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 data base.

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 was elected to the National Academy of Engineering. 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
# Table of Contents

## Letter from the Chair

## News

2. Koffolt Laboratories
4. Koffolt Laboratories National Campaign Committee
6. Interdisciplinary Research
8. Stuart Cooper Elected to NAE
8. Umit Ozkan Named 2010 Outstanding Woman in Technology
8. David Tomasko Gives Autumn Commencement Speech
9. Distinguished Alumnus Award
9. Jason Haskins-CBE's New Director of Development
10. Bakshi to Lead Sustainability Efforts in India
10. Winter Awarded NSF Grant
10. Pelotonia Fellowships
11. Fan Publishes Chemical Looping Book
11. Ozkan Receives Multiple Honors
12. CBE Students-Improving Communities, Improving Lives
13. Wood’s Biosensors Research

## Undergraduate Program

14. Course Enrollment
15. Cooperative Learning Experiences
16. 2009 Placement Record
19. Department Graphs
20. Undergraduate Scholarship Information

## Graduate Program

22. Ranking
22. Faculty Productivity
23. Graduate Degrees Granted
23. Graduate Student Fellowships
23. Research Expenditures
24. Graduate Program Seminar Series
25. Graduate Student Awards

## 2010 Alumni Donors

28. Faculty

## CBE Faculty and Staff

37. William G. Lowrie Department of Chemical and Biomolecular Engineering
125 Koffolt Laboratories, 140 West 19th Ave., Columbus, OH 43210

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Fax: 614-292-3769

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Koffolt Laboratories

The space plan for the new building is now complete. We will have more than 12,000 square feet devoted to undergraduate laboratories, design space and classrooms. The academic space is double what we have in our current building. 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 will offer a unique centralized research facility for chemical/materials synthesis and characterization, cell and tissue culture, and biological processing and characterization. The facility will be 225,000 gross square feet of which CBE will occupy 60%. 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.*
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.

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
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 Jas C. Lang, PhD, Elisabeth White, Amit Agrawal, MD, Enver Ozer, MD, David E. Schuller, MD, and Ted N. Teknos, MD, of the Department 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.

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 here at OSU and Nationwide Children’s Hospital. “In the future, along with continued follow-up of these patients, we want to further characterize these cells and determine if this technology can be used for early detection of cancer recurrence. This could help us individualize treatment and optimize outcomes for head and neck cancer patients. We believe our technique is superior to others because it removes normal cells from the blood, allowing for the detection of CTC’s in their native state,” Dr. Jatana says.

Dr. Jessica Winter has several collaborative projects. She is working with Dr. Atom Sarkar (University of Arkansas, Neurosurgery), Dr. Rebecca Dupai (OSU ME), and Dr. John Lannutti (OSU MSE) to evaluate the migration of glioblastoma multiforme (GBM) brain tumors. GBM cancers have a very low survival rate (only 12-15 months from time of diagnosis) because of their highly infiltrative nature. Dr. Winter has designed polymer materials that mimic brain tissue to study why these tumors permeate brain tissue as they grow. Dr. Sarkar, an MD, provides clinical insight as well as access to patient tumors and cells. Dr. Lannutti is providing fibrous polymer materials that can be used to mimic blood vessels and white matter, and Dr. Dupai is performing computational modeling to understand how the material properties of the brain change throughout polymer brain tissue designed by Dr. Winter. This project, funded by and NSF grant, spans a range of disciplines and would not be possible without collaboration.

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.

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**Interdisciplinary Research**

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.
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.

Election to the National Academy of Engineering is among the highest professional distinctions accorded to an engineer. Academy membership honors those who have made outstanding contributions to “engineering research, practice, or education, including, where appropriate, significant contributions to the engineering literature,” and to the “pioneering of new and developing fields of technology, making major advancements in traditional fields of engineering, or developing/implementing innovative approaches to engineering education.”

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.

Jason Haskins-CBE’s 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; For online giving please visit www.giveto.osu.edu
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

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.

Kevin Kaufmann

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.

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

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.

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.
CBE Students
Improving Communities, Improving Lives

Brenda and Maria are sisters that live in the small neighborhood of Las Pilitas close to the town of San Pedro Puxtla in the Ahuachapán Department of El Salvador. And like most girls in their country they attend school a few days a week and on the others stay home with female relatives while their father is at work. But unlike most girls in their country, they have gotten to know a group of college students from Ohio State who have been working on a sanitation project in their neighborhood. Brenda and Maria have witnessed these engineering students interact with their community to design and start to build latrines for each of the community’s 30 households. The girls see female students who are equally involved in design and construction of the latrines with male students. The girls’ idea of what occupations are open to them starts to shift. This is one of many effects Engineers Without Borders atOSU is discovering while working on their project in El Salvador.

