New Faculty Member

Dr. Chris Norfolk

We are pleased to announce that Dr. Christopher Norfolk has joined the Department of Chemical & Biomolecular Engineering as a Lecturer with joint responsibilities with General Engineering. Dr. Norfolk is returning to Earle Hall, having earned his B.S. from Clemson, and his M.S. and Ph.D. from Notre Dame. Prior to joining the faculty full-time, Dr. Norfolk served our department as an adjunct assistant professor for eight years. During this time, he also managed the implementation of advanced materials into defense applications as a Program Manager for SCRA Applied R&D in the Advanced Materials Division.

Highlights of Dr. Norfolk’s previous work include his research with prosthetic technologies. These include advanced manufacturing techniques, which reduce the cost and increase the strength of custom composite sockets for amputees, and prototype systems for addressing overheating of amputated limbs. These projects have been honored nationally. Further, Dr. Norfolk provided the main technical resource for entry into a new market, the use of composite materials for architectural applications.

Dr. Norfolk was motivated to join the faculty full time by his passion for mentoring students. His experiences as an adjunct were extremely rewarding, and he looks forward to building relationships and helping students realize their aspirations.

Dr. Norfolk will take a major role in the Unit Operations labs, and will teach the Chemical Engineering Tools course. He will also serve the General Engineering Program by teaching Introduction to Engineering and Problem Solving with MatLab.

Dr. Keisha Walters Receives Outstanding Young Alumni Award

ChBE alumnus, Keisha B. Walters, was honored at the 19th Annual College of Engineering and Science banquet in April with the Outstanding Young Alumni Award. The award was presented to her by Dean Anand Gramopadhye and department chair, Dr. Doug Hirt. Prof. Walters received her M.S. in Chemical Engineering in 2001 and her Ph.D. in Chemical Engineering in 2005, both from Clemson.

Prof. Walters is currently an Associate Professor at Mississippi State University where her research is in nanoparticles and stimuli-responsive materials. She has authored or co-authored 23 publications or book chapters and has generated over $1.7 million in research support. At MSU, she has graduated 3 Ph.D. and 5 M.S. students in the Swalm School of Chemical Engineering, along with mentoring over 50 undergraduates and high school students in her labs. She has also served as Interim Associate Dean for Strategic Initiatives in MSU’s College of Engineering.

Prof. Walters has also received numerous teaching and research awards. She was selected by the National Academy of Engineering to participate in their Frontiers of Engineering Education Symposium Program. She also won the 2012 Raymond W. Fahien Award from ASEE, a national award that recognizes the outstanding chemical engineering educator under the age of 40. Recently, she was selected to serve on Clemson University’s Alumni Council.

The Department of Chemical & Biomolecular Engineering congratulates Dr. Keisha Walters on a well-deserved award!
FOCUS ON ALUMNI

Dr. Santanu Kundu

Dr. Santanu Kundu (Ph.D. 2006, ChE) received the prestigious NSF Career Award in March 2014 to study ‘Large-Strain Deformation of Polymeric Gels: Non-linearity, Instability, and Fracture’ ($533k over 5 years). He has been an Assistant Professor in the Dave C Swalm School of Chemical Engineering Department at Mississippi State University since January 2012. His current research focuses on the large-strain deformation behavior of various polymeric gels as a function of their microstructure.

Before starting his academic career, Dr. Kundu was a post-doctoral research associate at the National Institute of Standards and Technology (NIST) and at the University of Massachusetts at Amherst. Santanu’s Ph.D. dissertation on the rheology and microstructure of discotic liquid crystalline pitch materials received the Best Dissertation award from the Elsevier Carbon Journal (2007). He completed his Ph.D. under the advisement of Dr. Amod Ogale, Dow Chemical Professor.

Dr. Parag Diwan

Dr. Paraq Diwan graduated with his Masters from Clemson in Chemical Engineering in 1985, working with Dr. Dan Edie on carbon-fiber research. Dr. Diwan returned to CU in May with his wife, Shalini, so they could attend their son’s (Prateek) graduation from Clemson.

