2010 Annual Report
Dear Alumni and Friends of the Department:

Much has happened in the past year to move our department into unprecedented territory. We added our 19th faculty member, Aravind Asthagiri, from the University of Florida, achieved more permanence in our laboratory instruction by appointing Carlo Scaccia as a clinical faculty member, coped with an increase in undergraduate enrollment to nearly 470 students (sophomore-senior) and saw our research expenditures increase to $16.2M. Faculty size, enrollment and research activity are all at new highs. The Department also was mentioned in the October 4th issue of Chemical and Engineering News where it was observed "for the second year in a row Ohio State took first place in terms of school spending on Chemical Engineering R & D". The years referred to were 2007 and 2008, the latest available from the NSF statistics database.

Other items of note in 2010 include the conferral of 96 B.S. degrees, 18 Ph.D. degrees, the publication of 125 papers and the issuance of 4 patents. It turns out that 10 undergraduates were co-authors on those publications indicating a robust continuation of undergraduate participation in faculty research. There are also special faculty accomplishments that are a pleasure to highlight. Umit Ozkan was elected as a Fellow both in AIChE and AAAS, and also received the Iowa State Alumni Association Professional Achievement Award in Engineering. Jim Lee won the Society for Plastics Engineers 2010 International Award and yours truly received the 2010 Founders Award from the Society for Biomaterials. Significantly, both L. S. Fan and S. T. Yang won multimillion dollar ARPA-E (Defense Department Advanced Research Projects Agency-Energy) awards for their research on clean coal technology using a chemical looping process and the use of genetically modified bacteria to produce of bio-butanol respectively. In addition L. S. Fan saw his latest book, "Chemical Looping Systems for Fossil Energy Conversions", published by Wiley-AIChE. Finally, David Tomasko, in recognition for his outstanding devotion to undergraduate education and student success, was given the high honor to present the Commencement Address at OSU’s autumn graduation ceremony.

There was also significant progress in the planning for our new building. The new Koffolt Laboratories will be part of a joint Chemical Engineering and Chemistry building of 225,000 gross square feet containing 124,000 sq. ft. of assignable space. We will be next door to our current location and demolition of Boyd, Johnston, Aviation and Haskett will commence this summer. The space plan is complete and it is a pleasure to note that we have more than 12,000 sq. ft devoted to undergraduate laboratories, very flexible design space and classrooms. We also have in that space an auditorium, which seats 120 students, that should accommodate our entire class of juniors or seniors for those occasions where individual sections meet for combined lectures. The space for the academic program is more than twice that which is available in the present Koffolt Laboratories. Overall Chemical and Biomolecular Engineering will occupy 60% of the building when it opens in late 2014. Schematic design is well underway and early concepts are presented within this report. Once the space plan is approved by the Board of Trustees in February we will be able to provide our major donors naming opportunities for space in our portion of the building. We thank all those alumni and friends of the department who have contributed to what will be a transformational change for our department.

Best wishes on behalf of our faculty, staff and students.

Stuart L. Cooper
Professor and Chair
Coopers@chbmeng.ohio-state.edu
614-247-8015
Lin Zhao, a Ph.D. student in Winston Ho’s membrane research group, is installing a new membrane that he just synthesized in a membrane cell to study the transport properties of the high flux membrane for desalination.
Koffolt Laboratories

The space plan for the new building is now complete. The new building will be called CBEC (Chemical and Biomolecular Engineering and Chemistry Building) and is just west of old Koffolt Laboratories. The building will be shared among CBE and Chemistry to create new knowledge and collaboration through basic research in the chemical sciences. CBEC, which incorporates Koffolt Laboratories, will offer a unique centralized research facility for chemical/materials synthesis and characterization, cell and tissue culture, and biological processing and characterization. The new Koffolt Laboratories will include research labs and support spaces, instructional spaces, core laboratories and faculty and administrative offices. The building will be a substantial upgrade from the department’s current home and will enable a much stronger focus on interdisciplinary research. Preliminary renderings of the outside of the building are shown on the right.* The following page depicts rough drawings of the basement and ground floor.

Project Mission:

- Help to create an environment that supports teaching and learning
- Help to create an accessible campus that enhances connections and linkages
- Help to create a campus with an ordered and timeless setting
- Help to create a campus that is timeless, maintainable, and flexible
- Provide flexibility in program and design

*Renderings and drawings from Pelli Clarke Pelli Architects, New Haven, Connecticut.
Koffolt Laboratories National Campaign Committee

The Koffolt Laboratories National Campaign Committee met on September 10, 2010 to discuss progress to date on the new building. Bill Lowrie ’66, chair of the committee, reported that more than $13.5 million had been committed to date towards the $17.5 million fundraising goal for the project.

The committee was especially pleased to welcome Bernard Constantino, University Architect, and Mariko Masuoka, from Pelli Clarke Pelli who provided an overview of the project planning and some preliminary design considerations for the space. Mike Boehm, Vice Provost for Academic Planning, reinforced the University's commitment to this very important project, and reassured the committee that the new building would be an exceptional facility for Chemical and Biomolecular Engineering and Chemistry.

The committee will meet again in April 2011 to get an update on the building plans and continue their efforts to engage fellow ChemE alumni in support of the new Koffolt Laboratories.

Left to right: Stuart Cooper, Kathleen Hogenson, Rich Brandon, Christina Stark Sistrunk, William Lowrie, Karen Lafferty Hendricks, Mike Winfield, Jim Dietz, Smith Howland, Ron Harris, Cindy Gerstle Bishop, Bill Hauschildt, Sonny Saeks, Matt Galosi, Paul Kienholz, Dennis Hurley, Larry Steele

Koffolt Campaign National Committee Members:

- **William G. Lowrie** (B ChE ’66), Chair
  Sheldon, South Carolina

- **Jeffrey D. Adams** (B ChE ’87)
  San Mateo, CA

- **Richard A. Arnold** (B ChE ’48, MBA ’50)
  Houston, TX

- **Cynthia (Cindy) Gerstle Bishop** (B ChE ’86)
  Coppell, TX

- **James (Jim) F. Dietz** (B ChE ’69, MS ’70)
  Northfield, IL

- **David (Dave) Grove** (B ChE ’70, MS ’70)
  Stuart, FL

- **Jack A. Hammond** (B ChE ’61)
  Iron Gate, VA

- **Ronald D. Harris** (B ChE ’61, MS ’61)
  Columbus, OH

- **F. William (Bill) Hauschildt, Jr.** (B ChE ’67, MS ’67)
  San Francisco, CA

- **Karen Lafferty Hendricks** (B ChE ’71)
  Maineville, OH

- **Dennis W. Hurley** (B ChE ’67)
  Midland, MI

- **Alex W. Kawczak** (B ChE ’82)
  Dublin, OH
Paul J. Kienholz (B ChE ’57)
Pittsburgh, PA

Thomas J. Koffolt
Savannah, GA

Summer (Sonny) Saeks (BS ChE ’82)
Cincinnati, OH

Christina Sistrunk (B ChE ’82)
Harvey, LA

Lawrence R. Steele (B ChE ’58, MS ’58, PhD ’62)
Princeton, NJ

Eugene (Gene) N. Wheeler (B ChE ’65, MS ’65)
Livermore, CA

Michael D. Winfield (B ChE ’62)
Long Grove, IL

L. E. (Larry) Woodworth (B ChE ’61)
Columbus, OH

Houston Volunteer Committee:

Brian K. Weider (B ChE ’78)
Houston, TX

Matthew J. Galosi (B ChE ’80)
Katy, TX

Kathleen (Kathy) Applegate Hogenson (B ChE ’82)
Houston, TX

Smith G. Howland (B ChE ’69, MS ’69)
Houston, TX

Vice Provost of Academic Planning, Mike Boehm, presents to the group.

Left to right: Cindy Gerstle Bishop, Matt Galosi, Kathy Applegate Hogenson, Smith Howland
Stuart Cooper Elected to the National Academy of Engineering

Stuart Cooper, professor and Chair of the William G. Lowrie Department of Chemical and Biomolecular Engineering, has been elected to the National Academy of Engineering.

Cooper was elected to the NAE for his contributions to polymer chemistry, biomedical polyurethanes, blood compatibility and academic administration. Ohio State now has 12 National Academy of Engineering members on its faculty, with three (Stuart Cooper, L.S. Fan and Winston Ho) in the Department.

Umit Ozkan Named 2010 Outstanding Woman in Technology

CBE professor, Umit Ozkan, was honored as Outstanding Woman in Technology for her research accomplishments in heterogeneous catalysis with applications in renewable energy and environmental protection. Ozkan found a way to convert ethanol and other biofuels into hydrogen very efficiently by developing a new catalyst that makes hydrogen from ethanol with 90 percent yield, at a workable temperature, and using inexpensive ingredients.

Ozkan leads the Heterogeneous Catalysis Research Group at Ohio State and has been a faculty member in engineering since 1985. She also has served as the college’s associate dean for research. Ozkan received an Iowa State University Professional Achievement Citation in Engineering; received the John van Geuns Lectureship Award at the Van’t Hoff Institute for Molecular Sciences at the University of Amsterdam; and was named a Fellow of both AAAS (American Assoc. for the Advancement of Science) and the American Institute of Chemical Engineers and also received the AIChE Mentorship Excellence Award.

David Tomasko Gives Autumn Commencement Address

CBE professor and College of Engineering’s Associate Dean for Undergraduate Education and Student Services, Dr. David Tomasko, was selected to speak at OSU’S autumn quarter commencement. Tomasko’s speech gave perspective from “the front of the classroom” of students as they walk through their college career, from freshman to senior year. He talked about changes to come and difficulties to be faced, “difficulties that will grow into perspective and eventually ripen into blessings.” Tomasko concluded his speech with a quote from E.B. White, author of Charlotte’s Web, “I rise in the morning torn between a desire to improve the world and a desire to enjoy the world. This makes it very difficult to plan the day,” thus wishing the graduates “a lifetime of difficulty….in planning [their] day.”

Tomasko is an outstanding teacher and mentor who creates opportunities for undergraduate students in his research lab. He tirelessly counsels students, especially minority and at-risk students, to help them find their voice in academia and their place in engineering. Through the Honors Collegium, he worked to create an environment for some of Ohio State's most exceptional students. He is also active in community outreach through the Ohio House of Science and Engineering that connects Ohio State students to area schools and teachers.
Congratulations to Kathleen Hogenson, a Recipient of the College of Engineering’s 2010 Distinguished Alumna Award

Kathleen Applegate Hogenson graduated from The Ohio State University in 1982 with a bachelor’s degree in chemical engineering. With 28 years experience, Hogenson is an accomplished CEO and skilled engineer in the oil and gas industry. She is the president and CEO of Zone Energy, LLC, that she founded in 2009. Hogenson sits on the advisory board for Samsung Oil & Gas USA Corp.

Previously, Kathleen was president and CEO of Santos USA Corp. and Santos Americas & Europe for six years. She was hired to rebuild the $6 billion public Australian company’s investment in the Americas. Beginning with an initial investment of $20 million, she completed numerous acquisitions and successfully placed Chinese, Korean and Japanese companies into an offshore exploration project operated by Santos. In 2007, she sold the Americas portfolio to a private company with its base of operations in Egypt.

Hogenson was vice president of technology and global chief reservoir engineer at Unocal Corporation. Prior to that, she was engineering manager, living in Ecuador for five years with Maxus Energy, where she played a key role in greatly increasing the company’s reserve value through the application of numerous innovative technologies in a $1 billion heavy oil project.

