Chemical Engineering Newsletter

December 21, 2007
Fall Semester 2007

University of Iowa

Advisor's Corner

By Professor David W. Murhammer

Greetings to Hawkeye Chemical Engineers!! The Fall 2007 issue of our AIChE Student Chapter Newsletter begins with an article about Professor Wiencek's departure from the University of Iowa and his new job as Dean of Engineering at the University of South Florida. We were sad to see Professor Wiencek leave the University of Iowa, but wish him well in his new position. Other articles in this issue include Jamie Cecil's account of his cooperative education experience at Cargill, Inc., a summary of the Fourth Annual Spooky Sprint fundraiser for the Iowa City Shelter House, and a summary of our student chapter's participation in the 2007 AIChE Annual Student Conference in Salt Lake City. I am proud to note that our Student Chapter was acknowledged at the Awards brunch held at this conference as an Outstanding AIChE Student Chapter. Furthermore, Jessica Heth received an AIChE Scholarship Award (a very prestigious award!).

This issue also contains four "topical papers" that were written by four different students in the Fall 2007 offering of our Process Calculations course taught by Professor Alec Scranton. These topical papers provide the students' views on timely societal issues: Wind energy, solar energy, stem cells, and an engineer's social responsibility. This newsletter concludes with a list of student and faculty awards received since our Spring 2007 issue.

Finally, I encourage our alumni to donate to the Kammermeyer Education Fund, which is an endowment fund used to support our educational mission, including support of student chapter activities. For example, the interest from this endowment will be used to support student participation in the Regional and National AIChE Conferences. If you are interested in contributing to this fund, then please contact me via email at david-murhammer@uiowa.edu to discuss specific details.

Inside This Issue

Chemical Engineering students Samantha Watkins and Rachel Levine register runners for this year's Spooky Sprint (left) while others anxiously prepare for departure outside the Seamans Center (right). For more information about the Spooky Sprint event and its purpose, see page 3.

Wiencek Advances, Heads South to Sunny Florida

By Zach Rodenburg

Dean John Wiencek, former UI Professor and Department Executive Officer (DEO, i.e., the Department Chair) of the Department of Chemical and Biochemical Engineering, has vacated this position at Iowa and accepted a new appointment as the Dean of The College of Engineering at the University of South Florida. Wiencek, who had been with Iowa for over twelve years, developed an interest in administration during his tenure as department chair and is now interested in furthering this new career path.

"Dean Butler does an excellent job at Iowa, and in order for me to advance in the field it was necessary for me to make this change," said Wiencek in a recent interview.

The University of South Florida is home to a chemical engineering department that is approximately twice the size of Iowa's. Although enrollment is high at the college, Wiencek notes "There was little research until about ten years ago, but the college is maturing on this front."

Because of South Florida's dynamic environment, the new dean says he sees the potential to make a strong impact at the University and is excited by the opportunities that lie ahead. Wiencek welcomes the challenge that the new position has to offer, but submits his biggest frustration with the change: "The budget cuts have followed me there."

Although Wiencek undoubtedly enjoys the newfound temperate weather that South Florida has to offer, not to mention the view of Busch Gardens across the street, he has mixed emotions about the move.

"I have grown up in an environment of constant change and I never lived anywhere for longer than five years until I landed here in Iowa. I had been here twelve years—which says a lot about The University of Iowa and the faculty, staff and students there in The College of Engineering."

Succeeding Dean Wiencek this semester as DEO is Professor David Murhammer. Murhammer, who has been a chemical engineering professor at Iowa since he received his PhD from The University of Houston over eighteen years ago, also serves as the faculty advisor for Iowa's AIChE student chapter.

With Great Soybeans Comes Great Responsibility

By Jamie Cecil

As my alarm goes off for the second time, I groggily reach for the snooze button to soak in ten more minutes of rest. My subconscious mind begins to drift, thinking about the classes, homework assignments, and labs waiting for me in the day ahead. Then a realization hits me – I am in Georgia working for Cargill now. Instead of days filled with academic responsibilities, I spend my time helping maintain and improve a major soybean facility. Let me be the first to tell you, with great soybeans comes great responsibility.

I began my seven-month chemical engineering co-op with Cargill in May and now have only one month remaining. The soybean plant I am working in has three main areas: crush, refinery, and packaging. These three areas work together to crush soybeans, extract their oil (selling the dry beans as meal), refine the extracted oil, then either package the oil or make mayonnaise out of it. My position here is a Project Engineering Co-op / Packaging Supervisor for the packaging section of the plant.

