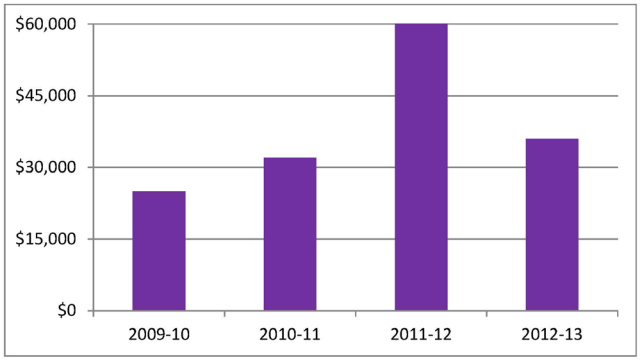


ALUMNI GIVING

Our alumni giving, including corporate matching, has been on the increase. However, the level of giving this year is projected to fall short of last year's level (fiscal year ending June 30th). Please give to the department as you are able.

Donations can be made online at this site: https://cualumni.clemson.edu/give/chembioengineering or you can mail donations payable to Clemson University Foundation, Annual Giving Office, PO Box 1889, Clemson, SC 29633-9972. Please reference Chemical Engineering account #B0943 on your check.

Thank you!



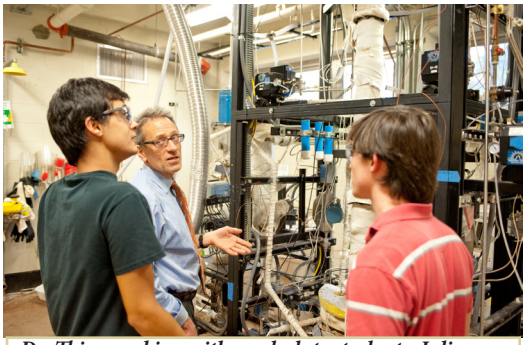
FACULTY HIGHLIGHTS

Prof. Anthony Guiseppi-Elie, has been named the **2013 Kenneth E. Avis Distinguished Visiting Professor** in the Department of Pharmaceutical Sciences of the College of Pharmacy at the University of Tennessee Health Science Center (UTHSC). The Department of Pharmaceutical Sciences at the UTHSC is located in Memphis, TN, and has three primary areas of specialization: Medicinal Chemistry, Pharmaceutics and Bioanalytics. Prof. Guiseppi-Elie has also been appointed founding **Editor-in-Chief of the MDPI journal, Bioengineering** (ISSN 2306-5354, http://www.mdpi.com/journal/bioengineering). As Editor-in-Chief, Professor Guiseppi-Elie will lead a dedicated and distinguished team of Associate Editors in a broadly comprised editorial board and will be responsible for the development and direction of the journal.

Prof. Scott Husson was selected as this year's recipient of the **Esin Gulari Leadership and Service Award** for the College of Engineering and Science. This award was presented at the CoES faculty meeting on May 9th along with a $1,000 research award. Prof. Husson is also serving on his 2nd term on the **Board of Directors for the North American Membrane Society.** One of Dr. Husson's articles with PhD graduate Nripen Singh is now among the **Most Cited Journal of Membrane Science** articles published since 2008. The list of articles is available at http://www.journals.elsevier.com/journal-of-membrane-science/most-cited-articles/. The title of the publication is "Surface-initiated atom transfer radical polymerization: A new method for preparation of polymeric membrane adsorbers."

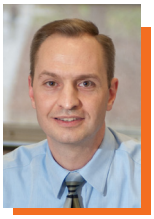
Prof. Amod Ogale received the **Excellence in Review Award** for service to the journal **CARBON in 2012.** The award is given annually to a volunteer reviewer whose volume and quality of service were the best over the last year. *CARBON*, published by Elsevier, has an impact factor of 5.4 and is the archival journal for carbon research. In February, Prof. Ogale attended the **AMPC 2013**, International Conference on Advances in Materials Processing, in Chennai, India. The conference addressed processing of high temperature materials including carbon, metals, ceramics, and composites.