Hogenson co-founded a new regional office in South America for the Society of Petroleum Engineers, and serves as a trustee of the Society of Exploration Geophysicists. Hogenson is an active member of the Young Presidents Organization. She is a board member of the Australian American Chamber of Commerce, co-leading its energy conference.

Hogenson is notably one of the few women serving in a CEO leadership role in the oil industry. She encourages business women to pursue the many opportunities in her industry. She serves on the Advisory Board of The Women’s Global Leadership Conference and was a speaker at the Harvard Business School Women’s Conference in 2008 and 2009.

Fan Publishes Chemical Looping Systems Book

Recently published in August 2010, “Chemical Looping Systems for Fossil Energy Conversions,” written by Distinguished University Professor and C. John Easton Professor in Engineering, Dr. L.S. Fan, discusses the process of how to convert fossil fuel energy using chemical looping technology.

“Chemical Looping Systems for Fossil Energy Conversions” looks at chemical looping systems’ unique ability to generate a sequestration-ready CO2 stream and how one day they can be used to efficiently convert fossil fuels into clean energy. The book discusses new techniques which have been developed for direct or indirect processing of coal and other carbonaceous feedstock in chemical looping reactors along with the sciences role in the production of steam, syngas, hydrogen, chemicals, electricity, and liquid fuels, and examines how chemical looping systems are poised to make the leap from the laboratory to real work applications. Fan's book comes with a CD that includes chemical looping simulation files and results based on the ASPEN Plus® software, fundamentals and applications of chemical looping, and many references for research or courses dealing with chemical processes, fossil energy systems, and CO2 capture technologies.

Right: Dr. Fan’s book cover
Bakshi leads sustainability efforts in India

Professor Bhavik Bakshi has accepted a part-time appointment as Vice Chancellor and Professor of Energy and Environment and TERI University in New Delhi, India, where he will be leading India’s first multidisciplinary academic program that is directed toward sustainability. While at TERI University Bakshi will continue his responsibilities at Ohio State encouraging interaction between researchers and students in both countries. The dual appointment will help to address global issues related to sustainable human activity.

Jessica Winter Awarded NSF Grant

Professor Jessica Winter and colleagues were recently awarded a $1.7M NSF grant to develop a high resolution microscopy method for imaging molecules in living animals. Dr. Winter will lead a team comprised of Dr. Peter Kner (University of Georgia), Dr. Beth Brainerd (Brown University), Dr. Ge Yang (Carnegie Mellon), and Carol Lynn Alpert (Museum of Science, Boston) in this effort, which would permit observation of muscle activation and neural transport for the first time in living organisms at this resolution.

CBE Students Win Pelotonia Fellowships

Shreyas Rao, a graduate student in Dr. Jessica Winter’s lab, has been selected to receive a Pelotonia Graduate Fellowship. The purpose of the Pelotonia Fellowship Training Program is to provide fellowships to promising OSU cancer researchers who have the potential to become productive and successful independent research investigators. The proposed training will offer and opportunity to enhance the applicant’s understanding of cancer research by doing research; attending classes, seminars and symposiums; and interacting with other groups and scientists. The award will provide 2 years stipends to fellows during the research training experience.

To learn more about Pelotonia, please visit their website: http://www.pelotonia.org/ride/index.jsp

Jessica Winter Awarded NSF Grant

Professor Jessica Winter Awarded NSF Grant

CBE Undergraduate, Kevin Kauffman, received a Pelotonia Undergraduate Fellowship which provides a one year research stipend of $12,000. Kauffman’s project titled, “Antibody Ligation to Pulmonary Polymeric Microparticles for the Treatment of Lung Cancer,” and his outstanding academic performance helped him to become one of 29 recipients of this award.

Jason Haskins-New Director of Development

Jason Haskins was hired in October of 2010 as a Director of Development in the College of Engineering with the responsibility of fundraising for the William G. Lowrie Department of Chemical and Biomolecular Engineering. He received his B.S. in Agronomy from The Ohio State University in 1996 and an MBA from Franklin University in 2004. Prior to joining OSU he worked for Turfgrass Inc., a regional distributor of professional agronomic solutions and plant protection products, as a Technical Sales Representative. Before that he was Manager of Business Development for Gudenkauf Corporation, a communications contractor specializing in the construction of fiber optic wide area networks. He brings with him over 17 years of experience in building relationships, leadership, prospecting, strategic planning and execution. He is married to Ashley his wife of 13 years and they have 3 children Lydia, Charlotte and Keegan. He is an avid runner, reader and soccer fan/coach/player. He can be can be reached at 614-292-9915 or Haskins.8@osu.edu.

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David Wood-Biosensors Research

David Wood's research group is currently working to create completely new methods for purifying complex pharmaceuticals, and is engineering new bacteria that can detect and identify hormone-like drugs and pollutants. To accomplish this, they engineer complex new proteins and enzymes by combining functional pieces of proteins and enzymes found in nature. For example, they have taken the human estrogen receptor protein, which recognizes and reacts to estrogenic chemicals in the human body, and have combined it with an enzyme found in E. coli that helps bacterial cells grow. When the resulting hybrid protein is made in bacterial cells, the cells react to the presence of estrogenic chemicals by changing their growth rate. Thus, they can use these cells to detect estrogenic chemicals by simply observing how cloudy their liquid growth medium becomes over time.

Since the estrogen receptor is an important drug target, and an important target for dangerous endocrine-disrupting pollutant chemicals, the ability to detect and identify chemicals that interact with it is very important. Their engineered bacteria can provide an important new tool for these determinations, and they have published several papers with them, including one where they detected significant estrogen-like behavior in several popular perfumes. Further, these bacterial cells are much easier to use than animal models, and they have now made bacteria with the estrogen receptors of several animals, and with several other human hormone receptors. Their goal is to use this general approach to create new methods for identifying hazards in industrial and environmental chemicals, and find new hormone-like drugs for humans and animals. Because these biosensing bacteria are fairly simple to create, they can use them for a wide variety of applications where they want to know if a given chemical is affecting an important hormone target.

Dr. Ozkan has been elected as a Fellow of both AIChE and the American Association for the Advancement of Science (AAAS). She received the honor from AAAS for her distinguished contributions to the field of heterogeneous catalysis and its applications to energy and environmental protection. In addition, she was selected because of her outstanding service to higher education as a teacher, mentor and administrator. Her AIChE Fellow election noted her major contributions in the areas of research, teaching, leadership and service.

In addition, Dr. Ozkan was awarded the Iowa State University Professional Achievement Award in Engineering by the Iowa State Alumni Association.
Interdisciplinary Research

Dr. Jessica Winter has several collaborative projects. She is working with Dr. Atom Sarkar (University of Arkansas, Neurosurgery), Dr. Rebecca Dupaix (OSU ME), and Dr. John Lannutti (OSU MSE) to develop nanoparticles for magnetic cell separation, work with Dr. Jeffrey Chalmers (OSU CBE) to develop magnetic nanoparticles to manipulate fibroblasts for enhanced wound healing, and Dr. Barbara Wyslouzil (OSU CBE) to scale-up nanoparticle synthesis using a continuous spray process.

In addition, Dr. Winter and Dr. Wyslouzil have been awarded a Facility Grant by the OSU Institute for Materials Research (IMR). IMR Facility Grants are part of IMRs Research Enhancement Program and one way that IMR supports innovative research within the OSU materials community. IMR Facility Grants provide $2,000 in direct research support towards facility user fees and related materials and supplies.

Through funding from the National Science Foundation, the National Cancer Institute and the State of Ohio Third Frontiers Program, Dr. Jeffrey Chalmers along with a handful of other researchers are currently working on a study which suggests that the presence of tumor cells in the circulating blood of patients, with squamous cell cancer of the head and neck, may predict disease recurrence and reduced survival.

The team of researchers at The Ohio State University Comprehensive Cancer Center–Arthur G. James Cancer Hospital and Richard J. Solove Research Institute include Dr. Kris Jatana, assistant professor of Oral and Maxillofacial Surgery, Priya Balasubramanian, PhD, Liying Yang, PhD, Jeffrey Chalmers, PhD, of the William G. Lowrie Department of Chemical and Biomolecular Engineering, and Courtney A. Jatana, DDS, of the Department of Oral and Maxillofacial Surgery.

The study involves 48 patients who underwent surgical intervention for squamous cell cancer of the head and neck, 35 of which had smoked the equivalent of a pack of cigarettes a day for 15 years, and half of them were moderate to heavy alcohol consumers. These patients were followed for about 19 months after surgery. To this day, no instances of cancer recurrence or disease-related mortality occurred in patients with no CTC’s (circulating tumor cells).

"These findings are extremely exciting, and they suggest that the presence of circulating tumor cells in the blood is correlated with reduced disease-free survival," says Dr. Kris Jatana, assistant professor of Otolaryngology – Head and Neck Surgery, Priya Balasubramanian, PhD, Liying Yang, PhD, Jeffrey Chalmers, PhD, of the William G. Lowrie Department of Chemical and Biomolecular Engineering, and Courtney A. Jatana, DDS, of the Department of Oral and Maxillofacial Surgery.

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Professor Martin Feinberg’s research takes place at a part of the scientific landscape where chemical engineering, biology, chemistry, and mathematics come together in interesting ways. In chemical engineering and, especially, in cell biology it is important to understand the behavior of complex networks of chemical reactions in a systematic way. These networks can involve many species and many interconnected chemical reactions. Although the reactions themselves might be known, it is rare that one has good knowledge of kinetic parameters (e.g., rate constants). For this reason, computer simulations are of limited value. Nevertheless, one might want to know about the qualitative capacity of a network to exhibit certain kinds of behavior. Can a reactor with a given chemistry behave in an unstable way? Can a specified biochemical network serve to maintain the concentration of a crucial cellular component at a steady value, even as the cell is buffeted by external fluctuations in its environment? These questions ultimately require fairly sophisticated mathematics for their resolution.

Professor Feinberg has active collaborations with mathematicians and cell biologists. He holds a grant from the National Institutes of Health that involves scientists and mathematicians from four institutions (Ohio State, U. Wisconsin, MIT, Rutgers), including his former PhD student Gheorghe Craciun, who is now an Assistant Professor of Mathematics and of Biomolecular Chemistry at Wisconsin. Feinberg also holds an Emerging Frontiers Grant from the National Science Foundation entitled “Design Principles of Biochemical Reaction Networks: Collaborative Research with the Weizmann Institute of Science.” The Weizmann scientists are centered in their Department of Molecular Cell Biology. Collaborative work with a Weizmann scholar appeared last spring in the prestigious journal, Science.

Dr. Umit Ozkan is involved in several collaborative projects. Among these, longest lasting collaboration is with Dr. Jean-Marc Millet of the Institut de Recherche sur la Catalyse et l’Environnement de Lyon. This international collaboration that dates back more than 15 years, has been very prolific and Drs. Millet and Ozkan have collaborated on projects ranging from Pt-free electrocatalysts for Polymer Electrolyte Membrane to understanding the Cu incorporation into iron oxide catalysts for water gas shift reactions.

Dr. Ozkan has been collaborating with Dr. Jeffrey Miller of Argonne National Laboratories in use of X-ray absorption spectroscopy (XAS) at the Synchrotron facilities at the Argonne Advanced Photon Source. One of the projects that they are collaborating on involves hydrogen production from bio-derived liquids. In this project, in-situ XAS techniques are used to understand the oxidation state and coordination environment of cobalt species under reaction conditions.

