Dear Alumni and Friends of the Department:

On this mid-winter morning we have been greeted by the coldest day of the year, yet construction continues apace on our new building. The concrete framework for the research bar is almost complete with the scaffolding for the forms and rebar for the roof of the building being laid down as we write. I can hear the clanging of the steelworkers as they complete the steel framework for the office tower section of the complex, an impressive six-story structure. The progress is amazing, but the reality is that it will be nearly two years before all the interior details are completed and we can move in. This also gives us two more years to complete our fund raising obligation of $17.5M. Thanks to all who have contributed so far to bring our total raised to over $15M. Hopefully others will step up to help us reach our goal.

We continue to set records in the department in a variety of categories. With the addition of Assistant Professor Lisa Hall we are at an all-time high of 20 tenure-track faculty. Last year we had a record of 535 majors (sophomore-senior) and 127 B.S. graduates. At the graduate level we have 88 students in residence with 21 students receiving their Ph.D. degrees this past year. Our research expenditures were $7.3M with particular successes achieved by L. S. Fan and Winston Ho which are summarized elsewhere in this report.

Other newsworthy events include an unprecedented sweep of Ohio State’s Innovator of the Year awards. L. S. Fan won the Distinguished Researcher Award of the ACS Energy and Fuels Division and was honored at the Spring 2012 ACS meeting with a 7-session symposium featuring 42 invited talks. Two ACSF awards were made to Winston Ho and Bharat Bakre. Winston won the 2012 Lawrence B. Drumm Award for Industrial Chemical Engineering Practice sponsored by the CACHE Corporation and Bharat won the 2012 Research Excellence in Sustainable Engineering Award from the Sustainable Engineering Forum.

College-level recognition included Umit Ozkan being named a College of Engineering Distinguished Professor, Andre Palmer winning the Harrison Award for Excellence in Engineering Education and Mike Paulaitis and Jim Lee winning Lunley Research Awards. Overall, things are going along with high intensity and great successes in all of our scholarly endeavors. And, our new building will help things enormously!

Best regards from all our faculty, staff and students.

Stuart L. Cooper
Professor and Chair
cooper.1682@osu.edu
614-247-4053

Koffolt Labs Campaign Committee members: Mike Winfield, Ron Harris, Bill Lowrie and Stuart Cooper on the new Koffolt Labs construction site. --Photo by Geoff Hulse.

On the cover: Bill Lowrie takes in the progress being made at the new Koffolt Labs construction site. Lowrie and the rest of the Koffolt National Campaign Committee toured the site after their fall meeting.

Lowrie’s generosity and commitment to Ohio State’s chemical engineering program was recognized in 2009 by The Ohio State University Board of Trustees when it approved the naming of the William G. Lowrie Department of Chemical and Biomolecular Engineering. The department will be housed in the new Koffolt Laboratories building scheduled for completion in 2014. --Photo by Geoff Hulse.

The Ohio State University
Koffolt Laboratories National Campaign Committee
Koffolt Laboratories National Campaign Committee members: Mike Winfield, Ron Harris, Bill Lowrie and Stuart Cooper on the new Koffolt Labs construction site. --Photo by Geoff Hulse.
Koffolt Laboratories National Campaign Committee

The Koffolt Laboratories National Campaign Committee gathered October 5, 2012. Chairman Bill Lowrie opened the meeting and updated the group on the But for Ohio State campaign kickoff events.

Department Chair Stuart Cooper gave a department overview. The department recently learned that it had ranked second nationally in the 2010 update of NSF’s database of total research funding. In 2010, the department was ranked 20th in Federal funding.

Guest Faye Hodelke gave an update on the construction of the new Koffolt Labs. The project was budgeted for $89M in construction dollars and a $3.8M in bid overage has been reduced to $1.1M. In March 2013, the last piece of steel is expected to be placed to top out the building. Building enclosure will occur in the fall of 2013. Occupancy in the new building is expected to begin at the end of 2014, beginning with the basement and teaching areas. It will take up to eight months to complete all the moves for the research laboratories.

New faculty member Lisa Hall gave an overview of her work in polymers and ionomers and their applications in car tires, golf ball covers, and photovoltaics.

Director of Development Jason Haskins gave a campaign update: $15M of the $17.5M goal has been achieved. Bill Lowrie and Jason briefly discussed identifying class leaders for each class year—particularly those with upcoming reunions—as a strategy for mobilizing additional support.