AMPC Conference (L-R) Prof. A. Rajadurai, Session Chair; Dr. K.K. Sankaran, Research Fellow, Boeing Corporation; and Dr. Ogale, Professor and CAEFF Director.



Dr. Thies working with gradudate students, Julian Velez and Adam Klett, in the lignin lab.

Profs. Mark Thies and David Bruce received a one-year grant from a Fortune 500 company for their research proposal entitled **"Ultrapure Lignin from Black-Liquor Streams as a Renewable Biopolymer".** Drs. Thies and Bruce will be investigating processes for converting metals-containing lignins derived from papermill black liquors into high-purity, biorenewable materials suitable for a wide range of polymeric applications.



ChBE PROFESSIONAL ADVISORY BOARD

The Department of Chemical and Biomolecular Engineering is proud to recognize the following members of our department's Professional Advisory Board. We would like to acknowledge and thank them for their time, efforts, and expertise in helping us define and refine our future goals and objectives. Thanks again!

Susan Bailey
Sales/Development Manager
formerly of Elk Corp of Texas
Ennis, TX
B.S. Clemson - 1986

Uwe Beuscher
Global Separations
Technology Leader
W. L. Gore & Associates Inc.
Elkton, MD
Ph.D. Clemson - 1997

Hunter Harris
Operations Director
MWV Specialty Chemicals
N. Charleston, SC
B.S. Clemson - 1978
M.S. Clemson - 1980

Gary Hayes (Chair)
Global Process Platform Leader
Sealed Air
Technology & Innovation
Duncan, SC
B.S. Missouri-Rolla - 1983
M.S. Clemson - 1989
Ph.D. Clemson - 1993

Patrick Hickey
President and COO
Merichem Company
Houston, TX
B.S. Manhattan College - 1989
Ph.D. Clemson - 1993

Jackie Moxham
Principal Scientist
Global Regulatory Chemistry
Manufacturing & Controls
Pfizer Inc.
Groton, CT
B.S. Clemson - 1992
M.S. Clemson - 1994

Deborah Savage
Independent Environment
Consultant
Arlington, MA
B.S. Clemson - 1984
Ph.D. MIT -1992

Bill Trapp
Director, Chemicals Develop.
Eastman Chemical Company
Kingsport, TN
B.S. Clemson - 1980

Andrew Zydney
Department Head and
Walter L. Robb Family Chair
Dept. of Chemical Engineering
The Pennsylvania State Univ.
University Park, PA
Ph.D. MIT - 1985

STUDENT HIGHLIGHTS

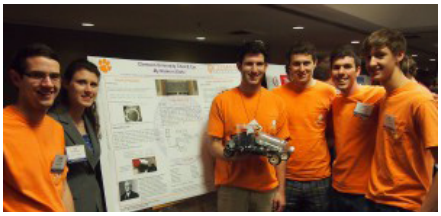
Profs. Douglas Hirt and Anthony Guiseppi-Elie presented graduate student, Heather Chenette, with the Outstanding Graduate Teaching Assistant of the Year Award, and David Esguerra with the Outstanding Graduate Researcher of the Year Award.

In March and April, the following students received **departmental awards**: **Alec Lamb**, Western S.C. Section AIChE Scholastic Award, for graduating senior with the highest scholastic average; **Clayton Hammontree**, American Institute of Chemical Engineers (AIChE) 2010 Donald F. Othmer Sophomore Excellence Award, for sophomore with the highest scholastic average; **David Esguerra**, Outstanding ChBE Graduate Researcher of the Year Award; and **Heather Chenette**, Outstanding Graduate Teaching Assistant of the Year Award.

