

# CHEMICAL ENGINEERING NEWSLETTER

June 25, 2008  
Spring Semester 2008



University of Iowa

## Advisor's Corner

By Professor David W. Murhammer

Greetings to Hawkeye Chemical Engineers!! The Spring 2008 issue of our AIChE Student Chapter Newsletter begins with an article about the University of Iowa's participation in the AIChE Mid-America Regional Conference held in Lincoln, Nebraska. Congratulations to Tyler Gunn, a senior in our program, who won the paper competition at this meeting. As a result of his victory, he will be representing the Mid-America Region at the National AIChE Paper Contest being held at the 2008 Annual AIChE Meeting in Philadelphia. I am very proud to say that this is the third consecutive year that a University of Iowa student will be participating in the National Paper Contest! The 2<sup>nd</sup> article in this newsletter is a profile of our alumnus Sharon Tinker (BSChE, 1980) and her generous contribution to our Chemical Process Safety Course and Laboratory. This newsletter also contains four "topical papers" that were written by four different students in our Chemical Process Safety course taught by Professor Tonya Peebles. These include two topical papers about the exclusion of government employees from OSHA regulations. The other two topical papers discuss laws related to protecting chemical plants from terrorist attacks. This newsletter concludes with a list of undergraduate student and faculty awards received since our Fall 2007 issue.

Finally, I encourage our alumni to donate to the endowment fund that will be used to support our student chapter activities. 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 [murham@engineering.uiowa.edu](mailto:murham@engineering.uiowa.edu) to discuss specific details.

*Interested in speaking at professional seminar (we still meet at 4:30 p.m. on Thursdays)? Would you like to make a tax-deductible contribution to the University of Iowa AIChE Student Chapter? If "yes" is your answer to either of these questions, then please contact Prof. David Murhammer at [murham@engineering.uiowa.edu](mailto:murham@engineering.uiowa.edu).*

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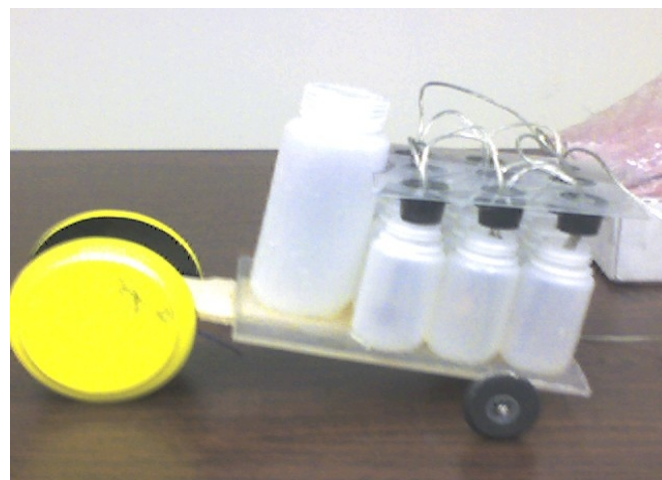
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*Editor-in-chief Mike Cross would like to thank the following people for their contribution to this issue of the Chemical Engineering Newsletter:*

*Faculty Advisor: Prof. David Murhammer*

*Contributors: Karen Haman, Bryan Schnicker, Rachael Collier, Anna Jordan and Matt Christensen*

*Thanks to everyone for being a part of this!*



After a 4-year hiatus, the University of Iowa fields a Chem E car in the AIChE regional conference in Lincoln, NE thanks to designers Gabe Wood and Bryan Schnicker. See related article on Page 2.

## AICHE Regional Conference in Lincoln, Nebraska

By Bryan Schnicker

The University of Iowa's AIChE student chapter participated in the annual regional conference held in Lincoln, Nebraska this year on the weekend of March 28<sup>th</sup>. This was a great opportunity for veteran and rookie students to take part in the activities offered in the beautiful downtown campus of the University of Nebraska-Lincoln. The conference included such activities as a student paper competition, workshops, keynote speakers, and the ChemE Car Competition.

On Friday, March 28<sup>th</sup> more than twenty anxious UI students and their advisor (Prof. Murhammer) embarked on the journey to Lincoln. After arriving, juniors Bryan Schnicker, Chuck Kozlowski, and Rachel Levine quickly prepared for the ChemE Car Competition, which was held later that night. This was the first time UI students had entered a ChemE car breaking a participation hiatus of four years. The car entered was to be powered solely off of a citric acid and magnesium reaction. The ChemE car team had faced many obstacles in preparing for competition, such as failed attempts using other power sources and a strict safety protocol. Unfortunately, the Iowa ChemE car team could not iron out their difficulties before the competition. The result was that the car did not move at the starting line. Although this was a tragic defeat for the UI students, it was not a total loss due to the fact that Iowa State University's Chem E car was disqualified for traveling out of bounds.

After the ChemE car competition, students had a chance to interact with other chemical engineering students from across the region at a social that included food, video games, and a raffle. UI students mingled with numerous schools that participated in the conference such as Oklahoma, Kansas, Kansas State, Missouri, and Tulsa. Saturday, March 29<sup>th</sup> was an uplifting day for the UI student chapter during the student paper competition. Stacy Sommerfeld and Tyler Gunn had the opportunity to present research they have participated in at the University of Iowa. Senior Tyler Gunn presented his research on "Seed-Mediated Growth of Platinum Nanoparticles via Green Chemical Reduction of Platinum Salts." His presentation was flawless and in result he earned first place in the paper competition. Since Tyler won the regional paper competition, he automatically has the opportunity to present at the National Conference being held in Philadelphia in November.