The meeting concluded by viewing the But for Ohio State campaign video featuring Bill Lowrie. Committee members then went on a tour of the construction site.
Karen ‘(71) and Milt Hendricks: Engineering a rewarding life

Karen Hendricks in 1971

The former high school valedictorian met her match in the rigorous ChemE program, but stayed motivated because she thought, ‘I’ll do this, there will be a payoff in the end.’ Karen excelled and blossomed as a ChemE student.

In 1966, disillusioned with a scholarship recipient is also very important to her. Scholarships enabled Milt to attend college at Lehigh University, and the motivation Karen felt as a scholar recipient is also very important to her.

Two years ago, Karen and Milt made a gift to name the Unit Ops Student Lounge in the new Koffolt Labs complex. “Much of the success of ChemE labs is attributable to this department, and it deserves better facilities,” Karen said. “It’s becoming impossible to train engineers of the future in the old building, because it is obsolete. The new building will be a much better learning environment.”

In 1969, disillusioned with a scholarship recipient is also very important to her. Scholarships enabled Milt to attend college at Lehigh University, and the motivation Karen felt as a scholar recipient is also very important to her.

Karen and Milt Hendricks enjoy a sunset in Cabo San Lucas.

Karen Hendricks in 1971

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Supporting the development of leadership skills is one of the goals of the Hendricks scholarship because “engineers with ‘people skills’ are the ones who can maximize their professional contributions and impact,” Karen explained.

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Karen and Milt Hendricks enjoy a sunset in Cabo San Lucas.
This year, CBE won all three awards. In the history of the award, no single college, let alone department, has done so before!

To support entrepreneurial activity among Ohio State researchers, OSU presents three annual university-wide awards recognizing research creativity and commercialization: Innovator of the Year, Early Career Innovator of the Year, and Student Innovator of the Year.

CBE’s 2012 “Innovators of the Year,” Faculty and student win all three Innovator Awards

In the fall of 2012, the project’s DOE-funded 25 kWth Coal-fired Direct Chemical Looping (CDCL) pilot unit completed over 200 hours continuous operation, making it the longest continuous demonstration of chemical looping technology using solid fuel feedstock anywhere in the world. This success signifies OSU’s advanced chemical looping technologies.

This process for producing electricity and liquid fuel from carbon-based fuels requires high capital and intensive CO2 separation systems that require high capital and energy-reduction-oxidation reactions of an oxygen carrier to segregate the air source from the fuel. This eliminates the need for energy-intensive CO2 separation systems that require high capital and operating costs.

In the fall of 2012, the project’s DOE-funded 25 kWth Coal-fired Direct Chemical Looping (CDCL) pilot unit completed over 200 hours continuous operation, making it the longest continuous demonstration of chemical looping technology using solid fuel feedstock anywhere in the world. This success signifies the commercial potential for the Ohio State-patented CDCL technology to be implemented at either new greenfield plants or for cost-effective repowering of existing coal-fired power plants.

In addition to the DOE, Ohio State is partnering with the Ohio Department of Development, Babcock & Wilcox Power Generation Group, Inc., CONSOL Energy Inc., and Clear Skies Consulting LLC. Further, DOE’s National Clean Energy Center in Columbus, OH, will serve as host site for building and operating a 25 kWth commercial carbon chemical looping pilot unit this year. It will be used to further prove the operability and economic feasibility of OSU’s advanced chemical looping technologies.

Fab’s inventions are not limited to CDCL. He also invented the first and only electrical capacitance volume tomography for three-dimensional real time imaging of multiphase flows and reactor systems. He commercialized it with spinoff company Tech4Imaging.

The technology has been used worldwide for academic research and industrial practice.

Leading-edge Fab (above, right) points out details of the Ohio State coal pilot demonstration unit and chemical looping process to the U.S. Department of Energy’s Assistant Secretary of Fossil Energy Charles McConnell (left) and other representatives from the DOE, Battelle, American Electric Power, and Babcock and Wilcox Power Generation Group at the Ohio State Clean Fuel Research Center in Columbus, Ohio (July 2012).

Fab’s Innovations: Clean Coal Carbon Capture Technology

Qussai Marashdeh, Jessica Winter, and L.S. Fan were named 2012 Innovators of the Year, and Qussai Marashdeh, who works with Dr. Fan, received the Student Innovator of the Year Award.

A TEM image shows increasing numbers of nanoparticles being encapsulated in thin plastic nanocontainers called micelles. They glow like little traffic lights in different colors, depending upon which material is used. Micelles containing different combinations of red and green dots provide the additional benefit of a continuous glowing vs. the on and off “blinking” of single-color particles. The dots help biologists see the inner workings of a cell, allowing them to track chemical reactions and cellular-level biological processes under a microscope. The technology can be used by biomedical engineers studying the root cause of disease like cancer, and for medical imaging. Visit http://nanoforneuro.com/ for info.