Initially, my job consisted of learning the processes for making mayo and packaging oil. Entering into such a large plant and trying to figure out how everything worked was a bit intimidating at first. However, since I did not come with a know-it-all attitude, people were willing to teach me. Soon, I started to pick up projects to work on.

One of my first projects involved predicting what the flow rate of a thick ingredient (soy lecithin) would be if we decided to pipe it automatically into an oil ingredients tank from a room upstairs. For this, I used a viscometer, an energy balance, and Poiseuille's equation to estimate flow rates of the soy lecithin at several different temperatures. Although cost analysis prevented us from implementing the soy lecithin system, it was still exciting to use some of Professor Stanier's Heat and Flow class in the real world.

Among the other projects I have worked on is our plant's coding system, which prints codes on the sides our packaged oil and mayo. When I arrived, the plant was in the middle of switching to new coding software, and I soon became very involved in the transition process. Since then, I have been given ownership of the coding equipment. I have also had the chance to work with the company that made our coders to switch over to a new type of ink, which helps save the plant around $10,000 a month in ink and maintenance costs.

Working for Cargill has been completely different than anything I have experienced. It has also been completely worth it. When I walk around the plant, I can see that I have made a big impact on the environment here. I can see it in new equipment that I have ordered, in the smiles on operators' faces when I say hello, in new production lines I helped plan and install, and in the friendships I have gained with those who have taught and trained me. The new responsibility I have learned to carry here and the chance to apply what I have learned at the University of Iowa has been fresh and exciting. I still have a lot to learn, but it is exciting to see that with the help of those around me I can already make a difference in a manufacturing facility. My time with Cargill has been invaluable, and I highly recommend that students pursue a co-op experience.

Fourth Annual Spooky Sprint Supports Shelter House

By Rachel Levine

On October 20, 2007, the student chapter of AIChE held its annual fundraiser, the Spooky Sprint. The Spooky Sprint is a 5K Funrun family event where participants are invited to dress up in costume and also participate in a costume contest. The money raised at this event benefits the Johnson County Shelter House, a little known but very important local charity. The Shelter House is a non-profit organization that provides shelter and basic and transitional needs to those who are homeless in our community. The Shelter House is not solely a refuge, the staff work to encourage self-sufficiency in everyone who comes through their door. The student members of AIChE believe that the services the Shelter House provides are very valuable to our community and they are proud to raise awareness about and support the organization.

This year's Spooky Sprint coordinators, Rachael Collier, Christina Devine and Rachel Levine, devoted their time through the summer and fall to organize the event, with the goal of attracting more participants and raising more money for the Shelter House than they had in previous years. They worked closely with Crissy Canganelli, the executive director of the Shelter House, and she provided invaluable assistance with local community contacts and advertisement.

This year the Spooky Sprint raised more than $700 and saw over 30 participants, many of whom came in elaborate costume. Those who dressed in costume included everything from a girl dressed up from the 80's, to a team of runners dressed as a DNA stop codon, to a family dressed as vampires. Barry Butler, Dean of the College of Engineering, and Chris Brus, Director of Women in Science and Engineering at the University, both participated as celebrity costume contest judges. The race began and ended at the John Deere Plaza of the Seamans Center of Engineering Arts and Sciences. Many local businesses including Atlas, Dick Blick Art Materials, Iowa City Fitness, the Iowa Hawk Shop, Prairie Lights, Starbucks, Summit and New Pioneer Coop donated to the event to contribute to its success, as well as Iowa State Bank and Trust, who has contributed each year the Spooky Sprint has occurred.

The 2007 Spooky Sprint carried on the University of Iowa's student chapter of AIChE's goal to increase community awareness of the Shelter House and to support the services it provides. The members of the student organization are looking forward to continuing to benefit this important cause in years to come.

For more information about the Shelter House or the Spooky Sprint, please visit http://www.shelterhouseiowa.org/ or www.engineering.uiowa.edu/~aiche

AIChE National Conference

By Bryan Schnicker

On November 2, 2007, three men embarked on an epic journey to the Mecca of all conventions in Salt Lake City, Utah. Bryan Schnicker, Gabe Wood, and Dan Weber represented the University of Iowa's student chapter of the American Institute of Chemical Engineers (AIChE). Each year, student chapters from around the country and thousands of chemical engineering students come to the annual conference to partake in the week's festivities. The general structure of the conference offered a variety of helpful workshops, a student paper competition, and many keynote speakers. Although these events provided technical insight and new innovations, the ChemE car competition was definitely the highlight of the week.