The Ohio State University chapter of Engineers Without Borders (EWB), founded by CBE junior Katie Zorc, has made two trips to Las Pilitas over Spring and Summer breaks in 2010 and will return again this March. They are working on a sanitation project to provide sanitation facilities and clean water to each household. Their mentors, the Central Ohio Professionals Chapter of EWB (EWB-COH), are building a road through this same community that was formerly a landfill.

There are about 40 active members in this relatively new organization to Ohio State, The chapter has existed for 2 years and they have been working on this project for the last year. EWB-COH had been working on the road project in the community for a few years when they realized the need for proper sanitation and clean water for the residents of Las Pilitas. At about this time EWB-OSU came into existence and the professionals approached the students with this project idea, providing both a great opportunity for the chapters to work together and guidance for the new chapter.
Undergraduate Kunal Parikh has created a local non-profit organization through a social entrepreneurship initiative at OSU in an attempt to counter prevailing economic conditions and attitudes and to provide support for nonprofits in need. The mission of Dollars 4 Change, the named organization, is to serve the community by developing sustainable community partnerships and raising funds and awareness for local nonprofits. Dollars 4 Change generates awareness among campus and the greater Columbus community by hosting events for worthy causes, providing attendees with an outlet to obtain more support, volunteers and funding for their own programs. Additionally, Dollars 4 Change utilizes these events as an opportunity to inspire students to dedicate themselves to service and to help improve their communities.

Parikh’s vision is to develop Dollars 4 Change into a national organization. His team is in the process of developing a handbook for motivated students, providing them with step-by-step instructions on raising money, outreach, and communicating with organizations and students. They are currently starting a chapter at the University of Toledo and are looking to create more chapters across the nation as they seek to multiply their influence and the number of communities they can help. Dollars 4 Change currently has over 100 students after only a month of actively recruiting members.

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.
## Undergraduate Program

### Course Enrollment

#### Winter 2010

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<thead>
<tr>
<th>Students</th>
<th>Course</th>
<th>Instructor</th>
<th>Course Title</th>
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<tbody>
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<td>Chemical Processes &amp; Calculations I</td>
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<td>Chemical Processes &amp; Calculations II</td>
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<td>Dr. James Rathman</td>
<td>Professional Practice in Industry</td>
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<td>Dr. Umit Ozkan</td>
<td>Thermodynamics I</td>
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<td>Dr. Isamu Kusaka</td>
<td>Thermodynamics II</td>
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<td>521</td>
<td>John Clay (Adjunct)</td>
<td>Transport Phenomena II</td>
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<td>522</td>
<td>Dr. S.T. Yang</td>
<td>Transport Phenomena III</td>
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<td>760</td>
<td>Dr. Carlo Scaccia</td>
<td>Engineering Economics &amp; Strategy</td>
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<td>764</td>
<td>Dr. Bhavik Bakshi</td>
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<td>Biotechnology and Bioprocess Engineering</td>
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<td>Biomedical Nanotechnology</td>
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<td>Dr. Barbara Wyslouzil</td>
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<td>Dr. L. James Lee</td>
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#### Spring 2010

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<td>Dr. Jack Zakin</td>
<td>Chemical Processes &amp; Calculations II</td>
</tr>
<tr>
<td>98</td>
<td>420/520</td>
<td>Dr. Martin Feinberg</td>
<td>Transport Phenomena I</td>
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<tr>
<td></td>
<td></td>
<td>Dr. Isamu Kusaka</td>
<td></td>
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<tr>
<td>0</td>
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<td>Dr. James Rathman</td>
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</tr>
<tr>
<td>28</td>
<td>509</td>
<td>Dr. Michael Paulaitis</td>
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</tr>
<tr>
<td>122</td>
<td>523</td>
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<tr>
<td>128</td>
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<td>Kinetics</td>
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<tr>
<td>12</td>
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<tr>
<td>11</td>
<td>733</td>
<td>Dr. Jeff Chalmers</td>
<td>Novel Separation Processes</td>
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<tr>
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<td>734</td>
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<td>Molecular Informatics</td>
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<tr>
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<td>750</td>
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<tr>
<td>104</td>
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<td>David Tomasko</td>
<td>Process Development</td>
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<tr>
<td>62</td>
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<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>
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<td>4</td>
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<td>Dr. W.S. Winston Ho</td>
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#### Summer 2010