In the history of the award, no single college, let alone department, has done so before!

Winter’s Innovation Involving Quantum Data

Jessica Winter was named Early Career Innovator of the Year. Winter and research scientist Gang Ruan filed a patent for inventing quantum data technologies, based on this research.

Quantum dots are fluorescent nanoparticles of semiconductor encapsulated in a magnetic wire array for molecular detection applications. Inside a cell, the particles’ brightness and more stable against oxidation.

Quantum dots are very bright and can be tailored to fluoresce with different colors.
Researchers W.S. Winston Ho (distinguished professor of chemical and biomolecular engineering and materials science), Prabir Dutta (distinguished university professor in chemistry and their students have taken another step forward in the global race for clean energy – a key element in national efforts to mitigate climate change – by developing a novel and more economical CO2 capture membrane.

The research was funded by the Department of Energy’s Office of Fossil Energy, which hopes to position the United States as a leader in global clean energy within ten years by deploying cost-effective carbon capture, utilization, and storage (CCUS) technologies at coal-fired power plants. The Ohio State team received about $1M beginning October 1, 2011 for the total funding of $3M for the project through December 2014.

The researchers’ groundbreaking development – an economical hybrid membrane that combines the separation performance of inorganic membranes with the cost-effectiveness of polymer membranes – has vast commercial potential for use at coal-fired power plants using CCUS technologies.

CCUS technologies strive to increase CO2 capture efficiency by re-using some of the emissions generated in coal-burning to produce further energy. However, before the carbon dioxide generated at a power plant can be securely stored or put to use, it must first be separated from the flue gas stream. Unfortunately, the energy cost of current separation technologies has been too high to make rapid commercial deployment of CCUS technologies feasible.

Although this method is very powerful and versatile, it has not been applied to therapeutic glycoproteins because the tags tend to cleave themselves too soon in the special mammalian cells where they are made – before the purification procedure can be completed.

Once purified, the tag is induced to remove itself, producing an unmodified target protein for use in research or in the clinic.

The Wood Lab has worked over the past several years to develop a solution to this problem by using self-cleaving molecular hooks, called “affinity tags.” This method adds a small sequence of DNA to the target protein so that the target becomes “tagged” with a molecular hook when it is made. This hook allows the target protein to be easily purified, using a simple and general method.

Divide and Conquer: Wood Labs develops method for splitting and reassembling a critical protein to control its activity in biopharmaceuticals production

Game-Changer: Winston Ho develops CO2 capture membranes

The breakthrough for Ho, Dutta and their team lies in their approach of combining polymer membranes (organic or plastic), which are mass produced and cost effective, with inorganic membranes (metal or ceramic), which exhibit much better performance but are expensive to produce. By using a flexible, polymeric membrane support, they can fabricate the membrane in roll-to-roll processing, enabling them to produce hybrid inorganic/organic membranes in a low-cost manner.

The researchers’ groundbreaking development – an economical hybrid membrane that combines the separation performance of inorganic membranes with the cost-effectiveness of polymer membranes – has vast commercial potential for use at coal-fired power plants using CCUS technologies.
The Engineering Cooperative Education & Internship Program (ECIP) helps undergraduate students 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. An 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 must advise in Brian Enfield and Holly Prouty to evaluate different schedule arrangements before interviewing because many employers hire for specific “rotations.” For instance, students may work fulltime during the summer, around full-time classes in autumn, and return to their employer for full-time work in the senior most popular term to work is the summer. Last year, CBE students completed 44 co-op rotations and 109 internship or part-time work opportunities.

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

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Students meet with advisors Brian Endres and Holly Prouty to evaluate different schedule arrangements before interviewing because many employers hire for specific “rotations.” For instance, students may work fulltime during the summer, around full-time classes in autumn, and return to their employer for full-time work in the senior most popular term to work is the summer. Last year, CBE students completed 44 co-op rotations and 109 internship or part-time work experiences.

Undergraduate Program
2012 Cooperative Learning Experiences

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Graduation of our program continues 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.

Sixty-four percent of our graduates will be going directly to industry with their BS degrees. About 15 percent of our students will be going on to graduate or professional school. Approximately 30 percent 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.