Since his days in Chemical Engineering, Dr. Diwan obtained his doctorate in Business Administration from Panjab University and has held various management and consulting positions over the years. In June of 2003, he became the Founder Vice Chancellor of the University of Petroleum and Energy Studies in Gurgaon, India, which is the only Energy Domain specific university in India. He is the principal academic and executive officer responsible for the overall development of the institution. He also is the Chief Operating Officer of the Indian School of Petroleum.

He has more than 200 papers to his credit and has authored and edited over 40 books on management and energy.

MESSAGE FROM THE CHAIR

Dear Alumni and Friends of the Department:

Hello from Clemson and we hope you are doing well. My message in this Spring 2014 newsletter focuses on planning for the future. We have a very active and supportive Professional Advisory Board. Two years ago the Board challenged us to develop a new strategic plan for the department. After much discussion and feedback, not to mention extensive revisions, we produced a plan last year that will guide us over the next decade. Key elements are given below.

Mission

The mission of our department is to prepare students for highly competitive employment, life-long learning, and societal and professional service by:

• Providing high-quality, student-centered educational opportunities through flexible yet rigorous curricula and cutting-edge research programs;

• Motivating engagement and leadership in areas that include co-op/internships, Creative Inquiry, research, study abroad, and student and professional organizations;

• Leading the future of chemical and biomolecular engineering through excellence in research, scholarship, and professional service;

• Fostering a collegial, collaborative, and productive environment for all students, faculty, and staff.

Vision

The ChBE Department at Clemson University will be a top 25 department among public universities by 2025.

Strategic Goals

Goal 1. Expand and further develop our faculty, staff, and facilities

Goal 2. Enhance our national stature in educational programs

Goal 3. Enhance our national reputation in research and scholarship

These elements are backed up by action items and metrics that we will monitor over the years. We are collaborating with the Dean and the upper administration to work toward our goals, and we’ll continue to report on our progress.

Have a great summer.

Best regards,

Doug Hirt
Professor and Chair
FACULTY HIGHLIGHTS

Prof. Mark Blenner and colleagues from the University of California – Riverside were awarded a collaborative research grant from the National Science Foundation to study novel mechanisms for improving biocatalysis of dicarboxylic acids from renewable resources. Dr. Blenner’s group will design novel and well-defined gene regulation tools for metabolic engineering of a non-conventional industrial yeast, Yarrowia lipolytica. This work is aimed at creating metabolic pathways that are self-regulating in order to improve the efficiency of bioproduction strategies. Dr. Blenner’s collaborators at Riverside will develop novel methods to localize enzymatic pathways to fat droplets accumulated in cells. Together, these technologies will be combined to produce high yields of biosynthetic dicarboxylic acids. The three-year award to Dr. Blenner is for $300,000.

Prof. Rachel Getman in collaboration with Northwestern University received a grant from the National Science Foundation. They are designing catalysts that are encapsulated by metal-organic frameworks, or MOFs, which are porous crystalline materials comprised of metal or metal oxide “nodes” connected by organic “linker” compounds. MOFs are highly tunable and thus can be designed for certain purposes. In this work, they are designing the MOFs and the catalyst for superior selectivity and regioselectivity. Their initial objective is to design the MOF and catalyst to oxidize butane to 1-butanol. The MOF pore structure will restrict butane interaction with the catalyst to the terminal carbon, and the catalyst composition will be designed to properly balance C-H bond activation and C-O bond formation. The total grant amount is $1.2 million.

Prof. Amod Ogale, Dow Chemical Professor, was the Guest of Honor at the 2014 Advanced Manufacturing and Materials Engineering (AMME 2014) Conference organized by the National Institute of Technology, Surathkal, India. He was invited to deliver a keynote lecture on his advanced carbon fibers research, which was recognized earlier by the American Carbon Society as the 2013 Graffin Award for distinguished contributions to carbon science and engineering.

