

After almost 100 years as the Department of Chemical Engineering, we are now the Department of Chemical and Biomedical Engineering.



Gupta

MESSAGE FROM THE CHAIR

The change is in recognition of the recent launch of the bachelor's degree program in biomedical engineering and is expected to provide visibility to the Department as we enter our second century of existence. The program has already proven popular with engineering undergraduates, and we expect steady enrollment growth. Feedback in support of the change was received from alumni, current students and faculty. This change will help us in recruiting high school and transfer students, in bringing potential employers to campus and in attracting faculty candidates. A search is in progress for a new biomedical engineering faculty member who we hope will join the Department in fall 2016. Professor Cerasela Dinu took on the responsibility of leading the program and she was appointed associate chair for biomedical engineering, effective July 1, 2015. Faculty in the Department and in other departments in the Statler College have established

close working research collaborations with their counterparts in WVU's Health Science Center. These interactions will provide a strong practical underpinning to the academic offerings in the biomedical engineering area. We are now planning for program accreditation, which can be sought after the first class has graduated in May 2017.

One of the provisions of the historic \$45 million gift to WVU by Ben and Jo Statler in 2012 that led to the naming of the College was the creation of three endowed faculty positions. The first of these positions has now been filled. Jianli "John" Hu, formerly with Koch Industries, joined the Department at the end of January as the first Statler Endowed Faculty Chair in Engineering for Natural Gas Utilization. He will oversee the creation of an interdisciplinary research center related to natural gas utilization, which will operate

» continued on page 2...

THE MAJOR **WV**

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BENJAMIN M. STATLER COLLEGE OF ENGINEERING AND MINERAL RESOURCES
DEPARTMENT OF CHEMICAL AND BIOMEDICAL ENGINEERING

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within the WVU Energy Institute. The center will foster education and research on all aspects of the energy cycle, from production to distribution, to utilization and conservation and management. Before joining Koch, Dr. Hu served as a research and development manager at Black & Veatch Corporation, and he also has experience in working for BP Oil and Pacific Northwest National Laboratory. Given his background and interests, he is expected to lead industry-university-national laboratory partnerships aimed at developing intellectual properties that benefit the University and the state's economy.

In other faculty news, Ahmed E. Ismail started as an assistant professor at the end of September. During the fall semester, he assisted in teaching the undergraduate thermodynamics course, focusing particular attention on students majoring in biomedical engineering. Also joining the Department as an assistant professor in January was Jeevan Maddala, who was a research assistant professor of chemical engineering at Texas Tech University. He has a B.Tech. in chemical engineering from the Indian Institute of Technology, Madras and a Ph.D. from Texas Tech. He does research in the area of microfluidics. Richard Turton is currently serving as chair of the WVU Faculty Senate, but he will return to full-time teaching in fall 2016.

The accreditation team from ABET visited the College in October and every aspect of the undergraduate program in chemical engineering was examined. This was a mammoth exercise that took more than a year of planning, and it involved students, faculty, alumni, the industrial advisory committee and the Chemical Engineering Academy. We appreciate the contributions and time of everyone involved in our ongoing efforts to improve our program.

With the opening of the Advanced Engineering Research Building in 2015 and the relocation of the Lane Department to that facility, renovations to the Engineering Science Building are now taking place. Some in the Department anticipate moving to the fifth floor of ESB to allow for renovations to the fourth floor. Others, including students and staff, will move to different parts of the building for about four months. When we return, the biomedical engineering faculty will remain on the fifth floor, and the net result will be additional space for the Department with the ability to accommodate future growth. The biomedical engineering faculty will also gain space in AERB for research laboratories.

We have a growing faculty with new ideas, and we have new programs and new facilities. The future looks bright!

Dr. Rakesh Gupta

George and Carolyn Berry Professor and Chairperson of the Department of Chemical and Biomedical Engineering

DEPARTMENT NEWS

CHE TO CELEBRATE 100 YEARS

Plans are underway for a 100-year celebration of chemical engineering at WVU. Tentative plans call for the celebration to be held in March 2017. We hope you will be able to attend. More details will be distributed as they become available.