Dr. Ozkan has been working with Professor Christopher Hadad of the Ohio State Chemistry Department in molecular modeling of catalytic reactions. They are working on understanding surface mechanism of steam reforming reactions on Co-based catalysts, and the role of phosphorus in hetero-atom containing carbon nano-structures for oxygen reduction reactions in PEM fuel cells.

Other collaborations are with Professor Henk Verweij of Ohio State Materials Science and Engineering, Professor Steven Chuang of the University of Akron on solid oxide fuel cells, and projects with NexTech Materials and Caterpillar on novel catalytic systems.

All of the collaborative efforts involve close interaction of Professor Ozkan’s research group members with other teams in different departments, different universities, different laboratories and in some cases, different countries. Professor Ozkan believes that working as a part of different collaborative teams is a very valuable experience for students and post-doctoral researchers, in preparing them for careers in academia and in industry.

Dr. Ozkan laboratories are always buzzing with excitement and activity where she and her students are working on several energy-related projects.
## Undergraduate Program
### Course Enrollment

#### Winter 2010

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<td>Dr. Umit Ozkan</td>
<td>Kinetics</td>
</tr>
<tr>
<td>12</td>
<td>694</td>
<td>Dr. Jessica Winter</td>
<td>Lab Techniques in Biochemical Engineering</td>
</tr>
<tr>
<td>16</td>
<td>733</td>
<td>Dr. Jeff Chalmers</td>
<td>Novel Separation Processes</td>
</tr>
<tr>
<td>27</td>
<td>734</td>
<td>Dr. James Rathman</td>
<td>Molecular Informatics</td>
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<tr>
<td>105</td>
<td>750</td>
<td>Dr. Stuart Cooper</td>
<td>Profession of Chemical &amp; Biomolecular Engineering</td>
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<tr>
<td>104</td>
<td>762</td>
<td>David Tomasko</td>
<td>Process Development</td>
</tr>
<tr>
<td>62</td>
<td>764</td>
<td>Dr. Jeffrey Chalmers</td>
<td>Process Design</td>
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<tr>
<td>31</td>
<td>772</td>
<td>Dr. Bhavik Bakshi</td>
<td>Principles of Sustainable Energy</td>
</tr>
<tr>
<td>4</td>
<td>774</td>
<td>Dr. W.S. Winston Ho</td>
<td>Polymer Membranes</td>
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#### Summer 2010

<table>
<thead>
<tr>
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<th>Course</th>
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<th>Course Title</th>
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<tbody>
<tr>
<td>113</td>
<td>630</td>
<td>John Corn &amp; Carlo Scaccia</td>
<td>Unit Operations Lab</td>
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<tr>
<td>21</td>
<td>755</td>
<td>Dr. Bob Johnson (Adjunct)</td>
<td>Chemical Process Safety</td>
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<td>4</td>
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<td>Various</td>
<td>Undergraduate Research</td>
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<tr>
<td>2</td>
<td>H783</td>
<td>Various</td>
<td>Undergraduate Honors Research (Thesis Track)</td>
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#### Autumn 2010

<table>
<thead>
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<th>Course</th>
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<td>Chemical Processes &amp; Calculations I</td>
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<tr>
<td>38</td>
<td>420/520</td>
<td>Dr. Andre Palmer</td>
<td>Transport Phenomena I</td>
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<td>3</td>
<td>489</td>
<td>Dr. James Rathman</td>
<td>Professional Practice in Industry</td>
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<tr>
<td>89</td>
<td>508</td>
<td>Dr. Aravind Asthagiri</td>
<td>Thermodynamics I</td>
</tr>
<tr>
<td>88</td>
<td>521</td>
<td>Dr. Isamu Kusaka</td>
<td>Transport Phenomena II</td>
</tr>
<tr>
<td>127</td>
<td>624</td>
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<td>Process Dynamics &amp; Controls</td>
</tr>
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<td>20</td>
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<td>Dr. Jeff Chalmers</td>
<td>Novel Separation Processes</td>
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<tr>
<td>34</td>
<td>735</td>
<td>Dr. Jessica Winter</td>
<td>Engineering Economics &amp; Strategy</td>
</tr>
<tr>
<td>80</td>
<td>760</td>
<td>Dr. Carlo Scaccia</td>
<td>Chemical Process Plants</td>
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<td>761</td>
<td>Dr. Jack Zakin</td>
<td>Biomedical Nanotechnology</td>
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<td>769</td>
<td>Dr. Stephen Lee</td>
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<tr>
<td>26</td>
<td>773</td>
<td>Dr. Stuart Cooper</td>
<td>Colloids &amp; Surfaces</td>
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<tr>
<td>42</td>
<td>790</td>
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<td>Undergraduate Research</td>
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<td>12</td>
<td>693</td>
<td>Various</td>
<td>Undergraduate Honors Research (Thesis Track)</td>
</tr>
<tr>
<td>9</td>
<td>H783</td>
<td>Various</td>
<td>Undergraduate Honors Research (Thesis Track)</td>
</tr>
</tbody>
</table>
Cooperative Learning Experiences:
Autumn 2009 through Autumn 2010

The Engineering Cooperative Education & Internship Program (ECIP) helps undergraduate students to obtain career-related employment of two types: cooperative education (co-op) positions and internships. A co-op experience provides an opportunity to apply what is learned in the classroom in career-related positions by alternating quarters of full-time coursework with periods of paid, full-time employment. Internship involves one work period with an employer. A work period may last for one quarter or for two consecutive quarters. Summer internships are the most popular among students and employers.

Students meet with Brian Endres and Holly Prouty to evaluate different schedule arrangements before interviewing because many employers hire for specific “rotations.” For instance, students may work full-time during the summer quarter, attend full-time classes in autumn, and return to their employer for full-time work in the winter. The most popular term to work is the summer. Last summer we had 31 students at internships and 15 at co-ops (as reported to ECS).

The following is a list of companies who hired OSU undergraduates in our program and the students who were hired by those companies:

- **Aker Solutions**: Bharat Ramamurthy
- **Algae Venture Systems**: Asher Kay
- **Anheuser Busch InBev**: Erica Wallis
- **Ashland, Inc.**: Nicole Bayona, Christina Elias, Zachary Johnson, Charles Kiessling
- **Batelle Memorial Institute**: Thomas Grimm, Barrett Richter, Stephen Rosegger, Alexander Sarmiento, Christopher Thurber
- **Boehringer Ingelheim-Roxane Laboratories**: Mark McGown
- **CDM**: Deanna Brackman, Katherine Zarc
- **Chemical Abstracts Service**: Dylan Silbiger, Katherine Erickson
- **Cooper Tire and Rubber Co.**: Alex Elchert, Michael Shivers
- **Delta Airlines**: Michael Birkmeyer
- **Diamond Innovations**: Thomas Mascolino
- **DOW Chemical**: Kevin Sutton
- **DOW Corning Corp**: Sefanit Berihun
- **Emerson Climate Technologies**: Megan Feagles, Jessica Epley
- **Entrotech**: William Brigode, David Sesher
- **Franklin International**: Jeanne Durell
- **General Electric Energy**: Robert Fidelibus, Dylan Silbiger
- **General Electric Transportation**: Jacquelyn Pittman
- **General Mills**: Jonathan Su
- **Goodyear Tire & Rubber Co.**: Patrick Heasley
- **Hamilton County (OH)**: Julia Mueller
- **Honda of America Manufacturing**: Jeffrey Rentfrow, Jacob Huggins, Erin Hiestand
- **Intel Corp**: Michael Fontaine
- **ISP (International Specialty Products)**: Danielle Hartley, Leslie Vanderkolk
- **Johnson & Johnson**: Derek Reichel
- **Kodak**: Peter Dobler
- **Marathon**: Steven Ottobre, Douglas Knapke, Cory Noyes, Michael Hartman, Joshua Martin, Vadim Vishnepolsky
- **Micron Technology, Inc**: Cameron Bodenschatz
- **NASA-John Glenn Research Center**: Megan Butts, Christine Copa
- **Nextech Materials**: Pradeep Kanakarajan
- **NSF**: Mark Borysiak
- **NuCor Steel**: Justin Spitzer, Christopher Wielgus
- **Ohio EPA (Environmental Protection Agency)**: Geoffrey Bailey
- **Ohio State University**: Rushinbhai Patel
- **Ohio Willow Wood Co.**: Ethan Ott
- **OMNOVA Solutions, Inc.**: Justin Reed
- **Owens Corning**: Christopher Riddick, Michael Yingling
- **Precision Energy and Technology (PET)**: Pradeep Kanakarajan
- **Procter and Gamble**: Brittany Niles, Japheth Pritchett, Kelly Ramos, Jasline Sahota
- **Rich Products Corp**: Dale Freier
- **RoviSys Co**: Sean Hawkins, Danielle Jensen
- **Scotts Company**: Sara Mihaloew, Greg Shoemaker, Alexander Vermejan, Jean Johnson, Michael Nechay
- **Shell Oil Co**: Robert Enouen
- **Solute Co**: Joseph Linsenmeyer
- **State Industrial Products**: Sean Pattison
- **Tedla Co Inc**: Michael Klimek
- **Unilever**: Anthony Constantino, Danielle Jensen, Katherine Kolakowski, Laurin Turowski
- **University of Florida REU**: Frederick Crawford
- **University of Queensland**: Julia Mueller
- **USEC Inc (United States Enrichment Corp)**: Thomas Warden
- **Veyance Technologies Inc**: Matthew Ustaszewski, Elliott Dolan
- **Whirlpool Corp**: William Murch
- **Wright Patterson Air Force Base**: Paul Gardner
2010 Placement Record for Undergraduates

Graduates of our program continue to have a strong placement record both within industry and within graduate and professional programs. The percentages provided here are based on senior exit surveys at the time of graduation.

Fifty-nine percent of our graduates will be going directly to industry with their B.S. degrees. About 15% of our students will be going on to graduate or professional school. Approximately 20% of our students have accepted positions in Ohio and will stay in the state to pursue their post graduation plans. Students will be working at various corporations such as Exxon Mobil, the Dow Chemical Company, Procter and Gamble, and DuPont.

A number of our graduates received Latin Honors, With Distinction Honors or With Honors in Engineering. Latin honors are defined as follows: a cumulative grade point average (GPA) of 3.5-3.69 is Cum Laude; 3.70-3.89 is Magna Cum Laude; and 3.90-4.00 is Summa Cum Laude. Twenty-eight percent of our students graduated with some level of Latin Honors.

A student who graduates “With Distinction” is an honors student (greater than a 3.4 GPA) who has completed a senior honors research thesis. A student who graduates “With Honors in Engineering” has completed a three-prong program consisting of completing a required number of honors courses, participation in community service, leadership and outreach as well participation in “investigational studies” which typically includes completing a research paper or thesis or completing a minor. Six students graduated with Honors in Engineering and six students graduated With Distinction in various disciplines.

Engineering Career Services (ECS) welcomes all employers to register, to recruit Ohio State engineering students and graduates. There is no cost to register and no fees for ECS services. If you, or someone you know, is interested in hiring Ohio State students for co-op experiences, internships or for full time placement, please contact Rosemary Hill, Director of Engineering Career Services at (614) 292-6651. You can read more about the services offered through ECS by visiting their webpage: http://career.eng.ohio-state.edu.