<table>
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<td>Rheology of Fluids</td>
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<td>24</td>
<td>693</td>
<td>Various</td>
<td>Undergraduate Research</td>
</tr>
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<td>7</td>
<td>H783</td>
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<td>Undergraduate Honors Research (Thesis Track)</td>
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#### Autumn 2010

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<th>Course Title</th>
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<td>Chemical Processes &amp; Calculations I</td>
</tr>
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<td>38</td>
<td>420/520</td>
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<td>Transport Phenomena I</td>
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<td>89</td>
<td>508</td>
<td>Dr. Aravind Asthagiri</td>
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<td>Transport Phenomena II</td>
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<td>Process Dynamics &amp; Controls</td>
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<td></td>
<td>Bob Urban</td>
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<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>
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<td>Colloids &amp; Surfaces</td>
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<td>790</td>
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<td>Undergraduate Research</td>
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</tr>
<tr>
<td>9</td>
<td>H783</td>
<td>Various</td>
<td></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 Bush InBev: Erica Wallis
Ashland, Inc.: Nicole Bayona, Christina Elias, Zachary Johnson, Charles Kessler
Batelle Memorial Institute: Thomas Grimme, Barrett Richter, Stephen Rosegger, Alexander Sarmiento, Christopher Thurber
Boehringer Ingelheim-Roxane Laboratories: Mark McGown
CDM: Deanna Brackman, Katherine Zarc
Chemical Abstracts Service: Dylan Silbiger, Kate Erickson
Cooper Tire and Rubber Co.: Alex Elchert, Michael Shivers
Delta Airlines: Michael Birkmeyer
Diamond Innovations: Thomas Moscalino
DOW Chemical: Kevin Sutton
DOW Corning Corp: Sefanit Berihun
Emerson Climate Technologies: Megan Feagles, Jessica Epley
Entrotech: William Brigode, David Sesser
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 (National Science Foundation) REU: Mark Borysiak
Nucor Steel: Justin Spitze, 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
Socar Co: Joseph Linsenmeyer
State Industrial Products: Sean Pattison
Tedia 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, Eliott 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.osu.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 Balde: 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 Ciclotti: No information provided
- Shawn Clegg: Hired by Magnesium Elektron, Ohio
- Brandon Collins: No information provided
- Ronald Criss: Hired by Appleton Papers, Ohio
- Phelan England: Seeking employment
- Elise Ferguson: Graduated Magna Cum Laude, With Honors in Engineering, Hired by Procter & Gamble, Ohio
Michael Urban  Graduated Cum Laude, Seeking employment
Steven Waites  Graduated Cum Laude, With Honors in Engineering, Seeking employment
Robert Waters  Hired by Owens-Illinois (O-I), location unspecified
Darren Wendel  Hired by Butyl Fuel LLC, Ohio
Tanner Williams  Hired by Procter & Gamble, OH
Whitney Wutzler  Graduated Summa Cum Laude, With Distinction, Hired by Epic, Wisconsin
Amy Zuo  Hired by Owens-Illinois (O-I), location unspecified
Aleksandr Zyskin  Employment not specified

Abdirazak Abdulahi  Seeking employment
Shilp Antani  Hired by Cargill, Nebraska
Matt Bierbower  Hired by Butyl Fuel LLC, Ohio
Annemarie Fox  Hired by Schlumberger, California
Rebecca Hanes  Graduated Cum Laude, Pursuing M.S, ChE, The Ohio State University
Anna Joyce  Seeking employment
Katherine Kinstedt  Graduated Magna Cum Laude, With Distinction, With Honors in Engineering, Pursuing Joint M.S in Enviromental Science, Technical University of Hamburg, Germany
Brian Knollman  Other plans
Jon Luers  Hired by EcoLab Inc, Illinois
Stephen Necamp  Hired by Procter & Gamble, Louisiana
Cunming Song  Hired by Owens-Illinois (O-I), location unspecified
Michael Turner  Hired by Schlumberger, Brazil
Yuki Uchida  Returned to homeland