CHE INDUSTRIAL ADVISORY COMMITTEE

The departmental Industrial Advisory Committee held its annual meeting on October 7-9. We had an unfortunate conflict with the Biomedical Engineering Society annual meeting, which resulted in several members being unable to attend. A Biomedical Engineering Subcommittee meeting is being planned for spring 2016.

The following members were present and provided valuable advice and counsel to the Department:

Steven Alford, West Point Homes

Steven Auvil, Air Products and Chemicals, Inc. (retired)

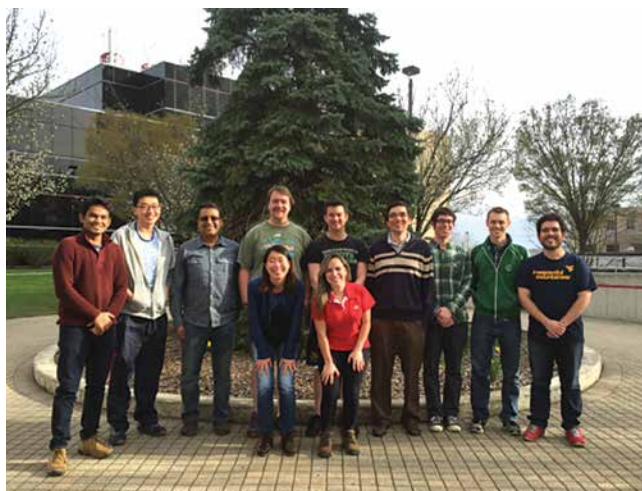
Kevin DiGregorio, Chemical Alliance Zone

Vince Stricker, W.R. Grace and Company

Madhava Syamlal, USDOE/NETL

The committee welcomed new member, **Jacob Hunter**, **Momentive**.

FACULTY CORNER: FERNANDO LIMA



With the growing energy demand and stringent environmental regulations, the efficient, economic and sustainable use of major energy sources has become increasingly important. The development and implementation of novel technologies for the improved utilization of such energy sources can be accelerated by the use of process systems engineering tools, such as process modeling, design, control and optimization.

Lima's research group focuses on novel and creative applications of computational tools to design and optimize new energy systems and sustainable processes.

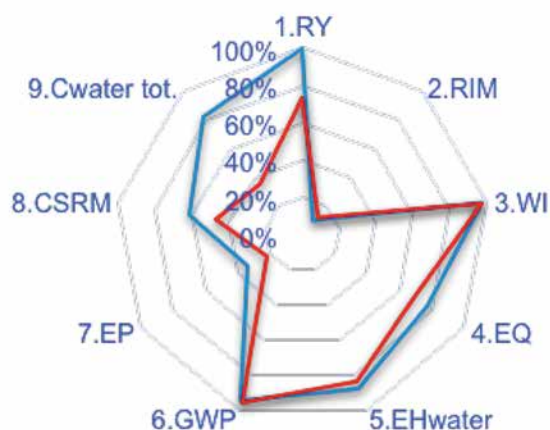
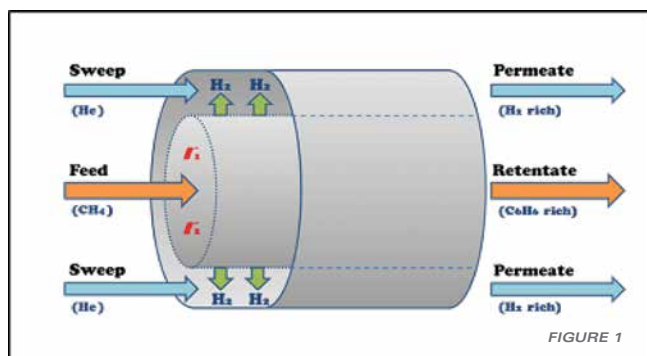
In particular, the focus areas of the Lima Research Group include:

(i) Development of advanced control approaches (e.g., biomimetic, model predictive control) for the optimization of the coal-fired power plants of the future with carbon dioxide capture;

(ii) Techno-economic feasibility analysis of natural/shale gas utilization routes for the production of fuels and chemicals. The use of membrane reactor processes for the direct methane aromatization conversion to hydrogen and benzene (see membrane reactor schematic in Figure 1) as well as the oxidative coupling of methane for ethylene production are some of the routes of interest. The investigation of intensified methane conversion routes with reduced cost and minimized environmental impact are especially motivated by the presence of abundant amounts of shale gas in the Marcellus shale in our area;

(iii) Sustainability and life cycle assessment of chemical process routes for improved process operation and minimization of environmental footprint. The implementation of process control approaches for fermentation processes with complex dynamics are being studied as an application focus (see results in Figure 2).

When developing the computational approaches, the Lima Research Group collaborates with experimental groups at other universities (e.g., University of Maryland) as well as national laboratories and agencies (e.g., National Energy Technology Lab, Los Alamos National Lab, Environmental Protection Agency) to ensure the performed process systems engineering studies have realistic conditions and expectations to also provide guidelines for experimental research. Additionally, the Lima Research Group offers training opportunities for undergraduate and graduate students to provide society a new STEM workforce with the necessary skills needed to succeed in a future clean energy environment.

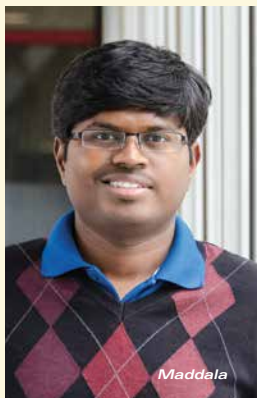


DEPARTMENT NEWS

CHE WELCOMES NEW FACULTY MEMBERS



Ahmed Ismail joined the faculty in September. Ismail received his Ph.D. in chemical engineering from MIT in 2005 and his B.S. in the discipline from Yale in 1998. Prior to coming to WVU, he was a junior professor in mechanical engineering at RWTH Aachen University, Germany. His research interests are in molecular simulations, renewable and sustainable energy, advanced materials, polymers, biomedical engineering, biomass dissolution, combustion and catalysis. His teaching interests are classical and statistical thermodynamics, molecular engineering and mass and energy balance.



Jeevan Maddala joined the faculty in January. Maddala received his Ph.D. in chemical engineering from Texas Tech University in July 2013 and a B.Tech. in the discipline from Indian Institute of Technology Madras in 2008. Prior to coming to WVU, Maddala was co-founder and lead engineer for SysEng, LLC, and a research assistant professor in the Department of Chemical Engineering at Texas Tech University. His research interests are in developing modeling, control, and design tools in microfluidics and fuel cells. Maddala can teach any core course in chemical engineering.



GUPTA HONORED AT INTERNATIONAL CHE CONFERENCE

Rakesh Gupta was one of 16 scientists from around the world honored with a Distinguished Speaker Award from CHEMCON, a four-day annual event of Indian Institute of Chemical Engineers. Gupta traveled to Guwahati, India, in December to participate in the international conference, where he discussed his research in the use of polylactic acid, a plastic derived from corn, for use in food packaging.



CONGRATULATIONS

Richard Turton, Debangsu Bhattacharyya and Stephen Zitney (NETL and adjunct professor) were winners of a prestigious 2015 R&D 100 Award. Their entry, "EYESIM v2.3 Immersive Real-Time Virtual Reality Software for Improving Energy Plant Operations and Safety," was announced as a winner in the Software/Service category at the award ceremony in Las Vegas, Nevada, in November 13. Zitney was on hand to accept the award on behalf of the Schneider Electric, WVU and NETL team.