2010 B.S. Graduates:

**Autumn 2009 (December 2009)**
- Abdullahi Ali: Pursuing M.S., ChE, The Ohio State University
- Ryan Bradstreet: Hired by DuPont
- Michael Heller: Graduated Magna Cum Laude, Seeking Employment
- Mohamed Keyse: Seeking employment
- James Mekker: Seeking employment
- Joseph Taris: Seeking employment

**Winter 2010 (March 2010)**
- Nariman Alkhatib: Pursuing Ph.D, Illinois Institute of Technology
- Alexander Aossey: Seeking employment
- Andrew Mittermiller: Seeking employment
- Kyle Morrison: Hired by Pilot Chemical Co., Ohio
- Oray Talu: Hired by DOW Chemical, Michigan

**Spring 2010 (June 2010)**
- Yahya Alzaabi: Graduated Magna Cum Laude, Returned to homeland
- Thierno Baldet: Seeking employment
- Ibrahim Bamba: Pursuing M.S./Ph.D, Georgia Tech & Emory-Dept of BME
- Samuel Bayham: Pursuing M.S. ChE, The Ohio State University
- Stephen Berling: Graduated Cum Laude, Seeking employment
- Jacob Bethel: Hired by Accenture, Washington, D.C.
- Sing Keat Chew: No information provided
- Richard Ciccotti: Hired by Magnesium Elektron, Ohio
- Shawn Clegg: No information provided
- Brandon Collins: Hired by Appleton Papers, Ohio
- Ronald Criss: Hired by Abbott Laboratories, Ohio
- Phelan England: Seeking employment
- Elise Ferguson: Graduated Magna Cum Laude, With Honors in Engineering, Hired by Procter & Gamble, Ohio
<table>
<thead>
<tr>
<th>Name</th>
<th>Status/Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael Urban</td>
<td>Graduated Cum Laude, Seeking employment</td>
</tr>
<tr>
<td>Steven Waites</td>
<td>Graduated Cum Laude, With Honors in Engineering, Seeking employment</td>
</tr>
<tr>
<td>Robert Waters</td>
<td>Hired by Owens-Illinois (O-I), location unspecified</td>
</tr>
<tr>
<td>Darren Wendel</td>
<td>Graduated Magna Cum Laude, Hired by Procter &amp; Gamble, OH</td>
</tr>
<tr>
<td>Tanner Williams</td>
<td>Graduated Magna Cum Laude, Hired by Procter &amp; Gamble, OH</td>
</tr>
<tr>
<td>Whitney Wutzler</td>
<td>Pursuing M.S. NE, The Ohio State University</td>
</tr>
<tr>
<td>Amy Zuo</td>
<td>Graduated Summa Cum Laude, With Distinction, Hired by Epic, Wisconsin</td>
</tr>
<tr>
<td>Aleksandr Zyskin</td>
<td>Employment not specified</td>
</tr>
<tr>
<td>Abdirazak Abdulahi</td>
<td>Seeking employment</td>
</tr>
<tr>
<td>Shilp Antani</td>
<td>Hired by Cargill, Nebraska</td>
</tr>
<tr>
<td>Matt Bierbower</td>
<td>Hired by NALCO, location not specified</td>
</tr>
<tr>
<td>Annemarie Fox</td>
<td>Hired by Schlumberger, California</td>
</tr>
<tr>
<td>Rebecca Hanes</td>
<td>Graduated Cum Laude, Pursuing M.S, ChE, The Ohio State University</td>
</tr>
<tr>
<td>Daniel Hickey</td>
<td>Graduated Cum Laude, Hired by RoviSys Co, North Carolina</td>
</tr>
<tr>
<td>Jeffrey Hollinshead</td>
<td>Hired by CDM, Illinois</td>
</tr>
<tr>
<td>Anna Joyce</td>
<td>Graduated Magna Cum Laude, With Distinction, Hired by CDM, Illinois</td>
</tr>
<tr>
<td>Katherine Kinstedt</td>
<td>Seeking employment</td>
</tr>
<tr>
<td>Sara Mihaeloew</td>
<td>Hired by Scotts Company, Ohio</td>
</tr>
<tr>
<td>Andrew Moore</td>
<td>Hired by Materials, West Virginia</td>
</tr>
<tr>
<td>Cory Noyes</td>
<td>Graduated Cum Laude, Hired by Marathon, West Virginia</td>
</tr>
<tr>
<td>James Penikas</td>
<td>Seeking employment</td>
</tr>
<tr>
<td>Jeffrey Rentfrow</td>
<td>Hired by PPG Industries, Inc.</td>
</tr>
<tr>
<td>Amanda Reymender</td>
<td>Seeking employment</td>
</tr>
<tr>
<td>Jessica Rittner</td>
<td>Hired by DOW Corning Corp, Michigan</td>
</tr>
<tr>
<td>Robert Rudd</td>
<td>Graduated Cum Laude, Pursuing M.S. BME, University of Kentucky</td>
</tr>
<tr>
<td>Nishit Shah</td>
<td>Hired by Pilot Chemical Co, Ohio</td>
</tr>
<tr>
<td>Sehar Sheikh</td>
<td>Hired by Newell Rubbermaid, Georgia</td>
</tr>
<tr>
<td>Emily Smith</td>
<td>Pursuing Ph.D, Auburn University</td>
</tr>
<tr>
<td>Evan Smith</td>
<td>Hired by Procter &amp; Gamble, Ohio</td>
</tr>
<tr>
<td>Justin Spitzer</td>
<td>Hired by Nucor Steel, Ohio</td>
</tr>
<tr>
<td>Xiao Sun</td>
<td>Seeking employment</td>
</tr>
<tr>
<td>Christopher Thurber</td>
<td>Graduated Magna Cum Laude, Pursuing Ph.D, Carnegie Mellon University</td>
</tr>
</tbody>
</table>
Autumn 2010 (December 2010)

Feras Alhothali  Hired by SABIC, Saudi Arabia
Mohammed Alsekhan  Hired by SABIC, Saudi Arabia
John Augustine  Seeking employment
Geoffrey Bailey  Seeking employment
Adam Brandt  Anheuser Busch InBev, Ohio
David Bukovec  Seeking employment
Benjamin Doup  Graduated Cum Laude, With Distinction, Pursuing M.S. NE, The Ohio State University
Sarah Garrett  Hired by Pilot Chemical Co, location not specified
Matthew Isabel  Hired by Appleton Paper, Ohio
Amanda Janasov  Hired by AEP, Ohio
Michael Klimek  Hired by Arkema Group, TX
Saud Milibari  Hired by SABIC, Saudi Arabia
Rebecca Murphy  No information provided
Rushinbhai Patel  Hired by Pilot Chemical Co.
Andrew Pitts  Seeking employment
Jason Porter  Pursuing M.S. Food Science, The Ohio State University
Ryan Silver  Seeking employment
Matt Tackett  Graduated Cum Laude, Hired by Capital One, Virginia

Right: Undergraduate Bilal Azzam works on a Gas-Solid Fluidized Bed Experiment in the Unit Operations Laboratory.
Undergraduate Enrollment
(number of students)

- Pre-Majors
- Majors
- Total

Female and Ethnic Minority Trends in Total Department Enrollment

Total Students
Women
Ethnic Min

Number of B.S. Degrees Per Year
Shows Total Students, Number Granted to Women and Number Granted to Ethnic Minorities

Chem. E Total
Women
Ethnic Min

Tracking CHBE 230 Enrollment
CHBE 230 is the department’s first major course. This table shows total enrollment in that course and the breakdown of enrollment of women and ethnic minority students. Previous years include only students who passed the course with a C- or better.
2010-2011 Undergraduate Scholarship Information

A total of 116 students were awarded undergraduate scholarships in the Chemical & Biomolecular program. The vast majority of those students were current majors, although a small amount went to recruit high ability first year students as well. A total of $103,800 was awarded to students heading into the 2010-2011 school year. This year the department awarded less scholarships but the average award amount ($894) was higher in than the previous year ($716).

Trends in data from financial aid show that the number and amount of both student and parent loans have been increasing. Both Ohio State tuition and University financial support have increased yearly. However, since the increase in scholarship support hasn't been able to keep up with tuition increases, engineering students and their families have had to increase their debt levels to cover the additional costs. In the Chemical & Biomolecular Engineering Department, department scholarships from alumni and corporate donors help defray a small part of the loan burden for many of our students.

Department scholarships are determined mainly by merit, however, when a scholarship specifies that a student's need be considered, both merit and need are taken into account. We thank those of our alumni who have established scholarship endowments for this purpose as well as our corporate donors who provide scholarships on an annual basis.

A description of the qualifications for each endowed scholarship is available on the Ohio State Treasurer’s website: http://www.treasurer.ohio-state.edu/endowment/index.html
The George S. Bonn Scholarship
Wenqin He
Yuhao Sun
Lianwan Huang
Qi Wang
Mengchuan Li
Zhao Zhao
Jianmin Pei
Zhi Zheng
Hui Peng
Yusu Zhu
Goutham Putta

The Samuel S. and Grace Hook Johnston Memorial Chemical Engineering Scholarship Fund
Joanna Gobielle
Adrian Stalnaker

J.R. Boothe Scholarship Fund
Parth Shah

Dorothy J. & Herbert L. Fenburr Scholarship
Nathan Arroyo
Sarah Basnight
Cameron Bodenschatz
David Diaz-Rivera
Anthony Garber
Jean Johnson
Sean Kernan
Katherine Kolakowski
Patrick Krantz
Kevin Kuhn
Brooke Laing
Chelsea Liao
Richard McConnell

William H. Whirl Scholarship
Peter Dobler

Below: 2010 Graduating Class
Brenna McNamee
Tri Nguyen
Kunal Parikh
Jason Porter
Timothy Regan
Nicholas Sakian
Daniel Savel
David Schnell
Anthony Unger
Daniel Valco
Mary Margaret Williamson
Michael Yingling
Graduate Program

Ranking

The 2011 *U.S. News and World Report* rankings of engineering graduate programs placed the Lowrie Department of Chemical and Biomolecular Engineering at #27. The College of Engineering moved up two spots to #25. While the college rankings are based in good part on objective measures such as research funding, number of Ph.D. graduates, number of publications, etc., the departmental rankings are based on subjective surveys of deans of engineering and industrial executives.

<table>
<thead>
<tr>
<th>Ohio State College of Engineering</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
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<tbody>
<tr>
<td>Engineering Specialties</td>
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<td>21</td>
<td>22</td>
<td>19</td>
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<tr>
<td>Biomedical</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>35</td>
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<td>27</td>
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<tr>
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<td>38</td>
<td>36</td>
<td>36</td>
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<td>Computer Engineering</td>
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<td>Electrical</td>
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<td>26</td>
<td>20</td>
<td>22</td>
<td></td>
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<tr>
<td>Environmental/Env. Health</td>
<td>44</td>
<td>39</td>
<td>39</td>
<td>39</td>
<td>42</td>
<td></td>
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<tr>
<td>Industrial/Manufacturing</td>
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<td>18</td>
<td>21</td>
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<td>Materials</td>
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<td>16</td>
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<td>22</td>
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<tr>
<td>Nuclear</td>
<td>14</td>
<td>Nr</td>
<td>Nr</td>
<td>13</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Ohio State College of Engineering 2006 2007 2008 2009 2010 2011

The National Research Council Rankings of Graduate Programs, which became available in 2010, are data driven, and report “rankings” derived from a variety of methods. Among these are the “Regression-based Ranking” and the “Survey-based Ranking.” Regression-based and survey-based ranking incorporated information obtained from a survey of faculty in each field. Faculty provided information on the relative importance of a variety of metrics that the NRC collected from all programs. This leads to the “Survey-based” rankings. Faculty were also asked to rate a sample of programs in their field. From these ratings, a regression model was constructed that related the data collected to ratings obtained. This leads to the “Regression-based” rankings. Statistical estimates of each program’s “rank” with respect to these methods are reported as ranges, obtained from empirical distributions developed analogous to 90% confidence intervals. Based on the 2008 data that were used in

<table>
<thead>
<tr>
<th>Regression-Based Ranking</th>
<th>Survey-Based Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>5th Percentile</td>
<td>95th Percentile</td>
</tr>
<tr>
<td>17</td>
<td>40</td>
</tr>
<tr>
<td>18</td>
<td>53</td>
</tr>
</tbody>
</table>

The data was useful, but complex, and as a result most departments were a bit bemused that the rankings were in the context of a range and that made explicit comparisons (i.e. 1-50) difficult to make.