Home of the Utah Jazz, University of Utah, and the Great Salt Lake, Salt Lake City offered a variety of flavor for the 4,000 students in attendance. Some exciting events to get the students acquainted with each other were student mixers, socials, and of course the Salt Lake City night life. Bryan, Gabe, and Dan met many fellow students from colleges such as LSU, Alabama, Texas Tech, and even Princeton. One night Gabe spent some time getting to know the members of the Puerto Rico ChemE car team. This team was fun to mingle with because they were the defending ChemE car competition champions.

Besides getting to know other fellow chemical engineers, some highlights of the conference included the student paper competition, awards banquet, and ChemE car competition. The student paper competition was really exciting because Dan was one of nine national finalists. His research was on the "Synthesis of Starch-G-Polymethylmethacrylate through Emulsion Photopolymerization." He gave a great presentation but ultimately fell short of winning. The next day, Bryan, Gabe, Dan, and Professor David Murhammer attended the student chapter awards banquet brunch. This banquet recognized students for various research and scholastic achievements. The University of Iowa's student chapter received yet another "Outstanding Student Chapter" award from AIChE. Also Jessica Heth, Iowa's chapter president, received an AIChE scholarship for her outstanding academic achievements.

After the brunch, the ultimate event for the AIChE conference was about to take place. Yes, this was the ChemE car competition. The overall goal of the competition was to run a small car off of a chemical reaction. The car that came closest to the desired distance was declared the winner. Cooper Union, from New York, used a vinegar and baking soda reaction to take home the gold and first place in the competition. This was the liveliest part of the week for Bryan and Gabe. They are currently working on their own ChemE car project. Expect to see an entry from the University of Iowa in the spring of 2008 at the regional conference in Lincoln, Nebraska.

Wind Power: The Renewable Energy Source of the Future

By Brice Wilson

On any given day, in all parts of the United States, a steady wind blows across the landscape. If harnessed, this wind has the potential to light homes, power appliances, and shrink this country's reliance on fossil fuels. Wind energy can, and should, be the next cheap and safe source of renewable energy that America turns to for the majority of its power generation.

Wind provides a never ending source of energy that fits nicely into the "green" worldview of the future. It is particularly appealing because, unlike coal and natural gas power plants, wind turbines generate electricity essentially pollution free. Throughout history, wind has been used to sail boats, irrigate crops, and grind grain (Wind Energy – How does it Work?). The next logical step in the progression of wind power was to begin generating electricity. Less than 1% of the electricity currently generated in the U.S. comes from wind power. With the current technology available today, 20% of America's electric needs could be provided through wind power. Furthermore, there is adequate wind in 46 states for commercial power production. North Dakota alone could supply one third of the nation's electricity (Wind Power Today, 2007). This vast, untapped potential, if turned into reality, would theoretically be enough to provide all the electricity for the entire country.

Wind is converted to electrical energy through a wind turbine. The rotors of the turbine convert the kinetic energy of the wind to rotational motion, which powers the turbine's shaft and generates electricity. There are many applications for these turbines, from large commercial wind farms, to small private turbines designed to charge batteries. Utility-scale turbines stand on towers 80 meters tall, with rotor blades 40 meters long, and are capable of producing 1.8 megawatts of power, enough energy to provide electricity for 600 homes (Wind Power Today, 2007). Wind turbine blades can begin turning, and generating electricity, at seven mph and have a maximum operational wind speed of 56 mph (Gray County Wind Farm, 2007). A medium sized turbine is used to generate power for an individual home or farm, while a small turbine can be hooked to a battery to store electricity for later use (2007).

Wind power projects large and small are providing energy, protecting the environment, generating revenue, and saving money for the people who started them. Near Montezuma, Kansas' first wind farm has been in operation since 2001. It has a generating capacity of 110 megawatts of electricity from 170 turbines that operate at an average wind speed of 20 mph, enough electricity to power 33,000 homes. Compared to producing 110 megawatts of electricity from a coal-fired power plant, carbon dioxide emissions are reduced by 600 tons annually. This is the CO_2 emission absorption equivalent to a 120-square mile forest in the middle of the Great Plains (Gray County Wind Farm, 2007). In West Texas, farmers are welcoming the addition of wind turbines to their farms as a way to replace declining payments from oil wells that have become depleted (Wind Energy – How does it Work?). In Forest City, Iowa, a wind turbine erected as a school project is predicted to save the district $1.6 million over its lifetime (Wind Energy – How does it Work?). Wind turbines are not without their drawbacks, however.