Summer 2010 (August 2010)
Abdirazak Abdulahi  Seeking employment
Shilp Antani  Hired by Cargill, Nebraska
Matt Bierbower  Hired by NALCO, location not specified
Annemarie Fox  Hired by Schlumberger, California
Rebecca Hanes  Graduated Summa Cum Laude, With Distinction, Hired by Epic, Wisconsin
Anna Joyce  Seeking employment
Katherine Kinstedt  Graduated Magna Cum Laude, With Distinction, With Honors in Engineering, Pursuing Joint M.S in Enviromental Science, Technical University of Hamburg, Germany
Brian Knollman  Other plans
Jon Luers  Hired by EcoLab Inc, Illinois
Stephen Necamp  Hired by Procter & Gamble, Louisiana
Cunming Song  Hired by Owens-Illinois (O-I), location unspecified
Michael Turner  Hired by Schlumberger, Brazil
Yuki Uchida  Returned to homeland
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
Tracking ChBE 200 Enrollment

ChBE 200 is the department’s first major course. This table shows total enrollment in that course and the breakdown enrollment of women and ethnic minority students. Previous years include only students who passed the course with a C- or better.

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<td>2010</td>
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<td>100</td>
<td>300</td>
</tr>
<tr>
<td>2011</td>
<td>200</td>
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Number of B.S. Degrees Per Year

Shows Total Students, Number Granted to Women and Number Granted to Ethnic Minorities.

<table>
<thead>
<tr>
<th>Year</th>
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<td>6</td>
<td>9</td>
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<tr>
<td>2008</td>
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<tr>
<td>2009</td>
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</tr>
<tr>
<td>2010</td>
<td>156</td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>
2009-2010 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 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 loans 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/
The George S. Bonn Scholarship
Wenqin He Yuhaoo 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 Brenna McNamee
Sarah Basnight Tri Nguyen
Cameron Bodenschatz Kunal Parikh
David Diaz-Rivera Jason Porter
Anthony Garber Timothy Regan
Jean Johnson Nicholas Sakian
Sean Kernan Daniel Savel
Katherine Kolakowski David Schnell
Patrick Krantz Anthony Unger
Kevin Kuhn Daniel Valco
Brooke Laing Mary Margaret Williamson
Chelsea Liao Michael Yingling
Richard McConnell

William H. Whirl Scholarship
Peter Dobler
Graduate Program

Ranking

The 2010 *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. In 2011, we expect the National Research Council to publish a listing of departmental rankings that will be more quantitatively based. We have submitted our data for the NRC exercise and are guardedly optimistic that our department will receive a higher ranking from that analysis compared to the U.S. News survey. In any case, these findings in the table are good news for the Department.

Faculty Productivity

The following table, relating to faculty research and our PhD program, reinforces that our faculty are highly productive. Since 2005, we have averaged a graduation rate of 15.4 PhD students per year and a ratio of 0.94 Ph.D. degrees per faculty member. It is significant that in 2005 and 2006, we were fifth in the nation in graduation of chemical engineering doctoral students. This is noteworthy as the leading departments in this category typically have many more faculty members than Ohio State.

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<th>Ohio State College of Engineering</th>
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<td>-</td>
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<tr>
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<table>
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<th>2008</th>
<th>2009</th>
<th>2010</th>
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<td>78</td>
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<td>6.58</td>
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<td>Books or Book Chapters</td>
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<td>8</td>
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<td>3</td>
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<td>95</td>
<td>88</td>
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<tr>
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<td>5.58</td>
<td>5.58</td>
<td>4.89</td>
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<td>11</td>
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<td>18</td>
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<td>Ph.D. Degrees/Faculty</td>
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<td>0.65</td>
<td>0.88</td>
<td>0.95</td>
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<td>12,249,000</td>
<td>12,462,000</td>
<td>13,332,000</td>
<td>16,181,000</td>
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<tr>
<td>Research Exp/Faculty</td>
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<td>720,530</td>
<td>733,060</td>
<td>740,670</td>
<td>851,580</td>
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(Data from the Ohio State University Foundation (fiscal year))
## Graduate Degrees Granted

### Winter Quarter 2010

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<th>Advisors</th>
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<tbody>
<tr>
<td>Ning Han</td>
<td>Jessica Winter</td>
</tr>
<tr>
<td>Congcong Lu</td>
<td>Shang-Tian Yang</td>
</tr>
<tr>
<td>Sharath Nirmal Kumar</td>
<td>Kurt Koelling</td>
</tr>
<tr>
<td>William Wang</td>
<td>Liang-Shih Fan</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Doctor of Philosophy</th>
<th>Advisor</th>
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</thead>
<tbody>
<tr>
<td>Xiaoxia Jin</td>
<td>Jeffrey Chalmers</td>
</tr>
<tr>
<td>Ning Liu</td>
<td>Shang-Tian Yang</td>
</tr>
<tr>
<td>Chi Yen</td>
<td>Winston Ho</td>
</tr>
<tr>
<td>Chaofang Yue</td>
<td>Michael Paulaitis</td>
</tr>
</tbody>
</table>