A student who graduates "With Honors Research Distinction" is an honors student (greater than a 3.4 GPA) who has completed a senior honors research thesis. A student who graduates "With Research Distinction" is a student (GPA between 3.0-3.39) who has completed a senior 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 as participation in "investigational studies" which typically includes completing a research paper or thesis, or completing a minor. Fourteen students graduated with Honors in Engineering and nine 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 Amy Tiah, 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.

2012 B.S. Graduates - Employment Status and Location (State)

**Autumn 2011 (December 2011)**

- Yaared Almotowa Hired by SABIC, Saudi Arabia
- Abdallah Almousa Hired by SABIC, Saudi Arabia
- Agel Alzahrani Hired by SABIC, Saudi Arabia
- Brandon Alzahrani No information provided
- Anthony Garber Hired by Capital One, VA
- Sean Hocking Hired by SABIC, Saudi Arabia
- Rebecca Heyse Hired by Battelle Marine Propulsion Corp-Battelle and KaPL, Lego, NL
- Bryan Hoolihan Hired by IBM Corp, NY
- James Hynes Hired by Baker Hughes, TX
- Alena Lewis No information provided
- Matt McKinney No information provided
- Matthew Murry Hired by IBM Corp, NY
- Jedson Post Hired by Baker Hughes, TX
- Britn Saunders Hired by HB Fuller Co., MN
- Henrik Sandgren No information provided
- Robert Wisec Hired by Battelle Marine Propulsion Corp-Battelle
- Brian Wolkfeith No information provided

**Winter 2012 (March 2012)**

- Matthew Cerone Hired by Norcold Inc., OH
- Ryan Clark Hired by SABIC, Saudi Arabia
- Michael Hamilton No information provided
- Christopher Harvey No information provided
- Johnathan Johnson No information provided
- Katrina Kolokotron No information provided
- Brooke Luai Hired by SABIC, Saudi Arabia
- Mengshan Li Hired by SABIC, Saudi Arabia
- Steven Lim Hired by Battelle Marine Propulsion Corp-Battelle
- Julia Medler Hired by Siemens, NJ
- Art Neely Hired by Baker Hughes, TX
- Justin Qiu Hired by Battelle Marine Propulsion Corp-Battelle
- Michael Smith Hired by Thermos Corp, IN

2012 Placement Record for Undergraduates
### Undergraduate Enrollment Graphs

#### Undergraduate Enrollment (number of students)

<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>205</td>
<td>190</td>
<td>405</td>
</tr>
<tr>
<td>2010</td>
<td>220</td>
<td>180</td>
<td>400</td>
</tr>
<tr>
<td>2011</td>
<td>235</td>
<td>175</td>
<td>410</td>
</tr>
<tr>
<td>2012</td>
<td>250</td>
<td>150</td>
<td>400</td>
</tr>
<tr>
<td>2013</td>
<td>260</td>
<td>140</td>
<td>400</td>
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#### Tracking CBE 200 Enrollment

- **Total Students**: Number of students enrolled in CBE courses.
- **Percent of Women or Ethnic Minority Students**: Percentage of women and ethnic minority students enrolled in CBE courses.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Students</th>
<th>Percent of Women or Ethnic Minority Students</th>
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</thead>
<tbody>
<tr>
<td>2009</td>
<td>405</td>
<td>10%</td>
</tr>
<tr>
<td>2010</td>
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<td>2011</td>
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<td>30%</td>
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<tr>
<td>2012</td>
<td>400</td>
<td>40%</td>
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<tr>
<td>2013</td>
<td>400</td>
<td>50%</td>
</tr>
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</table>