There are many critics who feel that wind turbines are not the future of renewable energy in this country because of their looming presence and environmental drawbacks. Wind turbines are large structures, reaching high into the sky, and are not aesthetically pleasing to some. Environmental concerns include bird deaths caused by the rotating blades and noise created by the turbine. Avian migration patterns and the types of light that attract birds are being studied to help prevent future wildlife fatalities (Wind Turbine, 2007). New and quieter technologies are under investigation to help placate the noise complaints generated by wind turbines. This new technology points to a bright future for wind power.

Wind is a fast growing renewable energy source, garnering worldwide attention due to its clean environmental record, its economics, and new technology that enhances the capacity and safety of wind turbines. Wind power is clean, has an abundant supply source, and is affordable. There are no nasty by-products of wind energy like there are for coal and nuclear power generation. Wind energy is also free from any "price shocks," due to international conflicts, that have the potential to affect some fossil fuels (Wind Energy – The Fuel of the Future is Ready Today). New technologies to improve the lifespan of turbines, the efficiencies of the blades, and to provide better controls and surge protectors are being developed that all point to a successful future for wind power (Wind Turbine, 2007). Wind power is the way to go for safe, economically feasible, and inexhaustible energy for the future. Harnessing the power of wind will provide an endless source of energy to meet the growing needs of this country in the not-so-distant future.

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Solar Energy: Brighter than Ever

By Amber Johnson

Currently the world uses fossil fuels, but due to depleting natural resources, alternative energy is quickly becoming a true necessity. Unconventional energy sources are becoming more common due to their low emissions and low costs. One such substitute for oil and coal is solar energy. Solar energy is often overlooked as a 'green' energy solution because of its higher cost. It should be considered a serious alternative because of recent improvements in efficiency and cost effectiveness.

Solar energy is not a new idea. Scientists have tested and re-engineered it ever since the first solar-powered steam engine was built in 1865 (Smith, 1995). High costs and low efficiencies make solar power unpopular (Davidson, 2007). The California Energy Commission estimated in 2004 that solar energy would cost 38.6 more cents per kilowatt hour than burning coal (Homsy, 2007). In the future, however, it is possible that solar power will increase significantly in use because of engineering advancements.

The production of solar panels used to capture solar energy is changing. Solar panels use silicon wedged between two metal plates. When sunlight hits the silicon, electrons flow amid the silicon and metal plates to generate electricity (Davidson, 2007). One revision includes rearranging the metal plates so both of them are below the silicon, increasing the efficiency to an industry high of 22% (Davidson, 2007). Increasing the efficiency lowers cost because fewer panels are needed to produce the same amount of energy. A smaller rooftop area is necessary, making solar power more accessible to small businesses and homeowners.

Another improvement in solar energy is the reduction of cost in the manufacturing process. Companies are beginning to mass produce the materials necessary to make the solar cells. One such corporation, Hemlock, plans to increase production from 1,000 metric tons of silicon per year to 10,000 metric tons per year in 2010 (Scott & Bryner, 2007). Another silicon manufacturer, Dow Corning, is growing at or above market rate (Scott & Bryner, 2007). Because of this growth, costs are charted to drop below one dollar per watt, which is the equal to the cost of carbon-based power (Scott & Bryner, 2007). Further advancements are predicted, and by 2014, solar energy prices will be competitive with conventional electricity (Davidson, 2007). Taking additional government incentives into consideration, the cost of solar energy is looking more cost effective than ever.

In addition to cost, more people are becoming environmentally concerned with global warming. Carbon dioxide from the burning of fossil fuels causes a change in the ozone layer; this is the cause of global warming (Brandt, 2007). The general public is ready to change their energy source. A CBS-New York Times poll in April 2007 found that 87 percent of Americans support the use of renewable energy sources, even though they are more expensive and can be less reliable than other sources (Homsy, 2007). Because it is natural and produces no carbon dioxide, solar energy is very earth-friendly. For every million British Thermal Units of energy produced from solar energy, up to 213 pounds of carbon dioxide is prevented from entering the atmosphere (Homsy, 2007).