Robin Hissam and her husband, Jason, welcomed Dylan Cole into the world on October 28. Dylan weighed in at eight pounds and joins his big sister, Harper, at home. Congratulations to the Hissam family.

David Klinke was the recipient of a 2014 Award of Excellence in Innovation announced by the Mary Babb Randolph Cancer Center in June.

STUDENT NEWS

CLASS OF 2015

AUGUST 2014

Alnaser, Ali Bader

Dorsey, Scott

Ede, Gregory

Eisentrou, Kevin

MAY 2015

Albuwaidy, Ahmed

Alford, Steven

Artimez, Matthew

Bagnolo, Nicholas

Brenwald, Steaven

Casteel, Richard

Cheesebrough, Cody

Cook, Kayla

Cranmer, Kathleen

Cuppert, Vanessa

Dalton, Ross

Dmitrzak, Kylie

Eppery, Andrew

Fenais, Abdulazia

Foran, Timothy

Fouty, Nicholas

Hamilton, Clark

Jerden, Jeremy

Jewell, Megan

Karolcik, Brock

Kramer, Kelly

Lewis, Thomas

Marozzi, Joseph

Marra, Andrew

McLaughlin, Matthew

Moran, Patricia

Neely, Kathryn

Niemeyer, Colin

Patel, Niku

Radcliffe, Andrew

Shank, John

Sherman, Tanner

Smolow, Linley

Solensky, Jason

Stevens, Riley

Tintle, Julia

White, Andrew

Yaussy, Cameron

Zugschwert, John

STUDENTS PARTICIPATE
IN POSTER COMPETITION
AT AIChE

Eight undergraduate chemical engineering students and 11 graduate students attended the annual meeting of the American Institute of Chemical Engineers, held in Salt Lake City, Utah, in November. Several of the students made poster and oral presentations at the meeting. **Andrew Maloney** ('16) placed second in the Food, Pharmaceuticals and Biotechnology Division with his poster titled, "Bionano Conjugates with Bacterial Decontamination Capabilities." **Reem Eldawud**, a Ph.D. candidate, also placed second for her poster, "Electronic Platform for Real-Time Multi-Parametric Analysis of Cellular Behavior Post Exposure to Single-Walled Carbon

Nanotubes." Both Maloney and Eldawud are performing research under the direction of Cerasela Dinu.

Maloney also placed first at the Summer Undergraduate Research Experience poster presentation in the Nanoscience Division for his poster, "Bionano Conjugates with Bacterial Decontamination Capabilities." **Jordan Chapman** ('17) placed second in the Nanoscience Division for his poster, "Hydrogel Encapsulation to Enhance Enzyme Stability and Functionality." The SURE presentations took place in July at the Waterfront Place Hotel in Morgantown.



Maloney



Eldawud

If your company is hiring, please let us know. We are always interested in providing more opportunities for our graduates.

RECENT GRADUATES

The Department has 215 chemical engineering undergraduate students and 46 biomedical engineering undergraduate students enrolled for the fall 2015 semester in the sophomore through senior years. This past May, 43 students graduated with a B.S. degree.

The BSChE graduates for 2014-2015 are shown above. Our congratulations and best wishes to all of them in their careers; please keep in touch!

In 2015-2016, the Department has 44 graduate students enrolled, 35 of whom are in the Ph.D. program. In 2014-2015, we graduated three M.S. students and seven Ph.D. students. Their names, research topics and research advisors are as follows:

AUGUST 2014

Chenbo Dong (PhD)*Research Advisor:* Cerasela Dinu

Title: Investigation of Chemical and Physical Properties of Carbon Nanotubes and Their Effects on Cell Biomechanics

Adam Finnis (PhD)*Research Advisor:* Rakesh Gupta

Title: Pylactic Acid-Based Polymer Blends for Durable Applications

Manohar Gaddipati (PhD)*Research Advisor:* Brian Anderson

Title: Reservoirs Modeling of Gas Hydrate Deposits in North Slope of Alaska and Gulf of Mexico