### Spring Quarter 2010

<table>
<thead>
<tr>
<th>Master of Science</th>
<th>Advisors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guo Chen</td>
<td>Andre Palmer</td>
</tr>
<tr>
<td>Geoffrey Grubb</td>
<td>Bhavik Bakshi</td>
</tr>
<tr>
<td>Lee Siers</td>
<td>Jessica Winter</td>
</tr>
<tr>
<td>Bin Zhu</td>
<td>L. James Lee</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Doctor of Philosophy</th>
<th>Advisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claudia Berdugo</td>
<td>Jeffrey Chalmers</td>
</tr>
<tr>
<td>Elizabeth Biddinger</td>
<td>Umit Ozkan</td>
</tr>
<tr>
<td>Geoffrey Grubb</td>
<td>Bhavik Bakshi</td>
</tr>
<tr>
<td>Orin Hemminger</td>
<td>L. James Lee</td>
</tr>
<tr>
<td>Brian Henslee</td>
<td>L. James Lee</td>
</tr>
<tr>
<td>Shwetha Ramkumar</td>
<td>Liang-Shih Fan</td>
</tr>
<tr>
<td>Manish Talreja</td>
<td>Isamu Kusaka</td>
</tr>
<tr>
<td>Bo Yu</td>
<td>L. James Lee</td>
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</tbody>
</table>

### Autumn Quarter 2010

<table>
<thead>
<tr>
<th>Master of Science</th>
<th>Advisors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hartawan Laksmono</td>
<td>Barbara Wyslouzil</td>
</tr>
<tr>
<td>Siva Movva</td>
<td>L. James Lee</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Doctor of Philosophy</th>
<th>Advisor</th>
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</thead>
<tbody>
<tr>
<td>Shreyas Rao</td>
<td>Jeffrey Chalmers</td>
</tr>
<tr>
<td>Andrew Tong</td>
<td>Andre Palmer</td>
</tr>
<tr>
<td>Nandita Lakshminarayanan</td>
<td>Matthew Nilsen</td>
</tr>
<tr>
<td>Matthew Nilsen</td>
<td>Michael Vilt</td>
</tr>
<tr>
<td>Fei Wang</td>
<td>Fei Wang</td>
</tr>
</tbody>
</table>

### Graduate Student Fellowships

**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

**University Fellowships**

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

### Summer Quarter 2010

<table>
<thead>
<tr>
<th>Master of Science</th>
<th>Advisor</th>
</tr>
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<tbody>
<tr>
<td>Yongjia Fan</td>
<td>Martin Feinberg</td>
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<tr>
<th>Doctor of Philosophy</th>
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<tbody>
<tr>
<td>Daniel Heath</td>
<td>Stuart Cooper</td>
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</table>

## Research Expenditures

For the past three years, our research expenditures (data from the Ohio State Research Foundation) have been outstanding, especially since they are based on the efforts of 19 faculty. On a per-capita basis, expenditures averaged over $700k per year during fiscal years 2007-2009. 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. Spending was listed at $24.6M in 2007 and $23.5M in 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

<table>
<thead>
<tr>
<th>Date</th>
<th>Speaker</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/14</td>
<td>Rashid Bashir</td>
<td><em>Interfacing Silicon and Biology at the Micro and Nanoscale</em></td>
</tr>
<tr>
<td>1/21</td>
<td><strong>Safety Seminar</strong>, Professor Umit Ozkan, Professor Jessica Winter</td>
<td></td>
</tr>
<tr>
<td>1/28</td>
<td>Maciej Radosz</td>
<td><em>Phase Behavior of Model Block Copolymers in Near Critical Solutions: Toward Self-Assembled Nanoparticles for Drug Delivery</em></td>
</tr>
<tr>
<td>2/18</td>
<td>James Liao</td>
<td><em>Synthetic Metabolism for Fuels from CO2 and Sun Light</em></td>
</tr>
<tr>
<td>2/25</td>
<td>Dilip Asthagiri</td>
<td><em>Multistate Models of Ion Hydration and Ion-Protein Interactions</em></td>
</tr>
<tr>
<td>3/05</td>
<td>Ying Liu</td>
<td><em>Computational Fluid Dynamics: Modeling of Multiscale Chemical Reactors</em></td>
</tr>
<tr>
<td>3/11</td>
<td>Wilbur A. Lam</td>
<td><em>Nanomechanics of Blood Diseases and Thrombosis</em></td>
</tr>
</tbody>
</table>