People should seriously consider solar power for their homes and businesses. It is a practical source of energy that is constantly evolving into better forms that are both cost and energy efficient. Taking care of the Earth is also important and solar energy can be part of the answer. Thousands of pounds of carbon dioxide emissions would be prevented if all coal plants were replaced with solar alternatives. Solar power is the way of the future: environmentally and economically friendly.

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Stem Cells' Use in Medicine

By Leah Zmolek

As the medical advancements are made, and the average human life-span expands, new diseases rampage the human body. These diseases such as Alzheimer's, Parkinson's, and all types of cancer, unheard of until this past century, call for even more medical advancements. Recently in 1998 a major discovery of a potential new treatment option known as regenerative medicine has brought promising hope for survival of virtually any degenerate disease. Regenerative medicine which is based upon the use of stem cells is still in the process of being developed into a treatment procedure but its potential is very promising.

As many people know or have heard from the moral debates, unspecialized stem cells come from embryos. The reason that embryonic cells are of such interest is that they have the ability to split and evolve into many kinds of cells with different functions found throughout the human body.

Scientists and doctors believe that these cells will make it possible to generate new tissues and organs for patients that have been affected by diseases that attack certain parts of the body. Therefore, putting aside this moral controversy, this is a very exciting discovery in the world of medicine.

Stem cells come in two types; stem cells found in 3-5-day-old embryos and stem cells found in the adult human body. Stem cells found in adults "typically generate the cell types of the tissue in which they reside"(Stem Cell Information). Stem cells found in embryos seem to have more flexibility, since they are able to differentiate into a variety of specialized cells. However in recent studies stem cells found in adults have shown plasticity, or the ability to give rise to cells different from the cells in which they originated around. Scientists are still looking at the fundamental properties and specific conditions that lead to differentiation of cells (Stem Cell Information).

Many scientists are studying the signs or signals causing the differentiation of stem cells. Embryonic stem cells sometimes remain unspecialized for great amounts of time and yet on other occasions scientists have found that the stem cells specialize sooner than imagined. In order to be able to use the stem cells' ability to generate specialized cells, scientists must understand what causes them to evolve into specialized cells. Scientists now know that both internal signals dependent on the genes within the cells and external signals such as physical contact with other cells and chemicals secreted by other cells affect differentiation (Stem Cell Information). By understanding these signals scientists hope to be able to control when the cells differentiate and into what specialized states they differentiate into.

Regenerative medicine is still in the relatively early stages of research; however, the research being conducted on stem cells will change the medical world forever. One example of a way to apply the new knowledge of stem cells is with leukemia patients. Studies have discovered the difference among stem blood cells that could lead to a change in the survival rates for these patients (Times Colonist). Further discovery and understanding about the different types of stem blood cells could lead to a very drastic change in the way to treat a cancer that plagues many children around the world.

There is still much to be discovered about regenerative medicine. Scientists are far from understanding stem cells in their entirety. The future developments will pave the way for cell-based therapies and bring new hope to people with diseases and their families. If scientists can harness the ability of stem cells to regenerate cell tissues and organs for medical use the benefits are endless.

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Bridging the Gap: An Engineer's Social Responsibility

By Liz Van Dril

In previous years, national tragedies and natural catastrophes have rekindled society's interest in the true causes behind these misfortunes. On August 1st, 2007 the community of Minneapolis was shaken by the structural deficiency of the I-35W Bridge. The collapse of the bridge into the Mississippi killed thirteen and emotionally scarred all who witnessed the devastation. When the dust of the disaster finally settled, all accusing eyes turned to engineers for an answer to their question; why? As engineers, we abide by an ethical code that holds us responsible for the well-being of those who interact with our work. The I-35W Bridge collapse was a result of inadequate engineering and the neglect of the engineering ethical code. With society focusing on alternatives to avoid future catastrophes such as this, the analysis of why and how to prevent structural deficiencies is immediately relevant to the future of engineering.