This year the Western S.C. Section of AIChE presented junior **Heather Snyder** (pictured right) with the **$1,000 Undergraduate Chemical & Biomolecular Engineering Scholarship.**

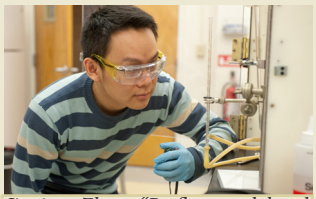
Julie Robinson, a ChBE junior (pictured left), received a **Barry M. Goldwater Scholarship**. This scholarship is considered the premier undergraduate award of its type and is awarded to only 300 college sophomores and juniors nationwide. Julie has researched with Dr. Scott Husson and Dr. Chris Kitchens. She also has researched with Drs. Maggie Bump and Richey Davis at Virginia Tech. **Scott Cole**, a junior in Bioengineering, also received a Goldwater Scholarship. Although a Bioengineering major, he has worked with Dr. Chris Kitchens for the past three years and co-authored two papers. He also has researched with Drs. Frank Alexis and Fivos Drymiotis.

Nina Breakiron was the Second Prize winner in the **J.T. Barton Jr. Ethics Essay Scholarship Competition**. The title of her paper was *"Mindset and Influence in the World of Fashion: A Response to 'Images of Beauty.'"* Nina will receive a $1,000 scholarship.



In April, ChBE sent 19 students to the **AIChE Southern Regional Conference** in Lexington, Kentucky. Students competed in the ChemE car competition, paper, and poster competitions. **Nina Breakiron** won 2nd place for her paper presentation *"Gold Nanoparticle Synthesis and Surface Modification for Drug Delivery Applications"* and won $200. The ChBE Jeopardy Team which consisted of seniors **J.T. Helms, Alexandra Kleven, Stephen Fessler, and Nina Breakiron** also won 2nd place and received a certificate.

WORLD CLASS SEPARATIONS RESEARCH



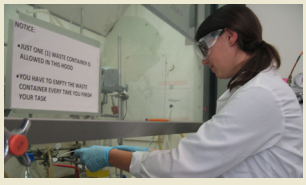
Jinxiang Zhou: "Perfluorocyclobutyl Polymer Thin Film CO2 Plasticization and Physical Aging"

Milagro Marroquin: "Location and Quantification of Biological Foulants in a Wet Membrane Structure by Cross-Sectional Confocal Laser Scanning Microscopy"

The graduate research group mentored by **Dr. Scott Husson** has had a lot of successes recently. At the North American Membrane Society conference held the week of June 10th, the following graduate students received awards: **Jinxiang Zhou** won first place in the membrane processes poster competition; **Juan Wang** won third place in the membrane materials poster competition; **Milagro Marroquin** won the NAMS Travel Award, which is presented annually to outstanding individuals who are near the start of their professional careers in membrane science and technology. **Jinxiang** also received the Elias Klein Founders' Travel Award. This award is named in honor of Elias Klein, whose vision and spirit guided the founding of NAMS in 1985. While others were at the NAMS conference, **Christine Duval** and **Joe Mannion** attended the competitive 2-week Radiation Detection for Nuclear Security Summer School. Details can be found at this website: http://science-ed.pnnl.gov/students_graduates/RDNS.stm

Juan Wang: "Development of Multimodal Membrane Adsorbers for Protein Separation"

Joe Mannion: "Alternative Sample Loading Preparation for Thermal Ionization Mass Spectrometry"



Christine Duval: "Synthesis of Extractive Scintillating Resins for Radionuclide Detection"

CLASS OF 2013

The Chemical & Biomolecular Engineering Department is proud to recognize the Senior Class of 2013. The students were honored at a Senior Reception on May 2nd at the Madren Center. The department also hosted an Open House for the graduates and their families on graduation day, May 10th. The faculty and staff of ChBE want to wish all of our graduates the best of luck in your future endeavors! Congratulations!