Faculty Productivity

The following table, relating to faculty research and our PhD program, reinforces that our faculty are highly productive. Since 2006, we have averaged a graduation rate of 15.2 PhD students per year and a ratio of 0.87 Ph.D. degrees per faculty member. It is significant that in 2006, we were fifth in the nation in the graduation of chemical engineering doctoral students. Our research expenditures have been over 12M for the past four years. The research expenditures per faculty are near the highest in the nation.

<table>
<thead>
<tr>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
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<tbody>
<tr>
<td>Total Faculty</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>Publications</td>
<td>73</td>
<td>89</td>
<td>78</td>
<td>91</td>
</tr>
<tr>
<td>Publications per Faculty</td>
<td>4.29</td>
<td>5.23</td>
<td>4.58</td>
<td>5.06</td>
</tr>
<tr>
<td>Books or Book Chapters</td>
<td>18</td>
<td>11</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>Patents</td>
<td>9</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Total Grad Students</td>
<td>77</td>
<td>96</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>Grad Students/Faculty</td>
<td>4.53</td>
<td>5.65</td>
<td>5.58</td>
<td>5.58</td>
</tr>
<tr>
<td>Ph.D. Degrees Granted</td>
<td>21</td>
<td>11</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Ph.D. Degrees/Faculty</td>
<td>1.24</td>
<td>0.65</td>
<td>0.65</td>
<td>0.88</td>
</tr>
<tr>
<td>Research Expenditures*</td>
<td>9,032,000</td>
<td>12,249,000</td>
<td>12,462,000</td>
<td>13,332,000</td>
</tr>
<tr>
<td>Research Exp/Faculty</td>
<td>531,290</td>
<td>720,530</td>
<td>733,060</td>
<td>740,670</td>
</tr>
</tbody>
</table>

(Data from the Ohio State University Foundation (fiscal year))
Graduate Degrees Granted

Winter Quarter 2010

**Master of Science**
- Ning Han
- Congcong Lu
- Sharath Nirmal Kumar
- William Wang

**Advisors**
- Jessica Winter
- Shang-Tian Yang
- Kurt Koelling
- Liang-Shih Fan

**Doctor of Philosophy**
- Xiaoxia Jin
- Ning Liu
- Chi Yen
- Chaofang Yue

**Advisors**
- Jeffrey Chalmers
- Shang-Tian Yang
- Winston Ho
- Michael Paulaitis

Spring Quarter 2010

**Master of Science**
- Guo Chen
- Geoffrey Grubb
- Lee Siers
- Bin Zhu

**Advisors**
- Andre Palmer
- Bhavik Bakshi
- Jessica Winter
- L. James Lee

**Doctor of Philosophy**
- Claudia Berdugo
- Elizabeth Biddinger
- Geoffrey Grubb
- Orin Hemminger
- Brian Henslee
- Shwetha Ramkumar
- Manish Talreja
- Bo Yu

**Advisors**
- Jeffrey Chalmers
- Umit Ozkan
- Bhavik Bakshi
- L. James Lee
- L. James Lee
- Liang-Shih Fan
- Isamu Kusaka
- L. James Lee

Autumn Quarter 2010

**Master of Science**
- Hartawan Laksmono
- Siva Movva
- Barbara Wyslouzil
- L. James Lee

**Doctor of Philosophy**
- Kurtis Blohm
- Shreyas Rao
- Andrew Tong

Graduate Student Fellowships

**Fellowships**
- Elena Chung
- Jie Dong
- Mandar Kathe
- Darshan Mehta
- Elif Miskioglu
- Viraj Modak

**University Fellowships**
- Nicole Guzman: Won the Ohio Space Grand Consortium Fellowship for 2010-2011
- Shreyas Rao: Received a Pelotonia Graduate Fellowship
- Troy Vogel: Dow Chemical Graduate Student Fellowship

Research Expenditures

For the past three years, our research expenditures (data from the Ohio State Research Foundation) have been outstanding. On a per-capita basis, expenditures averaged over $700k per year during fiscal years 2006-2010. Our faculty are among the most productive at Ohio State and near the top of all Chemical Engineering departments in the nation.

The William G. Lowrie Department of Chemical and Biomolecular Engineering received special mention in the October 4th 2010 issue of Chemical and Engineering News. The article states, "For the second year in a row Ohio State took first place in terms of school spending on Chemical Engineering R & D." The years referred to are the latest available from the NSF statistics data base, 2007 and 2008. This is quite a remarkable accomplishment considering that the department had 17 faculty members during that period in comparison to many other departments with high research expenditures that had a substantially larger faculty size. It is expected that when the 2009 data is published this spring it will again show Ohio State Chemical Engineering at or near the top of this category.
### Graduate Program Seminar Series

#### Winter 2010

1/14  **Rashid Bashir**, Bliss Professor of Engineering, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign, "Interfacing Silicon and Biology at the Micro and Nanoscale"

1/21  **Safety Seminar**, Professor Umit Ozkan, Professor Jessica Winter

1/28  **Maciej Radosz**, Professor and Department Head, Soft Materials Laboratory, Department of Chemical and Petroleum Engineering, University of Wyoming, "Phase Behavior of Model Block Copolymers in Near Critical Solutions: Toward Self-Assembled Nanoparticles for Drug Delivery"

2/18  **James Liao**, Chancellor’s Professor, Department of Chemical and Biomolecular Engineering, University of California, Los Angeles, “Synthetic Metabolism for Fuels from CO2 and Sun Light”

2/25  **Dilip Asthagiri**, Assistant Professor, Department of Chemical and Biomolecular Engineering, Johns Hopkins University, “Multistate Models of Ion Hydration and Ion-Protein Interactions”

03/05  **Ying Liu**, Research Engineer, BP America, “Computational Fluid Dynamics: Modeling of Multiscale Chemical Reactors”

3/11  **Wilbur A. Lam**, Assistant Professor, Department of Pediatrics, Division of Pediatric Hematology/Oncology, University of California, San Francisco, Department of Bioengineering, University of California, Berkeley, “Nanomechanics of Blood Diseases and Thrombosis”

#### Spring 2010

4/1  **Jeffrey Miller**, Group Leader of Heterogeneous Catalysis, Argonne National Laboratory, “X-Ray Spectroscopy in Catalysis Research: Application to Au Catalysts”


5/6  **Dionisios G. Vlachos**, Elizabeth Inez Kelley Professor of Chemical Engineering, Department of Chemical Engineering and Center for Catalytic Science and Technology, University of Delaware, “The Role of Catalysis and Reaction Engineering in the Energy Arena”

5/13  **Rakesh Jain**, Lowrie Lecture I – 11:30 a.m. Jennings Hall, Room 155, 1735 Neil Avenue, Andrew Werk Cook Professor of Tumor Biology, Biological and Biomedical Sciences at Harvard Medical School, Director, Edwin L. Steele Laboratory for Tumor Biology, Department of Radiation Oncology, Massachusetts General Hospital, “Normalizing Tumor Vasculature to Treat Cancer: From Mathematical Model to Mouse to Man”

5/14  **Rakesh Jain**, Lowrie Lecture II – 10:30 a.m. Campbell Hall, Room 200, 1787 Neil Avenue, Andrew Werk Cook Professor of Tumor Biology, Biological and Biomedical Sciences at Harvard Medical School, Director, Edwin L. Steele Laboratory for Tumor Biology, Department of Radiation Oncology, Massachusetts General Hospital, “Transport Phenomena in Tumors: Integration of Engineering Principles with Molecular and Nano-Medicine”

5/20  **Paul Buchler**, U.S. Food and Drug Administration, Center for Biologics Research and Review’s laboratory of Biochemistry and Vascular Biology, “Hemoglobin Based Oxygen Carriers: Approaches to Attenuating The Adverse Consequences of Hemoglobin Exposure”

5/27  **James J. Watkins**, Professor of Polymer Science and Engineering, Director, NSF Center for Hierarchical Manufacturing, Co-Director, Mass NanoTech, Polymer Science and Engineering Department, “Self-assembled Polymer Templates for the Fabrication of...”

#### Summer 2010

7/20  **Y. (Ishi) Talmon**, Department of Chemical Engineering, Technion-Israel Institute of Technology, “Cryo-TEM: Update”

#### Autumn 2010

9/16  **David Gracias**, Associate Professor, Departments of Chemical and Biomolecular Engineering, Chemistry and the Institute for NanobioTechnology, The Johns Hopkins University, “Three Dimensional Self-Assembly at Small Size Scales”

9/30  **J. Zach Hilt**, Assistant Professor of Chemical Engineering, Co-Director, UK NSF REU Program on Bioactive Interfaces and Devices, Department of Chemical and Materials Engineering, “Nanocomposite Polymer Networks: From Controlled Synthesis to Applications in Medicine”
Graduate Student Awards

**Elizabeth Biddinger**: Selected to attend The Council for Chemical Research’s Leadership Workshop, which will be held at the CCR Annual Meeting in Atlanta in April 2010. This selection brings with it a travel scholarship as well.