Dustin Jones (PhD)*Research Advisors:* Debangsu Bhattacharyya and Richard Turton

Title: Plantwide Control System Design for IGCC Power Plants with CO₂ Capture

Adrian Kosteleski (PhD)*Research Advisor:* Robin Hissam

Title: Inorganic Nanoparticle Nucleation on Polymer Matrices

DECEMBER 2014

Sarah Caprio (MS)*Research Advisor:* Debangsu Bhattacharyya

Title: Transient Studies of a Sodium Sulfur Cell

Tristan McQuain (MS)*Research Advisor:* John Zondlo

Title: Performance of Reformed Low-Sulfur Liquid Fuels in a Solid Oxide Fuel Cell

MAY 2015

Mohamed Elmajdoub (MS)*Research Advisor:* Charter Stinespring

Title: Inverse Problem of Finding an Unknown Parameter for One- and Two-dimensional Parabolic Heat Equations

Xiaoning He (PhD)*Research Advisor:* Brian Anderson

Title: Feasibility and Supply Analysis of U.S. Geothermal District Heating and Cooling System

Mark Smith (PhD)*Research Advisor:* John Zondlo

Title: Partial Oxidation of Hydrocarbons in a Segmented Bed Using Oxide-based Catalysts and Oxygen-conducting Supports

STUDENT NEWS

SCHOLARSHIPS ANNOUNCED

In addition to the Academy scholarships, which were identified in the last issue, the following scholarships were awarded for the 2015-2016 academic year.

Selorme Agbleze ('18), Williard W. Hodge Scholarship

Alexa Anderson ('18), DuPont Scholarship/Camden Coberly Memorial Scholarship

Kevin Apreku ('17), Williard W. Hodge Scholarship

Huda Ashfaq ('17), George A. & Sylvia B. Crago Scholarship

Beruk Bonga ('18), Williard W. Hodge Scholarship

Emily Brezler ('18), Georgia Nash Memorial Scholarship/John M. Summerfield Scholarship

Megan Cain ('16), Samuel and Doris Kasley Chemical Engineering Scholarship

Krystal Capers ('17), Williard W. Hodge Scholarship

Jordan Chapman ('17), DuPont Scholarship/Ruckman and Balmy Dietz Scholarship

Andrew Elliott ('18), W.J. Fitzgerald Chemical Engineering Scholarship

Kasey Fisher ('17), Lester Kincaid Scholarship

Elijah Hedrick ('17), James Kent Biomedical Scholarship

Melanie Hott ('17), Lester Kincaid Scholarship

Cecelia Jebbia ('18), Samuel and Doris Kasley Chemical Engineering Scholarship

Daniel Kenyon ('17), Williard W. Hodge Scholarship

Ashley Kovello ('18), Williard W. Hodge Scholarship

Oliver Lin ('18), Salvatore & Josephine Cilento Research Scholarship/W.J. Fitzgerald Chemical Engineering Scholarship

Karlee Lobban ('17), Martha Hopkins Hashinger Scholarship

Andrew Maloney ('16), James Kent Biomedical Scholarship

William Monaghan ('17), Williard W. Hodge Scholarship

Katelyn Null ('18), John M. Summerfield Scholarship

Dhruvi Patel ('17), DuPont Scholarship

Katherine Reynolds ('17), DuPont Scholarship

Michelle Riffle ('18), James Wimer Memorial Scholarship/B.G. McGuire Scholarship

Alec Salakovich ('17), Camden Coberly Memorial Scholarship

Cassidy Seamon ('18), Martha Hopkins Hashinger Scholarship

Jordan Shaver ('18), John M. Summerfield Scholarship

Nanda Siva ('18), W.J. Fitzgerald Chemical Engineering Scholarship/Salvatore & Josephine Cilento Research Scholarship

Matthew Sorrells ('16), Lester Kincaid Scholarship

Jacob Suffridge ('18), Albert Monack Scholarship/John M. Summerfield Scholarship

Patrick Thomas ('18), Salvatore & Josephine Cilento Research Scholarship

Harry Weaver ('17), Williard W. Hodge Scholarship

[Note: Multiple scholarships are given to some students because, for a select group of students, the College promises scholarships of a certain amount each year. Once the student enters the Department, he/she continues to receive this amount, but now it must come from departmental scholarship funds. Since these amounts can be large (up to \$1,750), the Department must sometimes draw funds from several separate scholarship accounts to meet the total promised.]