2013 Graduation Candidates
Bachelor of Science Degree
in Chemical & Biomolecular Engineering

Hanna R. Aucoin
Brian O. Baker
Eric J. Bohac
Yanina T. Breakiron
James A. Clark
Phillipsen S. Cornine
Anthony R. D'Amato
Bradley N. Daley
Stephen A. Fessler
Tyler V. Goodman
Samuel M. Gorosh
Stephen E. Gregg
John T. Helms

Brian S. Hudson
Michael W. Hughes
Mark W. Kalata, Jr.
Alexandra P. Kleven
Alec W. Lamb
B. Drake Lawson
James A. Losey
Benjamin H. Murphy
Brian P. Murphy
Stephanie C. Pearson
Patrick C. Philipp
Heather M. Rodgers
Courtney I. Rowe

William E. Rudisill
Allison L. Rue
Brittany A. Sandy
Zachary D. Siegel
Kirby L. Tate
Jason M. Tedstone
Zachary E. Thames
Neil A. Tolbert
David V. Truong
Colleen J. Warren
Nicholas R. Wegner
Frederick J. Wewers
Riley D. Wilson

CLASS OF 1963 - 50th ANNIVERSARY

The Class of 1963 celebrated their 50th Anniversary in our department in May. The highlight of their trip was the tour of the athletic facilities which included the new indoor football practice facility, Coach Dabo's office, the West End Zone, the baseball facility, and others. Attendees this year were John & Carol Cromer, Chip & Marty Hurst, Wade & Karen Ponder, Jim & Judi Rushton, and Al Tolson.

It was great seeing everyone! Happy 50th Anniversary!!

Department of Chemical and Biomolecular Engineering
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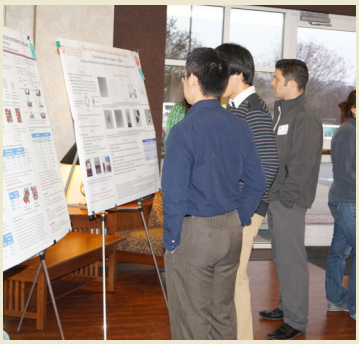
Biosensors and Biochips
Chemical & Biomolecular Separations
Energy
Kinetics and Catalysis
Molecular Modeling and Simulation



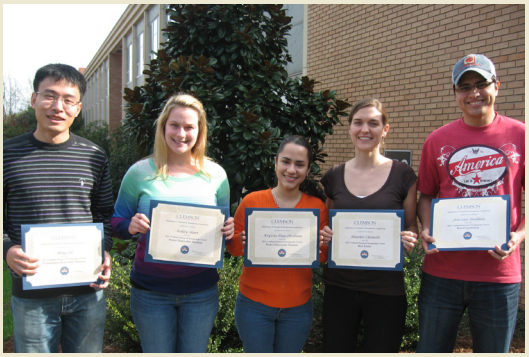

ChBE GRADUATE RESEARCH SYMPOSIUM

In February, the ChBE Graduate students held their first annual Research Symposium at the Madren Center. This symposium allowed our graduate students to share their research projects with their peers and faculty members, at the same time giving them valuable presentation experience.

Our department was honored to have Dr. Ronald Rousseau as the keynote speaker at this event. Dr. Rousseau holds the Cecil J. "Pete" Silas Endowed Chair at the Georgia Institute of Technology and is the chair of the School of Chemical & Biomolecular Engineering there. Dr. Rousseau is co-author of *Elementary Principles of Chemical Processes*, a textbook used internationally and by more than 80% of the chemical engineering programs in the United States.



This all-day event started out with a poster session in the morning, followed by oral presentations throughout the day. Each session was judged. Some of our undergraduate researchers also participated in the poster session.



The award winners of the Symposium were (pictured L-R): Ming He (Presentation Honorable Mention), Ashley Hart (Poster Honorable Mention), Kryssia Diaz-Orellana (Poster Honorable Mention), Heather Chenette (Best Poster), and Jose Orellana (Best Presentation).

Congratulations to everyone for this successful event!