**Adam Burley**: Best TA Award – Spring 2010 in the Department of Chemical and Biomolecular Engineering

**Guo Chen**: Outstanding Graduate Award for Academic Achievement, Lowrie Banquet

**Jacob Elmer**: Outstanding Graduate Award for Academic Achievement, Lowrie Banquet, Best TA Award – Spring 2010 in the Department of Chemical and Biomolecular Engineering

**Yongjia Fan**: Outstanding Graduate Award for Academic Achievement, Lowrie Banquet

**Presbrit Gawade**: Best Poster Award at the Annual Spring Symposium of the Tri-State Catalysis Meeting; Outstanding Graduate Award for Academic Achievement, Lowrie Banquet

**Daniel Heath**: Outstanding Graduate Award for Academic Achievement, Lowrie Banquet

**Nandita Lakshminarayanan**: Won 3rd place at the 2010 Fuel Cell Symposium

**Kelley Mullick**: Won a travel award from the American Association of Aerosol Research.

**Kartik Ramasubramanian**: Winner of the 2010 Elias Klein Founders’ Travel Award from the North American Membrane Society

**Shreyas Rao**: Won Best Student Poster Award at the 2010 OSU Materials Week Conference

**Haifeng Shi**: Outstanding Graduate Award for Academic Achievement, Lowrie Banquet

**Shweta Singh**: Best Paper and Best Poster Award at the Institute of Electrical and Electronics Engineers (IEEE) International Symposium on Sustainable Systems and Technology (ISSST)

**Manish Talreja**: Outstanding Graduate Award for Academic Achievement, Lowrie Banquet

**Michael Vilt**: Outstanding Graduate Award for Academic Achievement, Lowrie Banquet

**Troy Vogel**: Best TA Award – Winter 2010 in the Department of Chemical and Biomolecular Engineering

**Dieter von Deak**: Best TA Award – Winter 2010 in the Department of Chemical and Biomolecular Engineering; Won 1st place at the 2010 Fuel Cell Symposium, Received the AIChE Catalysis and Reaction Engineering (CRE) Division Travel Award

**Fei Wang**: Studentship Award, 6th World Congress on Industrial Process Tomography – Beijing, China; NSF Young Researcher Travel Award, 21st International Symposium on Chemical Reaction Engineering; Outstanding Graduate Award for Academic Achievement, Lowrie Banquet; NSF Student Travel Award, Fluidization XIII, Gyeong-ju, Korea

**Yipin Zhou**: Outstanding Graduate Award for Academic Achievement, Lowrie Banquet

**Bo Yu**: AIC Outstanding Graduate Student Award

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**10/7 Michael Janik, Assistant Professor of Chemical Engineering, Penn State University, “First Principles Evaluation and Design of Hydrocarbon Oxidation and Fuel Cell Catalysts”**

**10/14 Scott Banta, Associate Professor, Department of Chemical Engineering, Columbia University, “Protein Engineering for Biosensors and Biofuel Cells”**

**10/21 Fengwu Bai, Professor of Biochemical Engineering, School of Life Science and Biotechnology, Dalian University of Technology, “Self-Immobilized Cells: Concept, Research Progress and Industrial Application”**

**10/28 Kristy Ainslie, Principal Investigator, Ainslie Laboratory, Assistant Professor of Pharmaceutics, College of Pharmacy, “Novel Polymeric Carriers for Immune Modulation and Drug Delivery”**

**11/4 Graduate Research Initiative Program (GRIP) SEMINAR:**

**Dieter von Deak, “The Role of Phosphorus in Nitrogen-Doped Graphite Oxygen Reduction Catalysts in PEM Fuel Cells”**

**Kartik Ramasubramanian, “Modeling CO2-Selective Membrane Processes for Hydrogen Purification”**

**Yanan Zhao, “CO2-Selective Facilitated Transport Membranes Containing Sterically Hindered Amines for Hydrogen Purification for Fuel Cells”**

**11/18 Helena Hagelin-Weaver, Research Professor, Department of Chemical Engineering, University of Florida, “Catalysts Supported on Nanoparticle Oxides – Advantages in Methanol Reforming and Other Reactions”**
1936 - Joseph G. Mravec
1939 - Carl D. Fischer
      Dillard W. Kuhlman
1940 - Charles Boardman III, Loren F
      Grandey, E. H. Strobel
1941 - Earl G. Anderson, David Thomas,
      Thomas F. Lavery
1942 - Donald Smith Arnold
1943 - Halvor S. Christianson, Dalton F.
      Drake, Richard Marvin Garrett, James
      R. Randall, Roy E. Schneider, Carlyle E.
      Shoemaker, James C. Wynd,
1944 - Wallace L. Bostwick, Clarence A.
      Haverly, Jr., Edward W. Powell
1946 - Kenneth A. Brandstetter
1947 - William K. Fell, Thurman L. Graves,
      Robert H. Hill, Lewis C. Hullinger, Robert M.
      Kell, John M. Kolbas, Herbert G. Krane, John
      B. Martin, Bryce H. McMullin, Donald F.
      Stauffer
1948 - Richard A. Arnold, Paul E. Bates,
      John A. Burgbacher, William J. Buschman Jr.,
      Franklin M. Ernest, Lee B. Fosdick, Earl W.
      Goodman, Dick F. Hoffman, Robert E. Kraus,
      Manuel Ramos, R. Ted Scharenberg, George R.
      Secrist, Robert M. Tarr
1949 - Donald S. Arnold, Paul E. Bates,
      Gordon G. Cross, Bruce E. Hill, T. M. Jenney,
      J. Howard Kerstetter Jr., Bryce H. McMullen,
      Donald R. Roberts, Glen D. Schaaf, Roland I.
      Spencer
1950 - Walter E. Donham, Walter T. George,
      Verne R. Rinehart, Jean M. Scharenberg, Rich-
      ard L. Scott, Ralph E. Sieber, Harold L. Stelzer
      Jr., Alfred E. Withrow
1951 - Norman Bartrug, Charles L. Dornbusch,
      Richard N. Eilerman, John S. Koegle, John R.
      Parkinson, Norbert F. Reinert, Verne R. Rine-
      hart, David B. Speed, David A. Strang, Robert
      B. Weiser, Robert M. Yarrington
1952 - James F. Froning, Donald E. Haupt,
      Richard F. Hazelton, C. Richard Heil, Charles J.
      Schmitz, Lawrence R. Steele, David G. Stephan
1953 - Robert A. Bates, G. Clyde Bazell, Roger
      L. Briggs, Donald E. Findlay, Wilfred C. Ling,
      Manoj Kumar D. Sanghvi, Harold L. Stelzer Jr.,
      James L. Wilson
1954 - Gilbert E. Raines
1955 - John R. Blunden, Wendell B.
      Hammond Jr., Phillip J. McAteer
1956 - Robert A. Cody, William D. Coe,
      Herbert H. Fanning, Lloyd G. Jones, Robert M.
      Yarrington
1957 - Walter R. Andrews, Jr., A. Leo Carter
      Walter A. Flack, Jon D. Helms, Sung Ho Hong,
      Edward H. Bollinger, John J. Connelly,
      James R. Facer, Werner S. Lichtenstein,
      Thomas R. Loy, Frank J. Nagy, Valdis E.
      Petritis, Richard M. Smith, James W. Stark,
      Lawrence R. Steele
1958 - Edward H. Bollinger, John J. Connelly,
      James R. Facer, Werner S. Lichtenstein,
      Thomas R. Loy, Frank J. Nagy, Valdis E.
      Petritis, Richard M. Smith, James W. Stark,
      Lawrence R. Steele
1959 - Lee W. Addie, James O. Albery,
      James R. Godwin, Ronald M. Kovach, James
      H. Laughlin, Tim Laughlin, Darryl J. Von
      Lehmden, Gerald A. Wilcox
1960 - Virgil L. Anderson, Carl Brooks, Jr.,
      Gav A. Crossley, Edgar W. Fasig, Jr., Donal
      t T. Grube, Orville W. Gruebmeyer, Jr., George
      M. Hauswirth, Gordon R. Howard, Warren
      E. McAdams, Phillip J. McAteer, Irwin
      Weinstock, Russell L. Wilt
1961 - Paul R. Bigley, Richard B. Cooper,
      Ronald L. Follmer, Theodore J. Hanson,
      Ronald D. Harris, David E. Hazlebeck,
      David A. Parker, John N. Rapach, Larry E.
      Woodworth
1962 - David E. Bidstrup, James C. Opatrny,
      C. David Osburn, Dean Snider, Michael J.
      Sorocek, Michael D. Winfield
1963 - Nelson W. Barnhill, Gary L. Beeler,
      Myers G. Hammond, Robert P. Kasper, Fred A.
      Shaffstall, Kay L. Snider
1964 - Michael B. Cutlip, William R. Ferris,
      Alan K. Kochsiek, James L. Wilson
1965 - Oliver L. Davies, Frederick H. Flor, Jr.,
      John P. Gegner, Arthur H. Morth, Frederick
      J. Rerko, Michael C. Roey, Paul H. Schmitz,
      William A. Smith, Fred A. Shaffstall, Gary L.
      Street, Eugene N. Wheeler
1966 - James G. Arnold, William F. Deehake,
      Thomas E. Fitz, Sr., William G. Lowrie, John
      W. Mitchell
1967 - John W. Bradshaw, C. Douglas Dunlap,
      Keith A. Dunnigan, F. William Hauschildt Jr.,
      Dennis W. Hurley, Wilma Dishman Jancuk,
      Graham F. Painter, Jr., John M. Yacher
1968 - Ronald R. Remick, John M. Salladay,
      Doug Smith
1969 - James F. Dietz, Smith E. Howland,
      Robert D. Litt, Geoffrey A. Prentice, M.
      Anandha Rao, John W. Touissant
1970 - Paul Chunghoon Ahn, Bradford
      F. Dunn, David R. Grove, Charles A.
      Klingensmith, David M. Muller, Richard B.
      Strait, Rosa Uy
1971 - Juliet Davison Balmer, Dale A.
      Draudt, Karen Lafferty Hendricks, Kerry
      G. Hertenstein, Jeffrey L. Kosch, William
      E. Pritchard, Harry L. Stebbins, Armen
      Tergevorkian, Stephen Zakanycz
1972 - Ron Ransom, Yoon Soo Song, John A.
      Thomas
1973 - John C. Bost, Thomas E. Claugus,
      David A. Dargan, Thomas E. Spriggs
1974 - Steven M. Brown, Mark E. Forry, John
      E. Myers, George L. Ott, Michael A. Patterson,
      John T. Erikson, Stephen L. Grant,
1975 - John T. Erikson, Stephen L. Grant,

1976 - James M. Delabar, Darlene H.
      McCalmont
1977 - Robert J. Arnold, Douglas J.
      Hallenburg, Thomas M. Jones, Linnea A.
      Sheppard, Kenneth A. Yunker
1978 - Douglas T. Brown, Daniel M. Coombs,
      Janet L. Inkrott, Rad V. Scott III, Neil P.Stuber, Paul W. Vance Jr., Brian K. Weider, Thomas E.
      Winkler
1979 - Kevin R. Cole, Darice Ann Davis,
      Karen T. Murphy, Randy W. Schumaker, David
      J. Wasela, Michael W. Weber, Tad K. Williams
1980 - Frederick T. Clark, Matthew J. Galosi,
      Mark A. George, Gary R. Prok, Daniel R.
      Schwaegerle, Timothy L. Strickler, David G.
      Vutetakis
Faculty

Aravind Asthagiri

Refereed Papers


Current Projects and Grants
$354,300 Asthagiri, Aravind (50%) 2009-2011 Tailoring enantiospecific properties of chiral metal nanoclusters on chiral metal oxides, National Science Foundation.

$769,119 Asthagiri, Aravind (50%) 2009-2014 Computational catalysis and atomic-level synthesis of materials: building effective catalysts from first-principles, DOE-EFRC (LSU)

$600,000 Asthagiri, Aravind (25%) 2009-2012 Growth and reactivity of oxide phases on crystalline Pd and Pt surfaces, DOE-BES.

Bhavik Bakshi

Awards and Honors
Best paper award, first place at the IEEE International Symposium on Sustainable Systems and Technology, Washington, DC, 2010, with Shweta Singh

Refereed Papers


Lang, L., P. K. Goel and B. R. Bakshi, “Prior Checking and Moving Horizon Smoothing for Improved Particle Filtering,” Industrial and Engineering Chemistry Research, 49, 9, 4197-4209, 2010


Current Projects and Grants
$70,881 Bakshi, Bhavik R. 2009-2010 CANPBD: Evaluating the environmental impacts of nano-manufacturing via thermodynamic and life cycle analysis, subcontract from Nano Science and Engineering Center grant from National Science Foundation


$175,000 Bakshi, Bhavik R. 2005-2010 Matching funds from OSU Transportation Research Endowment Program (TREP)

$12,000 Bakshi, Bhavik R. 2006-2011 Supplementary funds from NSF Research Experience for Undergraduate Program.