#### Course Enrollment

<table>
<thead>
<tr>
<th>Winter 2012</th>
<th>Course</th>
<th>Instructor</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>288</td>
<td>Dr. David Wood</td>
<td>Chemical Processes &amp; Calculations I</td>
</tr>
<tr>
<td>85</td>
<td>285</td>
<td>Dr. Andre Palmer</td>
<td>Chemical Processes &amp; Calculations II</td>
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<tr>
<td>3</td>
<td>489</td>
<td>Dr. James Rathman</td>
<td>Professional Practice in Industry</td>
</tr>
<tr>
<td>45</td>
<td>588</td>
<td>Dr. S.T. Yang</td>
<td>Thermodynamics I</td>
</tr>
<tr>
<td>100</td>
<td>589</td>
<td>Dr. S.T. Yang</td>
<td>Thermodynamics II</td>
</tr>
<tr>
<td>45</td>
<td>521</td>
<td>Dr. L.S. Fan</td>
<td>Transport Phenomena I</td>
</tr>
<tr>
<td>150</td>
<td>522</td>
<td>Dr. Kurt Smalling</td>
<td>Transport Phenomena II</td>
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<tr>
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<td>768</td>
<td>Dr. Carlos Soria</td>
<td>Engineering Economics &amp; Strategy</td>
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<td>Dr. Jeffrey Doherty</td>
<td>Design of Experiments</td>
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<td>763</td>
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<td>Principles of Biochemical Engineering</td>
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<td>777</td>
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<td>Air Pollution</td>
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<td>Polymer Nano Engineering</td>
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<td>779</td>
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<td>Experimental Design</td>
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<td>13</td>
<td>783</td>
<td>Various</td>
<td>Undergraduate Honors Research (Thesis Track)</td>
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<th>Course</th>
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<td>Carlos Soria</td>
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<td>22</td>
<td>3730</td>
<td>Dr. Beth Johnson</td>
<td>Chemical Process Safety</td>
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<td>Undergraduate Research</td>
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<td>Undergraduate Honors Research</td>
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<td>4993</td>
<td>Various</td>
<td>Undergraduate Thesis Research</td>
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<tr>
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<td>4994</td>
<td>Various</td>
<td>Undergraduate Thesis Research</td>
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<table>
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<th>Course</th>
<th>Instructor</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>75</td>
<td>281</td>
<td>Dr. Jack Zakin</td>
<td>Chemical Processes &amp; Calculations I</td>
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<tr>
<td>156</td>
<td>438502</td>
<td>Dr. Martin Feinberg</td>
<td>Transport Phenomena I</td>
</tr>
<tr>
<td>45</td>
<td>583</td>
<td>Dr. S.T. Yang</td>
<td>Thermodynamics I</td>
</tr>
<tr>
<td>150</td>
<td>521</td>
<td>Dr. S.T. Yang</td>
<td>Thermodynamics II</td>
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<tr>
<td>145</td>
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<td>Dr. James Rathman</td>
<td>Kinetics</td>
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<td>Novel Separation Processes</td>
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<td>724</td>
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<td>Molecular Information</td>
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<tr>
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<td>759</td>
<td>Dr. Stuart Cooper</td>
<td>Process of CBE</td>
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<td>762</td>
<td>Dr. Michael Paulatis</td>
<td>Process Development</td>
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<td>Dr. Bhavik Bakshi</td>
<td>Process Design</td>
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<tr>
<td>8</td>
<td>760</td>
<td>Dr. L.S. Fan</td>
<td>Novel Separation Processes</td>
</tr>
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<td>31</td>
<td>772</td>
<td>Dr. Bhavik Bakshi</td>
<td>Principles of Sustainable Energy</td>
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<td>28</td>
<td>775</td>
<td>Dr. Kurt Smalling</td>
<td>Heat Transfer</td>
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<tr>
<td>13</td>
<td>783</td>
<td>Various</td>
<td>Undergraduate Honors Research (Thesis Track)</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Autumn 2012</th>
<th>Course</th>
<th>Instructor</th>
<th>Course Title</th>
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<tr>
<td>120</td>
<td>3200</td>
<td>Dr. Usam Oran</td>
<td>Process Fundamentals</td>
</tr>
<tr>
<td>14</td>
<td>2420</td>
<td>Dr. Andre Palmer</td>
<td>Transport Phenomena I</td>
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<tr>
<td>8</td>
<td>3165</td>
<td>Dr. James Rathman</td>
<td>Professional Practice in Industry</td>
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<tr>
<td>150</td>
<td>5457</td>
<td>Dr. Michael Paulatis</td>
<td>Thermodynamics I</td>
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<td>122</td>
<td>5152</td>
<td>Dr. S.T. Yang</td>
<td>Transport Phenomena II</td>
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<td>112</td>
<td>4624</td>
<td>Dr.Meg Falin</td>
<td>Process Dynamics &amp; Controls</td>
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<td>112</td>
<td>4670</td>
<td>Dr. L.S. Fan</td>
<td>Novel Separation Processes</td>
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<td>16</td>
<td>4674</td>
<td>Dr. Jeff Chalmers</td>
<td>Process Design and Development</td>
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<td>25</td>
<td>5740</td>
<td>Dr. Michael Paulatis</td>
<td>Quantitative Cell Biology</td>
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<tr>
<td>3</td>
<td>5780</td>
<td>Dr. K. Shekhar</td>
<td>Heat Transfer</td>
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<tr>
<td>48</td>
<td>5772</td>
<td>Dr. Barbara Wysocki</td>
<td>Air Pollution</td>
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<tr>
<td>27</td>
<td>5779</td>
<td>Dr. Stuart Cooper</td>
<td>Introduction to High Polymer Engineering</td>
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<tr>
<td>13</td>
<td>783</td>
<td>Various</td>
<td>Undergraduate Honors Research (Thesis Track)</td>
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</table>