The Greenville News featured a research achievement of Dr. Mark Roberts and Dr. Apparao Rao (Physics). The article highlighted their breakthrough in carbon nanomaterial synthesis, where they demonstrated a roll-to-roll process for manufacturing aligned carbon nanotube electrodes for high-power density energy storage. Low-cost and high-power systems are important for various applications, from storing energy generated by wind and solar to prolonging the lifetime of batteries in portable electronics or large format systems. The research carried out in the Clemson Nanomaterials Center (CNC) overcomes a key limitation in manufacturing of materials with dimensions on the order of 1 billionth of a meter and is expected to have a significant impact on commercialization efforts.

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

Richard Baud
Solution Improve Supervisor
Singapore Metallocene
Elastomers
ExxonMobil
M.S. Clemson · 1988

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

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

Mark Ingram
Director, Program and Performance Management
Global Infrastructure Operations
Merck
Whitehouse Station, NJ
B.S. Clemson · 1987

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

Mark Todd
Director Americas
Manufacturing & Supply Chain
BASF Corporation
Huntsville, AL
B.S. Clemson · 1986

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
The National Science Foundation recently announced awardees of the 2014 NSF Graduate Research Fellowship Program (GRFP). NSF received over 14,000 applications and made only 2,000 fellowship award offers. Recipients of the Fellowship included ChBE Senior Julie Robinson (2014) (pictured left), Scott Cole (BioE 2014) who worked with Dr. Kitchens on research, and ChBE 2011 Alumnus, Jennifer Moffitt. In addition, current ChBE Graduate Student, Steven Weinman, received an Honorable Mention. The program recognizes and supports outstanding graduate students in NSF-supported science, technology, engineering, and mathematics disciplines who are pursuing research-based master's and doctoral degrees at accredited U.S. institutions.

PhD student, Sam Lukubira, (Advisor Prof. Amod Ogale) was awarded 1st Place Honors in the SPE Global Plastics Environmental Conference (GPEC) 2014 poster contest for his poster entitled, “Processing and Characterization of Meat and Bone Meal-Based Bioplastics.”

Cameron Bodenschatz, a PhD student working with Dr. Rachel Getman, was awarded the NASA Space Technology Research Fellowship (NSTRF) for this coming school year, which provides money for tuition, health insurance, advisor allowance, and a stipend. In addition to this award, he will be paired with a research mentor from NASA and will be part of a 10-week visiting technologist experience at a NASA or other non-profit research center where he will be able to collaborate with other scientists.

ChBE graduate student, Julian Velez, competed in the Graduate School’s 3-Minute Thesis Contest on March 31st. He won third place with his thesis entitled, “Recovering Liquid Lignin as a Renewable Biofuel or Biopolymer.” The competition “challenges research-based higher degree students to present a compelling oration on their thesis and its significance in just three minutes in language appropriate to a non-specialist audience.” Congratulations, Julian!!

In April, the following students received departmental awards for this school year: Ryan DeFever, ChBE Undergrad Researcher of the Year; Kayla Murdaugh (left), ChBE Senior of the Year Award; and Julie Robinson, Western S.C. AIChE Scholastic Achievement Award. Graduate awards went to: Jesse Kelly (right), Outstanding Graduate Research Assistant; and Julian Velez, Outstanding Graduate Teaching Assistant.

Dylan Bruckner (AIChE Student Chapter President), and several of our ChBE students, along with Dr. Mark Blenner, represented Clemson at the AIChE Southern Regional Conference hosted by the University of Puerto Rico in San Juan in March. They competed against hundreds of other college students from several universities in ChemE paper, poster, jeopardy, and car competitions. Ryan DeFever (left) and Jeremy Arvay were in the paper competition and Ryan won 2nd Place Overall. Kim Owen, Kayla Murdaugh, Heather Snyder, and Katie Ailey also won 3rd Place Overall in jeopardy. Members of the ChemE car team were Joy Coats, Jayraj Joshi, Ben Childs, Kim Owen, Matt Filanova, Joe Redzikowski, and Jacob Dworkin.
The Chemical & Biomolecular Engineering Department is proud to recognize the Senior Class of 2014. The students were honored at a Senior Reception on May 1st at the Madren Center. The department also hosted an Open House for the graduates and their families on graduation day, May 9th. The faculty and staff of ChBE wish all of our graduates the best of luck in their future endeavors! Congratulations!