$375,000 Bakshi, Bhavik R. 2006-2010 Evaluating the Impacts of Nanomanufacturing via Thermodynamic and Life Cycle Analysis, (co-PI: Prof. L. James Lee), Environmental Protection Agency

$200,000 Fiksel, Joseph, Resilient Enterprise Consortium, Center for Resilience (co-PI: Bhavik R. Bakshi)

$300,000 Bakshi, Bhavik R. 2009-2011 (co-PI William J. Mitsch) Toward Integration of Industrial Ecology and Ecological Engineering, NationalScience Foundation


$100,000 Bakshi, Bhavik R. 2008-2011 Comparative Study of Thermodynamics Based Life Cycle Assessment of Nano-Materials with Conventional Technologies,

Robert S. Brodkey
Professor Emeritus, Ph.D., University of Wisconsin, 1952. Validation of computational fluid dynamic codes with experimental measurements that involves full field, time-resolved, velocity vector measurements.
Jeffrey Chalmers

Professor, Ph.D., Cornell, 1988.
Bioengineering

Books and Book Chapters

Refereed Papers

Hu, W., Gladue, R., Hansen, J., Wojnar, C., Chalmers, J.J. Scale-up of algae culture can be limited due to high oxygen demand: It was not shear sensitivity this time! Biotechnol. Progress. 26(1):79-87. 2010.


Current Projects and Grants
$50,000 Chalmers, Jeffrey 2009-2010
Characterization of Millipore Disposable bioreactor Millipore Corporation, Phase II

$728,154 Chalmers, Jeffrey 2010-2012
Large-scale human placenta progenitor cell-derived erythrocyte production – continuous red blood cell production. Celgene Corp./DARPA, Phase II

$676,657 Moldovan, Cooper P.I. (Chalmers, Co-I).2009-2011
Characterization of Millipore Disposable reactor Millipore Corporation, Phase II

$716,118 Zborowski, M., P.I; Chalmers, P.I. of subcontract 2008-2011, Magnetic Cell Sorting and Analysis, National Cancer Institute

$3,500,000 Advanced Biomedical Devices for Disease 7/1/06-12/31/10, Diagnosis and Therapy, State of Ohio Third Frontier Commission

$1,086,000 S.L. Cooper, N. Moldovan (Co-P.I.s) 2009-2011
“Cell Trap: A Novel Solid Phase Platform for Analysis of Stem/Progenitor Cells,” NIH


*Jeffrey Chalmers*

Liang-Shih Fan

University Distinguished Professor and C. John Easton Professor, Fluidization and Multiphase Flow, Particle Technology, Energy and Environmental Engineering, and Tomography.

Awards and Honors
Texas Distinguished Faculty Lectureship in Chemical Engineering, University of Texas, Austin (2010).

Appointed Honorary Professor of Tsinghua University, P.R. China (2010).

Plenary Lecturer of the following international conferences:
• 1st International Conference on Chemical Looping, Lyon, France, March 17 – 19, 2010.
• 13th Asian Pacific Confederation of Chemical Engineering Congress (APChE 2010), October 5-8, 2010.

Books and Book Chapters

Refereed Papers


Current Projects and Grants
$2,860,143 Fan, Liang-Shih 2009-2012 Coal-Direct Chemical Looping Retrofit to Pulverized Coal Power Plants for In-Situ CO2 Capture, Department of Energy (DOE).


$160,000 Fan, Liang-Shih 2010-2012 Coal Feeder Development for the Coal-Direct Chemical Looping Process, Ohio Coal Development Office (OCDO).

$160,000 Fan, Liang-Shih 2010-2012 Quantum Calculation to Predict Oxygen Migration Pathway, Ohio Coal Development Office (OCDO).

$160,000 Fan, Liang-Shih 2008-2010 Hydrogen Production from Syngas using Novel Metal Oxide Composite Particles, Ohio Coal Development Office (OCDO).


$309,474 Fan, Liang-Shih 2008-2011 Carbon Negative Chemical Looping Process for Hydrogen or Liquid Fuel Synthesis using Refuse Derived Fuel, Biomass and/or Ohio Coal, Ohio Department of Development (ODOD)

$160,000 Zakin, Jacques (PI) and Fan, Liang-Shih (Co-PI) 2009-2011, Enhanced Coal to Liquid Technology using the Calcium Looping Process, Ohio Coal Development Office (OCDO).
$160,000  Fan, Liang-Shih  2010-2012  

$466,587  Fan, Liang-Shih  2010-2011  

$1,247,052  Fan, Liang-Shih  2007-2011  
High Purity Hydrogen Production with in-situ CO2 and Sulfur Capture in a Single Stage Reactor, Department of Energy (DOE).

$202,444  Fan, Liang-Shih, Wang, Jin  2010-2013  

$47,694  Fan, Liang-Shih, Lee, James  2009-2010  
CANPBD II: Multiscale Simulation of Complex Flows in Micro/Nano-fluidic Devices, National Science Foundation (NSF).

**Martin Feinberg**

Morrow Professor, Ph.D., Princeton University, 1968, Complex Chemical Systems

**Refereed Papers**


**W.S. Winston Ho**


**Awards & Honors**

Lumley Research Award, College of Engineering, The Ohio State University, 2010.

Invited Commencement Speech, Department of Chemical Engineering, National Taiwan University, Taipei, Taiwan, June 5, 2010.


**Books and Book Chapters**


**Current Projects and Grants**

$150,000  Ho, W.S. Winston  08/01/2006-07/31/2010  
National Science Foundation, Carbon Dioxide-Selective Membranes

$12,000  Ho, W.S. Winston  06/15/2008-07/31/2010  
National Science Foundation, REU Supplement for Current Grant NSF CBET-0625758, Carbon Dioxide-Selective Membranes

$306,000  Ho, W.S. Winston  02/12/2008-05/31/2010  
Office of Naval Research, Advanced Membranes for Reformate Hydrogen Sulfide Clean-up

$306,000  Ho, W.S. Winston  02/29/2008-06/30/2010  
Office of Naval Research, CO Conversion and Clean-up via CO2-Selective Membrane with Water-Gas-Shift Reaction

$205,558  Ho, W.S. Winston  09/01/2009-08/31/2011  
National Science Foundation, Liquid Membranes in Nanopores with Strip Dispersion for Antibiotic Recovery

$59,914  Ho, W.S. Winston  08/20/2009-07/15/2010  
Office of Naval Research /DJW Technology, LLC, Advanced Hydrogen Reformate Stream Purifier for Fuel Cell Applications

$48,874  Ho, W.S. Winston  02/01/2007-12/31/2010  
Ohio State University Residual Funds, Polymer Membranes
$233,268  Ho, W.S. Winston  09/01/2004-08/31/2010 National Science Foundation, Center for Affordable Nanoengineering of Polymer Biomedical Devices, NSEC. Project sponsoring 1 Ph.D. Student, with L. James Lee (PI)

$124,000  Ho, W.S. Winston  01/01/2010-12/31/2011 Office of Naval Research, Fouling-Resistant High-Flux Water Desalination Membranes

$300,000  Ho, W.S. Winston  08/01/2010-07/31/2013 National Science Foundation, Advanced CO2- and H2S-Selective Membranes

Kurt Koelling
Professor, Ph.D., Princeton University 1993. Polymer Rheology and Processing, Polymer Nanocomposites, Multi-phase flows, Micro/Nanofluidics.

Refereed Papers


Current Projects and Grants
$400,000 Tomasko, David, Koelling, Kurt, Kusaka, I., Lee, L.J. 2006-2010 Scalable Nanomanufacturing of High Performance Nano-composite Foams, National Science Foundation.

$50,000 Koelling, Kurt, Vodovozt, Yael  2007-2010 Processing of Bipolymer Films, Institute for Materials Research

$39,800 Koelling, Kurt, Vodovozt, Yael  2008-2010 Biobased Polymer Film, I/UCRC Center for Advanced Packaging and Processing Studies

$50,000 Koelling, Kurt  2007-2010 Extensional flow induced orientation and rheology of polymer/carbon nanotube composites, Toray Industries

$100,000 Koelling, Kurt, Tomasko, David  2007-2010 Nanocomposite Foams, Nanomaterial Innovation Ltd.

$131,179 Koelling, Kurt, Lee, L.J., Yang, S.T.  2006-2010 STTR Phase II: Microfluidic cd biochips for enzyme-linked immunosorbent assays, National Science Foundation

$118,348 Koelling, Kurt  2008-2010 Properties of Carbon Nanotube Fibers and Bucky Papers, Battelle Memorial Institute

Isamu Kusaka
Associate Professor, Ph.D., Caltech 1998. Thermodynamics, Statistical mechanics

Refereed Papers


$8,000,000 Lee, L. James (PI) 2007-2011
Commercialization of High-Performance Nano-Tailored Structural Composites for Energy and Survivability Applications, Ohio Department of Development

Umit Ozkan
Professor, Ph.D., Iowa State University, 1984. Catalysis and catalytic materials

Awards and Honors
Received Iowa State University Presidential Achievement Citation in Engineering Award (2010)

Elected a Fellow of the American Institute of Chemical Engineers (AIChE) (2010)

Elected a Fellow of the American Association for the Advancement of Science (AAAS) (2010)

John van Geuns Lectureship Award at the Van’t Hoff Institute for Molecular Sciences at the University of Amsterdam (2010)

Refereed Papers


Current Projects and Grants

$1,145,624 Ozkan, U.S. 2005-2010
Investigation of reaction networks and active sites in bio-ethanol steam reforming over Co-based catalysts, U.S. Department of Energy

$480,000 Ozkan, U.S. 2007-2010
Investigation of the nature of active sites on heteroatom-containing carbon nano-structures for oxygen reduction reaction, US Department of Energy-Basic Energy Sciences

$160,000 Ozkan, U.S. 2008-2010
Novel cathode electrocatalysts for reduced temperature coal gas-fed SOFC systems, Ohio Coal Development Office

$160,000 Ozkan, U.S. 2008-2010
Sulfur and coke resistant novel anode catalysts in reduced temperature coal gas-fed SOFC systems, Ohio Coal Development Office

$162,057 Ozkan, U.S. 2009-2011
Internal Steam Reforming of Natural Gas for SOFC, Rolls-Royce/Ohio Department of Development
$285,000  Ozkan, U.S.  2009-2011
Natural Gas Engine After-treatment, Caterpillar, Inc.