#### Spring 2010

<table>
<thead>
<tr>
<th>Date</th>
<th>Speaker</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/1</td>
<td>Jeffrey Miller</td>
<td><em>X-Ray Spectroscopy in Catalysis Research: Application to Au Catalysts</em></td>
</tr>
<tr>
<td>4/29</td>
<td>Jonathan P. Rothstein</td>
<td><em>The Dynamics and Stability of Viscoelastic Wormlike Micelle Solutions in Strong Extensional Flows</em></td>
</tr>
<tr>
<td>5/6</td>
<td>Dionisios G. Vlachos, Elizabeth Inez Kelley</td>
<td><em>The Role of Catalysis and Reaction Engineering in the Energy Arena</em></td>
</tr>
<tr>
<td>5/13</td>
<td>Rakesh Jain</td>
<td><em>Lowrie Lecture I – 11:30 a.m.</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jennings Hall, Room 155, 1735 Neil Avenue, Andrew Werk Cook Professor of Tumor Biology, Department of Radiation Oncology, Massachusetts General Hospital, “Normalizing Tumor Vasculature to Treat Cancer: From Mathematical Model to Mouse to Man”</td>
</tr>
<tr>
<td>5/14</td>
<td>Rakesh Jain</td>
<td><em>Lowrie Lecture II – 10:30 a.m.</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Campbell Hall, Room 200, 1787 Neil Avenue, Andrew Werk Cook Professor of Tumor Biology, Department of Radiation Oncology, Massachusetts General Hospital, “Transport Phenomena in Tumors: Integration of Engineering Principles with Molecular and Nano-Medicine”</td>
</tr>
</tbody>
</table>

#### Summer 2010

<table>
<thead>
<tr>
<th>Date</th>
<th>Speaker</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/20</td>
<td>Paul Buchler</td>
<td><em>Hemoglobin Based Oxygen Carriers: Approaches to Attenuating The Adverse Consequences of Hemoglobin Exposure</em></td>
</tr>
<tr>
<td>5/27</td>
<td>James J. Watkins</td>
<td><em>Self-assembled Polymer Templates for the Fabrication of</em></td>
</tr>
</tbody>
</table>

#### Autumn 2010

<table>
<thead>
<tr>
<th>Date</th>
<th>Speaker</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/16</td>
<td>David Gracias</td>
<td><em>Three Dimensional Self-Assembly at Small Size Scales</em></td>
</tr>
<tr>
<td>9/30</td>
<td>J. Zach Hilt</td>
<td><em>Nanocomposite Polymer Networks: From Controlled Synthesis to Applications in Medicine</em></td>
</tr>
</tbody>
</table>
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