WVU begins its fourth year in the Big 12 Conference with an exciting slate of football games scheduled. Information regarding the College tailgates will be sent at a later date.

Sat., Sept. 3	Missouri	Morgantown, W.Va.
Sat., Sept. 10	Youngstown State	Morgantown, W.Va.
Sat., Sept. 24	vs. BYU	Landover, Md.
Sat., Oct. 1	Kansas State*	Morgantown, W.Va.
Sat., Oct. 15	at Texas Tech*	Lubbock, Texas
Sat., Oct. 22	TCU*	Morgantown, W.Va.
Sat., Oct. 29	at Oklahoma State*	Stillwater, Okla.
Sat., Nov. 5	Kansas*	Morgantown, W.Va.
Sat., Nov. 12	at Texas*	Austin, Texas
Sat., Nov. 19	Oklahoma*	Morgantown, W.Va.
Sat., Nov. 26	at Iowa State*	Ames, Iowa
Sat., Dec. 3	Baylor*	Morgantown, W.Va.

CLASS NOTES

1977

Christopher Dean (BS) is a principal consultant for High Olefins FCC Technology Services, LLC, and resides in Houston, Texas. He visited the Department in September.

1981

Richard Stemple (BS) is the business director/anti-static fibers for William Barnet and Son, LLC, and resides in Spartanburg, South Carolina.

2008

Joshua Welshans (BS, MS '11) is a production engineer for Optima Belle and resides in Charleston.

2011

Matthew Thompson (BS) is a materials, process and physics engineer in the Boeing Research and Technology Division of The Boeing Company. He will receive his Ph.D. from WVU in 2016. His research was under the direction of Rakesh Gupta. Thompson and his family reside in St. Louis, Missouri.

REMINDER

For those who have sent contributions to the Department this past year, OUR MANY THANKS! These funds are used to support many undergraduate and graduate activities and to help enhance the overall academic and learning environments in the Department. Your support is greatly appreciated.

Please remember to designate your tax deductible gifts for use by the Department. The best way for contributing to support the Department of Chemical and Biomedical Engineering is to write your check out to the WVU Foundation and designate it for use by chemical or biomedical engineering on the memo line. Please check with your company; many provide matching gifts.

THE MAJOR WV

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Alumni Update March 2016

PLEASE WRITE TO US! We want to know where life has taken you since you left West Virginia University. Complete and return this form with your news and comments. Pass this newsletter on, or let us know any alumni who are not receiving *The Major*.

Send to: Department of Chemical and Biomedical Engineering
West Virginia University | 403 ESB, PO Box 6102 | Morgantown, WV 26506-6102

Or, email updates to linda.rogers@mail.wvu.edu.

Name: _____

Degree(s): _____ Year: _____

Home Address: _____

City: _____ State: _____ Zip: _____

Home Phone: _____

Business Phone: _____

E-mail: _____

Employer: _____

Position Title: _____

Employer Address: _____

City: _____ State: _____ Zip: _____

Preferred Mailing Address: Home Work

Brief News of Professional and Family Activities for Future Newsletters:

Suggestions/Comments: _____

This newsletter is published twice yearly to keep our alumni and friends informed of departmental news and ongoing activities. For additional information, visit our website: cbe.statler.wvu.edu

We continue to make it more informative and useful to our visitors. Let us know your thoughts and comments, and drop us a line.