$30,000  Ozkan, U.S.  2010-2011
Dual NOx/NH3 Sensors for Diesel After-treatment Systems
NSF/NexTech Materials

$510,000  Ozkan, U.S.  2010-2013
Investigation of the nature of active sites on heteroatom-containing carbon nano-structures for oxygen reduction reaction,  US Department of Energy-Basic Energy Sciences

$80,000  Ozkan, U.S.  2010-2011
Novel cathode electrocatalysts for reduced temperature coal gas-fed SOFC systems, Ohio Coal Development Office

$160,000  Ozkan, U.S.  2010-2012
Coal-based SOFC, Ohio Coal Development Office

André Palmer

Associate Professor, Ph.D., The Johns Hopkins University, 1998. Bioengineering & Hemoglobin-Based Oxygen Carriers

Awards and Honors
OSU College of Engineering Lumley Research Award (2010)

NOBCCChE Annual Midwest Regional Conference Keynote Speaker (2010)

Distinguished Mechanical Engineer Lecturer (2010)
Department of Mechanical Engineering, Stanford University, CA

Refereed Papers


N. Zhang and  A. F. Palmer, “Polymerization of human hemoglobin using the cross-linker 1,11-bis(maleimido)triethylene glycol for use as an oxygen carrier,” 26:1481-5 Biotechnology Progress (2010)

Current Projects and Grants
$1,875,000  A.F. Palmer (PI)  2006-2011
Mechanically stable blood substitutes, National Institutes of Health

$598,500  A.F. Palmer (PI)  2006-2010
Enhanced O2 delivery to C3A hepatocytes, National Institutes of Health

$265,416  A.F. Palmer (PI)  2009-2011
(ARRA) Mechanically stable blood substitutes, National Institutes of Health

$530,548  A.F. Palmer (PI), John Lannutti (Co-PI), Dave Far son (Co-PI) and Mariano Viapiano (Co-PI)  2010-2013
Nanofiber-based sensors for oxygen determination in model glioblastomas, National Science Foundation

Michael Paulaitis

Professor and Ohio Eminent Scholar, Ph.D., University of Illinois, 1976. Molecular Thermodynamics, Role of Hydration in Biological Organization, Self-Assembly and Molecular Recognition, Multi-scale Modeling of Biological Interactions.

Refereed Papers


Current Projects and Grants

$587,256  M.E. Paulaitis  2005-2010
Collaborative Research: The Thermodynamics of Protein Separations, National Science Foundation

$440,148  M.E. Paulaitis  2007-2010
Profilng of Influenza-Specific Immune Responses in the Elderly, NIH NIAID

$36,000  M.E. Paulaitis  2008-2010
Electrochemical impedance spectroscopy of tethered bilayer membranes, National Institute of Standards and Technology

James Rathman
Professor, Ph.D., University of Oklahoma 1987. Chemical informatics, interfacial phenomena, molecular self-assembly

Current Projects and Grants

$12,500  Rathman, James  Oct 2010 – Feb 2011
Cell Membrane Interactions with Small Molecules, L’Oreal Foundation

David Tomasko
Professor, Ph.D., Univ. of Illinois Urbana-Champaign, 1992. Molecular Thermodynamics, Supercritical Fluid Processing, Polymer Processing, Engineering Education

Current Projects and Grants

$2,500,000  Tomasko, David (PI)  2008-2013
Ohio’s Sustainable Science and Engineering Talent Expansion Program (OSTEP) – Bridges to Success

$400,000  Tomasko, David (PI)  2006-2010
Scalable Nanomanufacturing of High Performance Polymer Foams, National Science Foundation; Co-PIs: I. Kusaka, L.J. Lee, K.W. Koelling

$1,982,000  Tomasko, David (Co-PI)  2004-2010
Track 2, GK-12, Optimization and Institutionalization of the Science Fellows Supporting Teachers (SFST) Program, National Science Foundation; PI: S. Olesik, Co-PIs: G. McKenzie, K. Irving

$12,000,000  Tomasko, David (Co-PI)  2009-2014
Center for Affordable Nanoengineering of Polymeric Biomedical Devices, National Science Foundation; PI: L.J. Lee, Co-PIs: A.T. Conlisk, J.J. Chalmers, R. Lee

$100,000  Tomasko, David (PI)  2008-2010
Development of Melt Extrusion Processes for Pharmaceutical Applications Using Chemical Engineering Perspectives, Hoffmann-La Roche

Jessica Winter
H.C. “Slip” Slider Assistant Professor, Ph.D., University of Texas at Austin, 2004. Bionanotechnology, Neural Biomimetics, Drug Delivery, Neural Prostheses

Refereed Papers


Current Projects and Grants

$1.7M ($579,527)  Winter, J.O., Kner, P., Brainerd, B., Yang, G., Alpert, C.L.  2010-2013
QSTORM: Activatable Quantum Dots for Super-Resolution, In Vivo Imaging, National Science Foundation.

MRI: Acquisition of High Field Physical Properties Measurement System with Cryogenic AFM/MFM, National Science Foundation.

Fluorescent-Magnetic Nanomanipulators for Cytoskeletal Mechanical Investigations, National Science Foundation

$44,604  Winter, J.O.  2009-2011
Magnetic- Fluorescent Nanoparticles for Cellular and Molecular Separations, National Science Foundation (OSU NSEC)

$28,600  Winter, J.O.  2010-2011
Brain Mimetic Materials, Women in Philanthropy (OSU)

Services  Winter, J.O., Bachand, G.  2010
Fluorescent-Magnetic Nanocomposites: A New Tool for Manipulating the Cytoskeleton, Department of Energy (Sandia National Labs)

CellTrap: A novel solid phase platform for analysis of stem/progenitor cells, National Institutes of Health

$2,000 Winter, J.O., Ruan, G., Wyslouzil, B. 2011

Micelle-Mediated Self-assembly of Multi-functional Hybrid Nanoparticles, Institute for Materials Research (OSU)

David Wood

Associate Professor, Ph.D., R.P.I. 2000. Protein Engineering, Bioseparations, Biosensing, Biopharmaceutical Processing

Books and Book Chapters


Refereed Papers


Current Projects and Grants

$250,000 Wood, David 2008-2011

Bacterial Biosensors for Identification of Endocrine Disruptors Associated with Autism Spectrum Disorder, Nancy Lurie Marks Family Foundation

Christina and Jeffrey Lurie Family Foundation

$275,000 Wood, David 2008-2011

Bacterial Biosensors for Endocrine Disrupting Compounds, National Institute of Environmental Health Sciences.

$273,404 Wood, David 2008-2011

Micelle-Mediated Self-assembly of Multi-functional Hybrid Nanoparticles, Institute for Materials Research (OSU)

Barbara Wyslouzil

Professor, Ph.D., Caltech, 1992. Aerosol Science, Nucleation, Nanoparticle Growth and Structure, Biomedical Applications of Aerosols

Refereed Papers


GOALI: Collaborative Research: Fundamental studies of water-hydrocarbon condensation, National Science Foundation

Current Projects and Grants

$90,000 Wyslouzil, Barbara E., 2007-2010

Multicomponent droplet growth in supersonic natural gas separators, Petroleum Research Fund

$519,000 Wyslouzil, Barbara E., 2005-2010

The formation rates and structure of nanodroplets, National Science Foundation

$450,000 Wyslouzil, Barbara E., 2009-2012

Nanodroplet aerosols: Nucleation rates and structure, National Science Foundation

$45,479 Wyslouzil, Barbara E., 2009-2010

Multifunctional nanoparticles: Formation and fundamental studies, National Science Foundation

$213,178 Wyslouzil, Barbara E., 2010-2013

GOALI: Collaborative Research: Fundamental studies of water-hydrocarbon condensation, National Science Foundation
Shang-Tian Yang

Professor, Ph.D., Purdue Univ. 1984. Bioprocess engineering, biochemical engineering, metabolic engineering, tissue engineering; biofuels and bio-based chemicals; high throughput screening for drug discovery and bioprocess optimization; stem cell engineering

Books and Book Chapters


Refereed Papers


Current Projects and Grants
$ 90,000 Yang, Shang-Tian 2007-2010 Production of Organic Acids and Esters from Plant Biomass by Extractive Fermentation and Enzymatic Esterification, The Consortium for Plant Biotechnology Research, Inc. (DOE)

$300,000 Yang, Shang-Tian 2007-2010 Production of butanol from sugar wastes in a fibrous bed bioreactor, EnerGenetics International, Inc.

$108,000 Yang, Shang-Tian 2007-2010 An Integrated Fermentation-Ultrafiltration Process for the Production of Xanthan Gum from Whey Lactose, Bioprocessing Innovative Company, Inc., USDA SBIR Phase II

$185,500 Yang, Shang-Tian 2008-2010 Metabolic engineering of C. tyrobutyricum and C. acetobutylicum for butanol and hydrogen production, Nagarjuna (India)

$1,000,000 Yang, Shang-Tian 2008-2011 Engineering Clostridia for economic production of biobutanol as a biofuel , Ohio Department of Development Third Frontier Advanced Energy Program

$277,144 Yang, Shang-Tian 2009-2011 Production of fumaric acid and ethanol from soybean meal, United Soybean Board

$217,117 Yang, Shang-Tian 2010-2012 Engineering Clostridia for economic production of biobutanol production, National Science Foundation, STTR Phase II, Bioprocessing Innovative Company, Inc.,

$110,000 Yang, Shang-Tian 2009-2011 Production of fumaric acid and ethanol from soybean meal, United Soybean Board

$250,000 Yang, Shang-Tian 2010-2012 Engineering clostritrial fermentation for biobutanol production, National Science Foundation, STTR Phase II, Bioprocessing Innovative Company, Inc.,

$3,977,349 Tabita, F. Robert; Yang, Shang-Tian 2010-2013 Carbon Dioxide to Biofuels by Facultatively Autotrophic Hydrogen Bacteria, Department of Energy – ARPA-E

$1,063,605 Yang, Shang-Tian 2010-2013 Production of Propionic Acid and Propanol from Biomass, Dow Chemical

Jacques Zakin

Books and Book Chapters

Refereed Papers


Current Projects and Grants

$4,982 REU Supplement 9/1/2010-8/31/2011

Professors
Bhavik Bakshi
Jeffrey Chalmers
Stuart Cooper
Liang-Shih Fan
Martin Feinberg
Winston Ho
Kurt Koelling
L. James Lee
Umit Ozkan
Michael Paulaitis
James Rathman
David Tomasko
Barbara Wyslouzil
Shang-Tian Yang

Associate Professors
Aravind Asthagiri
Isamu Kusaka
Andre Palmer
David Wood

Assistant Professor
Jessica Winter

Instructor
Carlo Scaccia

Post Doctoral Researchers
Iraj Ghazi
Ning Han
Daniel Heath
Jingjing Li
Rustin Matthew
Shenkman
Jianxin Sun
Dawei Wang
Fei Wang
Chuang Xue
Jingbo Zhao

Post Doctoral Researcher
Post Doctoral Researcher
Post Doctoral Researcher
Post Doctoral Researcher
Post Doctoral Researcher
Post Doctoral Researcher
Post Doctoral Researcher
Post Doctoral Researcher
Post Doctoral Researcher

Research Scientists
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Gang Ruan

Research Associates
Burcu Bayram
Fanxing Li
Qussai Mohammad
Marashdeh
Bureu Mirkelamoglu
William Kane Wang
Zhao Yu
Yang Zhao

Emeritus Professors
Robert S. Brodkey
Harry C. Hershey
Thomas L. Sweeney
Jacques L. Zakin

Instructor
Carlo Scaccia

Research Scientists
Richard Lease
Gang Ruan

Research Associates
Burcu Bayram
Fanxing Li
Qussai Mohammad
Marashdeh
Bureu Mirkelamoglu
William Kane Wang
Zhao Yu
Yang Zhao

Visiting Scholars
Wei-Lun Chang
Ding Li

Visiting Scholar
Visiting Scholar

Administrative Staff
Graduate Program Coordinator
Building Coordinator
Human Resources Manager
Systems Specialist
Academic Advising Coordinator
Design Engineer
Fiscal Manager
Laboratory Supervisor
Director of Information Technology
Senior Support Engineer
Communications Coordinator
Administrative Fiscal/HR
Administrator (NSEC)
Undergraduate Academic Advisor
Director of Development
Fiscal Associate
A Tradition of Excellence.