If "approximately 12.4 percent of all bridges rated by the Federal Highway Administration have been declared structurally deficient," what is being done to prevent failure in the future? (Snyder, 2007) The cause of structural collapse depends on several variables: poor design, overuse, surrounding climate, etc. Snyder reports that the biggest concern is generally in the northern states where salt is being used more frequently. In 1999, the I-35W Bridge was the first major bridge in the nation to be outfitted with an automatic de-icing system, and now "the National Transportation Safety Board is looking into whether the chemical potassium acetate [involved in the de-icing system] corroded the bridge structure." (Murphy, 2007) Potassium acetate originally replaced road salt in de-icing systems because it "carries a lower risk of corrosion and environmental impact and is longer lasting than most road salts, requiring fewer applications." (Anderson, 2007) A study done in May of 2006 concluded that the corrosive effect of potassium acetate puts concrete bridge decks and supporting structures at risk. This report was preceeded only by a 2001 comprehenisive study on the de-icing system. "The study said the pump house holding the potassium acetate performed poorly and that at one point, all the chemicals in the 3,100 gallon tank leaked, seeping into the foundation of the bridge." (Murphy, 2007) Engineers claim "bridge maintenance appears to be one of the most important methods for preventing a collapse." (Snyder, 2007) Yet, bridge maintenance to correct the effects of daily weather conditions [i.e. the potassium acetate de-icing system] seems to be nothing more than a waste of money and poor engineering. Therefore, chemical engineers must occupy themselves discovering the safest chemical options necessary for road treatment, while structural flaws that cause deficiencies must be recognized and corrected by

structural engineers. The truss design, like that of the I-35W Bridge, has its weaknesses compared to suspension and cable-stayed bridges. In 2000 a report from the University of Minnesota stated that "the bridge's deck truss has not experienced fatigue cracking, but it has many poor fatigue details on the main truss and floor truss system," but "fatigue cracking of the deck truss is not likely." (Smock, 2007) Additionally, the federal government first noticed corrosion in the bearings seventeen years ago. Bearing systems, which are used to redistribute major longitudinal shifts in load, occasionally use Elastomeric and Fluoropolymer materials, but "often for different purposes than the steel system used on the Minneapolis Interstate bridge." (Smock, 2007) After the Minneapolis catastrophe and the community's infatuation with other structural deficiencies Smock believes "engineers will put new emphasis on potential use of polymeric materials," such as Elastomeric and Fluoropolymer. (Smock 2007) The basic design of the bridge was a major factor in the collapse. "Truss-type designs date all the way back to the late 18th century, but have fallen out of favor since 1970 as better highway construction materials [pre-stressed concrete and steel plate girders] have emerged." (Smock, 2007) The bridge, finished in 1967, consisted of steel arched truss spanning 458 feet over the Mississippi River. With corroded bearings, obsolete design and heavy daily traffic flow, the collapse of this particular structure was imminent.

Bridges all over the world are decades, if not centuries old. Many of the designs are outdated, and the structures have had their fair share of deteriorating weather and traffic conditions. As engineers we are honored to design such achievements as the I-35W Bridge, but with this honor we have a responsibility to periodically reevaluate our work to guarantee that it's the best solution for the presented problem. Unfortunately it took a fatal disaster to encourage the proper reevaluation of other deficient bridges. With the shock of structural failure in Minneapolis, engineers are being summoned from all fields to analyze the works of their peers and predecessors, and to develop safer solutions to all aspects of bridge operations. Denying the importance of bridge and general structural safety advancements would be neglecting the ethical code of engineering, and therefore addressing these issues is in the immediate future for the engineering society.

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Faculty and AIChE Student Awards: Fall 2007

Faculty:

Allan Guymon – *Donald E. Bentley Faculty Fellowship*
Charles Stanier – *Walter A. Rosenblith New Investigator Award*
Alec Scranton – *Regents Award for Faculty Excellence*

Students:

UI AIChE Student Chapter – *AIChE Outstanding Student Chapter Award*
Jamie Cecil – *AIChE Sophomore Academic Excellence Award*
Jessica Heth – *AIChE Student Scholarship*
Dan Weber – *AIChE Student Paper Competition Finalist*

Interested in speaking at professional seminar? If so, contact AIChE Student Chapter Vice President Seth Kleinschrodt at seth-kleinschrodt@uiowa.edu for details and availability!

Would you like to make a tax-deductible contribution to the University of Iowa AIChE Student Chapter? Please contact Prof. David Murhammer at david-murhammer@uiowa.edu for more information.

Editor-in-chief Zach Rodenburg would like to thank the following people for their contributions to this issue of the Chemical Engineering Newsletter:

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Your help is much appreciated!