Preshit 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
2010 Alumni Donors

1936 - Joseph G. Mravec
1940 - Charles Boardman III, Loren F Grandey, E H Strobel
1941 - David Thomas
1942 - Donald Smith Arnold
1943 - Halvor S. Christianson, Dalton F. Drake, Marvi Garrett, 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, Lewis C. Hullinger, Robert M. Kell, John Michael Kolbas, Herbert G. Krane, J. Bruce Martin, Bryce H. McMullen, Donald F. Stauffer
1949 - Paul E. Bates, Gordon G. Cross, Bruce Edward Hill, T M Jenney, J. Howard Kerstetter, Jr., Donald R. Roberts, Glen D Schaaf, Roland I. Spencer
1951 - Richard N. Eilerman, John R. Parkinson, Norbert F. Reinert, David B Speed, David A. Strang, Robert B. Weiser
1952 - James F. Froning, Donald E. Haupt, Richard F Hazeltine, C. Richard Heil, Charles J. Schmitz, David George Stephan
1954 - Gilbert E. Raines
1955 - John Robert Blunden
1956 - Robert A. Cody, William David Coe, Herbert H. Fanning, Robert M Yarrington
1957 - Walter R. Andrews, Jr., Walter A. Flack, Jon D. Helms, Sung Ho Hong
1959 - Lee W. Addie, James O. Albercy, Ronald M. Kovach, Darryl J. Von Lehmden, Gerald A. Wilcox
1961 - Paul R. Bigley, Richard B. Cooper, Ronald L. Follmer, Jack Arnold Hammond, Ronald D. Harris, John N. Rapach, Larry E. Woodworth
1962 - David E. Bidstrup, Kenneth J. Fulk, Richard L. Hoffman, Dean Snider, Michael J. Sorocak, Michael D. Winfield
1963 - Nelson W. Barnhill, Gary L. Beefer, Robert P. Kasper, Fred A. Shaffstall, Kay Logan Snider
1964 - Michael B. Cutlip, William R. Ferris, Alan K. Kochsieck, James B. Sapp
1966 - William F. Deerhake, Thomas E. Fitz, Sr., William G. Lowrie, Glenn L. McKee
1968 - Dean Howell Reber, John M. Salladay
1970 - Bradford F. Dunn, David R. Grove, Charles A. Klingensmith, Richard B. Strait, Rosa Uy
1972 - John A. Thomas
1973 - John C. Bost, Thomas E. Claugus, David A. Dargan
1974 - Steven M. Brown, John E. Myers George L. Ott, Michael A. Patterson,
1975 - John T. Erikson, Stephen L. Grant
1976 - James M. Delabar
1979 - Kevin R. Cole, Darice Ann Davis, Karen T. Murphy, Randy W. Schumaker, David J. Wasela, Tad K. Williams
1980 - Frederick T. Clark, Matthew J. Galosi, Mark A. George, Gary R. Prok, Timothy L. Strickler, David G. Vutetakis
1981 - Nancy Coultrip Dawes, Ronald A. Gibson, William E. Naseman, James A. Telljohann
1982 - Dan Lambert, Andrew M. Weber
1983 - Michael Brian Begland, Tracy Flora Begland, Thomas D. Burns, Samuel D. Fink, Carolyn Marie Lin, Keith R. Nowak
1984 - Wendell E. Harkins, Gregory M. Masica, George W. Miller, Roger W. Nelson, Patrick A. Renner
1985 - Douglas J. Ball, Roger G. Facer, Rongher Jean, Timothy A. Johnson, David J. Moonay
1986 - Robert M. Canright, Michael L. Gilles, Rajeev L. Gorowara, Tharuvai S Ramesh, Dave Vance, Brian A. Yanok
1987 - Jeffrey D. Adams, Karen S. Johnson, D. Brian Noe
1988 - Amy Schmidt Doty, Craig L. Shoemaker, Annette Brough Ventura
1989 - Stuart F. Doty, Amy Reynolds Pressly
1990 - Craig M. Kehres, James V. Lombardi, Timothy F. Matheis
1991 - Rick Wright
1992 - Scott D. Blatter, Samir Kumar, Frank E. Seipel
1993 - John Dee Clay, Christopher W. Voight
1994 - Beth Gibson, Jack R. Reese II, Liping Zhang
1996 - Beth Gibson, Jack R. Reese II, Leping Zhang
1997 - Nanette Lynn Nardi Triplett, Michael D. Triplet II
1998 - Aravind Rajappa Astagirir
1999 - James William Holder
2000 - Regis Paul Geisler III
2001 - Thomas J. Jaynes, Eric S. Jensen
2002 - Jun Luo, Nihar Arvind Patel
2004 - Angela N.D. Carlson, Jeffrey L. Ellis, Lori Ann Engelhardt, Erica Nicole Jones, Marisa A. LaPalomento,
2005 - Michael G. Klidas
2008 - Jeffrey Ross Skinn


*Donations listed were received during the 2010 calendar year.*
Faculty

Aravind Asthagiri

Refereed Papers


Current Projects and Grants
$3,545,300 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


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


Current Projects and Grants
$30,000 Chalmers, Jeffrey 2010-2011
CCTS NCTMP ARRA Pilot – Chalmers Nat Center for Research Resources (64000010): UL1 RR025755

$90,000 Chalmers, Jeffrey 2010-2013
CTC blood Test and Analysis-Naval Health Research Center

$50,000 Chalmers, Jeffrey 2010-2011
Characterization of Millipore Disposable bioreactor Millipore Corporation, Phase II

$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


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

$33,810 Komives, P.I., Chalmers, P.I. of sub-contract. 7/1/2008-12/31/11, CCLI: Educational materials to enhance chemical engineering curricula with applications in biological engineering. National Science Foundation

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

$1,040,458 Caliguiri, M. (P.I), Chalmers, co- Investigator, 12/2004-11/2010, Director of Analytical Cytometry Shared Resource, OSU Comprehensive Cancer Center Support Grant, National Cancer Institute

Stuart Cooper
University Scholar Professor and Department Chair, Ph.D., Princeton University, 1967. Polymer Science and Engineering, Properties of Polyurethanes and Ionomers, Blood-Materials Interactions, Tissue Engineering

Awards and Honors
2010 Founders Award from the Society For Biomaterials

Refereed Papers


Current Projects and Grants
$46,375 Stuart L. Cooper
Center for Affordable Nanoengineering of Polymer Biomedical Devices, Sponsorship of 1 Ph.D. student, National Science Foundation (P.I. James Lee)

$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

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 (APCChE 2010), October 5-8, 2010.