2014 Graduation Candidates
Bachelor of Science Degree in Chemical Engineering

Kiah L. Baker
Matthew D. Bell
Alexandra J. Brown
Dylan M. Bruckner
David R. Carey
Andrew S. Casella
Robert J. Clark
Joy C. Coats
Michelle E. Coburn
David C. Cooke
Grace C. Custer
Davis L. Cyr
Ryan S. DeFever
Maritessa C. Fabrizio
Joshua G. John
Jacob R. Johnson
Jayraj N. Joshi
Christopher J. Keffer
Thomas W. Kelly
Georgio L. King
Brian P. Klett
Maxon H. Learner
Laura W. McLean
Kara D. Mundauge
Siddharth S. Parasnavis
Alex R. Patterson
Kyle M. Perry
Julie R. Robinson
Joshua D. Rochester
Tyler A. Scheurich
Steven J. Schofield
Cheyenne M. Simmons
Heather M. Snyder
Andrew C. Tamashun
Luke E. Thies
Katherine R. Turner
Kyle Vassallo
Paul H. Watters
Bradley S. Weaver
Thomas W. Welch
Brantley J. Wentworth

GRADUATE STUDENTS

Dr. Nolan Wilson
Doctorate Degree
Dissertation: “Drug Delivery with Feedback Control in Bioresponsive Hydrogels”
Advisors: Dr. Anthony Giuseppi-Elie, Dr. Mark Blenner

Lizzie Bollmann
Masters Degree
Advisor: Dr. Rachel Getman

LIFE OUTSIDE THE CLASSROOM

Many of our seniors took time to pursue other interests. Senior Grace Custer, a music minor, found a passion for playing music on the Carillon bells in the tower of Tillman Hall. Grace has blessed our campus with many musical numbers on the bells.

Senior Ryan DeFever is the President of the Clemson University Dixie Skydivers, organizing their information sessions and dropzones. To get a glimpse of a couple of his skydives, please go to one of these links: https://www.youtube.com/watch?v=s_LGEpfDang https://www.youtube.com/watch?v=HN6SzoUh_Nk.

Senior Drew Casella served as the Student Senate President this school year: “I have had the privilege to serve as the Student Senate President for the 2013-2014 term and the experience has been life-changing. . . . The balance between Chemical Engineering and this commitment takes its toll on my sleep but that is a cheap price for the invaluable experiences and knowledge. I have come to know Clemson University on a deep level and I will forever be happily indebted to this institution. The most important thing I’ve learned is this: you will never stop learning. I am looking forward to starting a career in industry where I will always carry the lessons I’ve learned in Earle Hall, Student Government and every corner of this campus.”
The ChBE Graduate Research Symposium was held on March 5th in the Holmes Ballroom at the Clemson House. 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.

ChBE was honored to have Dr. Ewe Beuscher (pictured left with Dr. Hirt) as our keynote speaker this year. Dr. Beuscher is the Global Separations Technology Leader at W.L. Gore & Associates Inc., which is the world leader in fluoropolymer materials. They are best known for the Gore-Tex® brand of apparel. Dr. Beuscher received his degree in Mechanical Engineering from RWTH Aachen in Germany in 1992 and his Ph.D. in Chemical Engineering from Clemson University in 1997. He is currently a member of the ChBE Professional Advisory Board. Since joining W. L. Gore, Dr. Beuscher contributed to developments in a wide variety of separation applications, including adsorption, catalysis, chromatography, polymer fuel cells, gas-liquid contactors, barrier materials, gas separation, liquid purification, and most recently advanced microfiltration.

This all-day event included a poster session in the morning, followed by oral presentations throughout the day. Some of our undergraduate researchers also participated in the poster session. The award winners of the Symposium were (pictured L-R): Murtaza Shabbir-Hussain (Advisor Dr. Mark Blenner) Poster Honorable Mention; Christine Duval (Advisor Dr. Scott Husson) Best Poster; Julian Velez (Advisor Dr. Mark Thies) Best Presentation; and Meng Zhang (Advisor Dr. Amod Ogale) Presentation Honorable Mention.