- **Total Number of CBE Students**: Total number of students enrolled in CBE courses.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Number of CBE Students</th>
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<tr>
<td>2009</td>
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<tr>
<td>2010</td>
<td>693</td>
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<td>2011</td>
<td>724</td>
</tr>
<tr>
<td>2012</td>
<td>766</td>
</tr>
<tr>
<td>2013</td>
<td>791</td>
</tr>
</tbody>
</table>

- **Number of B.S. Degrees Per Year**: Number of B.S. degrees granted each year.
A total of 135 students were awarded undergraduate scholarships in the Chemical & Biomolecular program. The vast majority of those students are current seniors, although a small amount went to recent high school graduates just outside of it. A total of $334,470 was awarded to students heading into the 2012-2013 school year. The average award was $995 this year compared to $866 this year.

Scholarship Information

We sincerely thank those of our alumni who have established scholarship endowments, as well as our corporate donors who provide corporate donors help defray a small part of the burden of loans for many of our students. In the Chemical & Biomolecular Engineering Department, department scholarships from alumni and families have had to increase their debt levels increases, engineering students and their families have had to increase their debt levels to cover the additional costs. In the previous year.

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 tuition has been less than the increase in debt.

MERIT-BASED AWARD

Lily Glick

Jesaiah King Hannah Zierden

Zachary Adams Eric Piening

Scholarships Fund

The James F. and Patricia C. Dietz Engineering

J.R. Boothe Scholarship Fund

Allan J. Gordon Undergraduate Scholarship for Study in Biocatalytic Engineering

Webster B. Ray Scholarship in Chemical Engineering

The Samuel S. and Grace Hook Johnston Memorial Chemical Engineering Scholarship Fund

The Tom and Grace Hoxie Johnston Memorial Chemical Engineering Scholarship Fund

The Howard R. Steele Memorial Scholarship in Chemical Engineering

The George S. Bonn Scholarship

The Harold W. & Doris M. Harris Scholarship in Chemical Engineering

The Michael D. Winfield Scholarship

Scholarship

Richard Coates

The McHenry B. Kay Scholarship in Chemical Engineering

The Milton R. Schott Chemical Engineering Scholarship

The Aldrich Syverson Scholarship

The David H. George Chemical Engineering Scholarship

The Samuel S. and Grace Hook Johnston Memorial Chemical Engineering Scholarship Fund

The Harold B. Warner Scholarship

William R. & Dorothy L. Harris Scholarship in Chemical Engineering

The George S. Bonn Chemical Engineering

The Robert W. Adams Memorial Scholarship

The James F. and Patricia C. Dietz Engineering

The Dorothy J. & Herbert L. Feucht Scholarship

The Robert W. Adams Memorial Scholarship

2012-2013 Undergraduate Scholarship Information

Robert W. Adams Memorial Scholarship

Kevin Asper Nicholas Blum

Mary (Mollie) Hesse

Daniel Lacey

Scholarships

William R. & Dorothy L. Harris Scholarship in Chemical Engineering

Melakie Cheruya

Mitchell Gaesther

Chunna Halloway

Geoffrey Klimeyer

Jason Lee

Mitchell Lois

William R. & Dorothy L. Harris Scholarship in Chemical Engineering

Melakie Cheruya

Mitchell Gaesther

Chunna Halloway

Geoffrey Klimeyer

Jason Lee

Mitchell Lois

The Harold R. Steele Memorial Scholarship in Chemical Engineering

Joshua Fouasnon

Gregory Jameson

Aldrich Syverson Scholarship

Kevin Asper

Lauren Dillion

Scott Hochberg

H. Richard Cusab Chemical Engineering Class of 1941

William Cohen Joseph Gaesther

Paul Hudson Bradley Jordan

Marina McCaffrey Lisa Stefan

Jonathan Strute Nathan Vikhiko

Harry R. Warner Scholarship

Brittany Niles

William R. Whirl Scholarship

Jessica Tafts

The Michael D. Winfield Scholarship

Garrett Price

Scott Hochberg

Kevin Asper

Katie Jones

Alexander James

Scholarship Fund

The Meridian B. Kay Scholarship in Chemical Engineering

The James F. and Patricia C. Dietz Engineering

The Milton R. Schott Chemical Engineering Scholarship

The Tom and Grace Hoxie Johnston Memorial Chemical Engineering Scholarship Fund

The Aldrich Syverson Scholarship

Zachary Coates

Rachel graduated in the summer of 2012. Rachel Williard in the midst of the “Unit Ops experience.”