Books and Book Chapters

Zhu, Chao and Fan, Liang-Shih, co-editors “Special issue on Particuology of Particulate Flows and Reaction Engineering, Volume 8, No. 5. 2010.”


Patents


Current Projects and Grants
$5,000,000 Fan, Liang-Shih 2010-2013 Pilot Demonstration of the Carbon Negative Syngas Chemical Looping Process, Advanced Research, Projects Agency – Energy (ARPA-E)

$3,200,000 Fan, Liang-Shih 2010-2013 Pilot Demonstration of the Carbon Negative Syngas Chemical Looping Process, Ohio Coal Development Office (OCDO)

$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).

$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).
Fan, Liang-Shih  2010-2012

$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

$87,694  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


Patents.


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

$205,558


$59,914

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)

Kurt Koelling  

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

Refereed Papers


$400,000  Tomasko, David, Koelling, Kurt, Kusaka, I., Lee, L.J. 2006-2010, Scalable Nanomanufacturing of High Performance Nanocomposite Foams, National Science Foundation.

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

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

$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

L.James Lee  

Professor, Ph.D., University of Minnesota, 1979. Polymer Engineering, Micro/Nanotechnology, BioMEMS/NEMS

Awards and Honors

2010 Founders Award from the Society For Biomaterials

Books and Book Chapters


Refereed Papers


$400,000  Tomasko, David, Koelling, Kurt, Kusaka, I., Lee, L.J. 2006-2010, Scalable Nanomanufacturing of High Performance Nanocomposite Foams, National Science Foundation.

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

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

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$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  

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Awards and Honors

2010 Founders Award from the Society For Biomaterials

Books and Book Chapters


Refereed Papers


Patents


Current Projects and Grants

$60,000 Lee, L. James (PI) 2010

Polymer Foams for Thermal Insulation, Owens Corning

$12,900,000 Lee, L. James (PI) 2009-2014

Nanoscale Science and Engineering Center for Affordable Nanoengineering of Polymer Biomedical Devices-Phase II, National Science and Foundation
$2,886,763  Lee, L. James (co-PI)  2008-2013  Targeted Lipopolypelexes for Oligonucleotide Delivery to AML, National Institute of Health

$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 Professional 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


$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

**Andre 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)

**Patents**


U.S. Provisional Patent Application Serial No.: 61/376,041 “Composition and process for synthesizing polymerized human serum albumin for applications in transfusion medicine,” Inventor: **Andre F. Palmer**

**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 Farson (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
  Profiling 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

**Patents**


**Current Projects and Grants**

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

- **$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 Nanoeengineering 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

**David Tomasko**

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

**Awards and Honors**

Faculty Diversity Excellence Award, College of Engineering, 2010

Commencement Speaker, 394th Commencement of The Ohio State University, Dec 12, 2010

**Refereed Papers**


**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 Nanoeengineering 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

$300,000  Winter, J.O., Sarkar, A.  2009-2012
Brain Mimetic Materials for Cancer Cell Migration Studies, 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)

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)

$250,000  Wood, David  2008-2011
Bacterial Biosensors for Endocrine Disrupting Agents with Associated with Autism Spectrum Disorder, Nancy Lurie Marks 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

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

Referred Papers


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 (OSU NSEC, subaward)

$399,961  Bohrer, Gil, Zhao, LingYing, Wyslouzil, Barbara E.,  2010-2012
Large eddy simulations of PM dispersion to quantify the effects of windbreaks on air quality around CAFOs, U.S. Department of Agriculture

$213,178  Wyslouzil, Barbara E.,  2010-2013
GOALL: 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  2008-2011
Production of fumaric acid and ethanol from soybean meal, United Soybean Board

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

$110,000  Yang, Shang-Tian  2009-2011
Production of fumaric acid from sugars and starch by filamentous fungal fermentation, The Consortium for Plant Biotechnology Research, Inc. (DOE)

$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

$250,000  Yang, Shang-Tian  2010-2012
Engineering Clostridia for economic production of biobutanol as a biofuel, United Soybean Board

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

Jacques Zakin
Surfactant Drag Reduction, Heat Transfer Enhancement, Rheology

Books and Book Chapters

Refereed Papers


Current Projects and Grants

$4,982  REU Supplement  9/1/2010-8/31/2011
A Tradition of Excellence.