Student preparing the water-diluted acetic acid charge for the activated carbon fixed bed adsorption experiment in the Unit Ops Lab.
Pictured right: graduate students Xiang Zhao, Whpee Salee, and Chong Cheng
The 2013 U.S. News and World Report rankings of engineering graduate programs placed the Lowrie Department of Chemical and Biomolecular Engineering at #28. The 2013 rankings of engineering graduate programs in the nation.

Productive at Ohio State and near the top of all Chemical Engineering departments $650K per year during fiscal years 2008-2012. Our faculty are among the most recently joined the department. On a per-capita basis, expenditures averaged over number of our senior faculty and the ramping up of research of faculty who have significant increases in future years due to the extraordinary productivity of a outstanding. While we experienced a decline to $7.2M in fiscal year 12, we expect During the past five years the research expenditures for the department have been

| Nuclear | - | 11 | 12 | 12 | 14 |
| Radiation | - | 11 | 12 | 12 | 14 |
| Environmental/Env. Health | 39 | 39 | 42 | 42 | 48 |
| Electrical | 26 | 20 | 22 | 22 | 19 |
| Mechanical | 39 | 39 | 42 | 42 | 48 |
| Industrial/Manufacturing | 26 | 20 | 22 | 22 | 19 |
| Materials | 14 | 16 | 15 | 15 | 17 |
| Mechanical | 20 | 22 | 21 | 21 | 19 |
| Nuclear | - | 13 | 15 | 15 | 15 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
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| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
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| Polymer | - | 11 | 12 | 12 | 14 |
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| Polymer | - | 11 | 12 | 12 | 14 |
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| Polymer | - | 11 | 12 | 12 | 14 |
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| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
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| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
| Polymer | - | 11 | 12 | 12 | 14 |
Graduate Student Awards

Samuel Barber: Won 2nd place in the poster competition at the 2nd International Conference on Chemical Looping in Darmstadt, Germany. Received the Outstanding Student Award for Research Excellence at the Lowrie Banquet.

Ray Kim: Won Outstanding Graduate Student Award for Research Excellence at the Lowrie Banquet.

Daniel Knight: Won Outstanding Graduate Student Award for Research Excellence at the Lowrie Banquet.

Meizhe Liu: Won the Alumni Grants for Graduate Research and Scholarship from the Graduate School in the Spring 2012 competition.

Kuldeep Mamtani: Received the Fall 2012 Career Development Grant in Minneapolis, MN in October 2012.

American Association of Aerosol Research Conference

Kariket Ramasubramanian: Won Outstanding Graduate Student Award from the Council of Graduate Students.

Nihar Phalak: Won the Graduate Research Symposium held Fall 2012. Nihar also served as the lead organizer for the event. --Photo by Geoff Hulse.

Ray Kim: Won the Autumn 2012 TA Award from the Council of Graduate Students.

Yinan Zhao: Won Outstanding Graduate Student Award for Research Excellence at the Lowrie Banquet.

Zhenchao Sun: Won Outstanding Graduate Student Award at the Lowrie Banquet.

Harshad Pathak: Won the 2012 NAMS Student Travel Award to attend the 31st Annual Meeting in New Orleans.

Daniel Knight: Won the 2012 NAMS Student Travel Award to attend the 31st Annual Meeting in New Orleans.


Unit with 30% Carbon Content" Foundation, 465, 495 - 501 (2011).
   Current Grants/Contracts
   $160,000 Fan, L.S. (2010-2013) Undergraduate Research Award, Dow Chemicals.
   $1,000 Fan, L.S. (2010-2014) Syngas Chemical Looping Demonstration at NCCC – II, Department of Energy (DOE-ARPA-E and OCDO).
   $1,600,000,000 Fan, L.S. (co-PI) 2012-2017 CDCL- Phase I Demonstration, Department of Energy.
   $381,826 Feinberg, Martin (2008-2013) Collaborative Research: Multistability in Biological Networks, National Institutes of Health - General Medical Sciences.
   $300,000 Fan, L.S. (co-PI) 2012-2015 Emerging Frontiers, National Science Foundation.


poly(ethylene glycol) attenuates their reactions with gaseous ligands and regulates nitric oxide dependent vasodilation, "Biophysical Chemistry: 45-60 (2012).

Manish Talreja, Isamu Kusaka, David L. Tomasko, "Analyz-

Refereed Papers


Palmer, continued:

Michael Panelisit


Research Awards:


Palmer, continued:

Refereed Papers

Feather, continued

Michael Panalitisi


Palmer, continued:

Palmer, continued:


Palmer, continued:

Palmer, continued:

Palmer, continued:

Feather, continued
ICorps: Next Generation ‘MultiDot’ Quantum Dots for
(OSU NSEC).
Molecular Separations, National Science Foundation
National Science Foundation
Brain Mimetic Materials for Cancer Cell Migration Studies,
$300,000   Winter, J.O., Sarkar, A.  (2009-2012)
Mechanical Investigations, National Science Foundation.
Fluorescent-Magnetic Nanomanipulators for Cytoskeletal
Quantum Dots, National Science Foundation.
(Published Online in 2012, Currently In Press).
Micellular Electrospray Synthesis of Magnetic Quantum Dots

GOALI: Collaborative Research: Fundamental studies of water-
hydrocarbon condensation, National Science Foundation.
$213,178   Wyslouzil, Barbara E. (2010-2013)

Nanodroplet aerosols: Nucleation rates and structure, National
Science Foundation.
$478,000   Wyslouzil, Barbara E. (2012-2015)

Large eddy simulations of PM dispersion through the effects of windbreaks on air quality around
CAFOs, U.S. Department of Agriculture.
$400,000  Wood, David W ., Lease, Richard.  (2012-2014)
Multifunctional nanoparticles: Formation and fundamental
studies, National Science Foundation (OSU NSEC, subaward).
$134,367   Wyslouzil, Barbara E. (2009-2013)

Riboswitch-sRNA for Dual Transcript Control by a Ligand,
Biochemical engineering, biotechnology development,
Department of Chemical Engineering, National Science Foundation.
$335,000   Winter, Jessica, Chalmers, Jeffery, Ruan, Gang,
GOALI: Collaborative Research: Fundamental studies of water-
hydrocarbon condensation, National Science Foundation.
(Was awarded prior to the end of the award period).

Z.-X. Liang, L. Li, S. Li, Y .-H. Cai, S.T. Y ang, J.-F . Wang,
Enhanced propionic acid production from artemisial broth by immobilized Propionibacterium acidiurici, in
N. Lu, D. Wu, X. J. Yang, J. Chen, S.T. Y ang, Regulation of
lipid metabolism in the snow alga Chlamydomonas nivalis in
response to NaCl stress: An integrated analysis by cytomic and
Z. X. Liang, L. Li, Y.-H. Cai, C. Y. Yang, S.T. Y ang, Enhanced propanol production by Clostridium acetobutylicum,
N. Lu, D. Wu, X. J. Yang, J. Chen, S.T. Y ang, Effects of ptb knock-out on
butanol production by Clostridium acetobutylicum JB200
Z.-X. Liang, S. Li, L. Li, Y .-H. Cai, S.T. Y ang, Effects of ptb knock-out on
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Current Projects and Grants

$1,063,605   Yang, Shang-Tian (2010-2013)

Production of Propionic Acid and Propanol from Biomass, Dow Chemical.

$250,000   Yang, Shang-Tian (2010-2013)

Engineering Clostridia for economic production of biobutanol and hydrogen, United Soybean Board.

$217,117   Yang, Shang-Tian (2010-2012)

Carbon Dioxide to Biofuels by Facultatively Autotrophic Hydrogen Bacteria, Department of Energy – ARPA-E.

$110,000   Yang, Shang-Tian (2009-2012)

Engineering clostritrial fermentation for biobutanol production, National Science Foundation, STTR Phase II.


“Photoreversible Micelle Solution as a Smart Drag Reduction Fluid in District Heating/Cooling Systems” , H. Shi, W. Ge, S.R., Raghavan, J.L., Zakin, Langmuir DOI:http://dx.doi.org.10.1021/la304001N

$277,144   Yang, Shang-Tian  (2008-2012)


$27,000,152   Yang, Shang-Tian (2012-2015)


$10110-10124 (2012).

$10,1016/j.procbio.2012.11.014


Investigating the Impact of Light on Functional Properties of a Turbulent Drag Reduction Fluid (NSF FRIO06X) with Enhanced Environmental and Natural Systems. ” CURE 955225- BES--supplemented 54,982

$4,982.

Projects and Grants

$4,982.

Projects and Grants
Graduate student Jeevan Baretto sees how he measures up. Read about the method he and other graduate students of Professor David Wood have developed for rapidly purifying complex biopharmaceuticals on page 10.