Overall, the AIChE regional conference in Lincoln was a fun and educating opportunity for UI chemical engineering students. The conference offered exciting activities that promoted valuable research and careers in the field of chemical engineering. Future and existing ChemE students should definitely consider participating in National Conference in Philadelphia or the next Regional Conference in 2009.

## UI Alum Makes Big Contribution to Chemical Process Safety Laboratory

By Karen Haman

University of Iowa alum Sharon Tinker (B.S.E. Chemical Engineering, 1980) understands the importance of chemical process safety and incident prevention in industry. With over 28 years of combined service in process control and technical supervision at ExxonMobil, Sharon has worked closely with fellow engineers, operators, maintenance, and management to ensure that safety remains a top priority. It is from this experience that her generous support of the Chemical Process Safety course and laboratory at The University of Iowa stems. With her assistance, new equipment was purchased for use in the laboratory component of the Chemical Process Safety course, and students enrolled in the course received a supplemental text, What Went Wrong? by Trevor Kletz, to emphasize the relevance of the course content to industry and the impact of actual events.

Just a few years after Sharon began working for ExxonMobil Chemical in Houston, Texas, the methyl isocyanate release at the Union Carbide plant in Bhopal, India, stunned the world and elevated the priority placed on process safety. Further incidents in the following years and experience she gained in her work assignments initiated Sharon's continued interest in process safety and incident prevention. Wishing to contribute to the

improvement of process safety performance beyond the scope of her job, Ms. Tinker chose to support her alma mater, which is home to one of the few chemical engineering programs in the United States to offer and require for graduation a chemical process safety course.

It is Sharon's wish that with her gift, chemical engineering students will take away a basic understanding of the process safety fundamentals. This understanding will originate from the course content and will be supported by hands-on experience in the laboratory as well as close study of actual incidents in the supplemental text. By improving the laboratory facilities available to students, her gift will also help to encourage prospective students to look into chemical engineering at Iowa. Sharon believes that equipping future engineers with the costly lessons learned from past incidents will help to prevent history from repeating itself. As process safety remains a top priority in industry, future chemical engineering graduates from The University of Iowa will benefit considerably from their early exposure to safety fundamentals made possible in part by Sharon Tinker's generous support.

## PROTECT EMPLOYEES THROUGH TRAINING, NOT OSHA

By Rachael Collier

They protect our homes from fire, preserve our parks, educate our professionals, and provide support services for cities, towns, counties, and states. They are firefighters exposed daily to asbestos, they are municipal workers exposed to raw sewage and waste in confined spaces, and they are maintenance workers who operate heavy machinery. They are public employees and they work in some of the nation's most dangerous workplaces: highways, prisons, hospitals, law enforcement, fire fighting, mental health institutions, and waste water treatment plants. According to the Bureau of Labor Statistics, 6,455 public employees died in the workplace from 1992-2001 (Barab, 2004).

The Occupational Safety and Health Act (OSHA) was passed in 1970 to assure safe and healthy conditions for working men and women. The act authorized enforcement of standards by providing research, information, education, and training in the field of occupational safety and health (OSHA, 2008). When OSHA was passed it excluded state and local government workers. Today, 38 years later, not every working man and woman is ensured a safe and healthy working environment as 8.5 million state and local government public employees in 26 states are not covered under OSHA (Torres, 2007). These 26 states developed and operate their own job safety and health programs for public employees. "This situation is not fair, and it not right," David Fillman, executive director of the American Federation of State and Municipal Employees Council, said. "Having the right to a safe job should not depend on the state in which public employees work" (Torres, 2007). Every employee in the United States has the right to a safe and healthy work environment.

Yet OSHA's staff and resources are already limited, and expanding OSHA coverage would only further restrict OSHA regulation and compliance. David Sarvadi, an attorney with the law firm of Keller and Heckman LLP, argued the effectiveness of expanding OSHA coverage to the other 26 states would be hindered by "another layer of bureaucracy to an already burdened system" (Torres, 2007). OSHA already regulates eight million private sector workplaces with only 1,100 inspectors who are able to conduct approximately 100,000 inspections per year (Silverstein, 2007). Thus, each workplace can expect an inspection once every 88 years. Workplaces in the United States are already inspected so infrequently that most employers have little economic incentive to pay much attention to OSHA standards. Expanding OSHA coverage would only weaken OSHA's regulation.

A better approach to ensuring safe and healthy work environments for all employees would be to expand funding

for safety training and hazard awareness programs to strengthen and improve current state compliance regulations. "It is the responsibility of everybody involved, for the [safety] managers as well as the employees, to take the steps necessary to protect themselves," Sarvadi says (Torres, 2007). Regulation cannot ensure compliance and having compliance does not guarantee safety. Thus, it is important to properly educate and train all employees working with or in hazardous conditions. OSHA Safety Training currently offers over 1,000 OSHA health and safety training resources including safety videos, safety posters, safety software, books, and online training courses (OSHA, 2008). Federal grants and other forms of funding tied in with current state compliance programs would provide a good incentive to employers to utilize OSHA training resources and provide adequate training and safety measures for employees.

The economic benefits of installing and enforcing safety and health measures and training could also be used as an incentive for employers to implement additional training and safety measures in their facilities. It has been seen that in facilities operating under a comprehensive safety and health management system, incidents of injury and illness, insurance costs, and workers compensation payments decrease. At the same time, employee morale rises, driving an increase in production, and ultimately boosting profits. An example of this success is Good Shepherd Nursing Home in Wheeling, West Virginia. The nursing home installed additional protective measures within its facility to increase the safety for its employees in 2000. Between 2000 and 2005 the nursing home has saved more than \$800,000 as a result of reduced workers' compensation insurance premiums (Rowe, 2007).

While it is not effective to expand OSHA's limited resources for regulation to public employees, it is a necessity that states and employers ensure public employee safety and health. A strong and effective method of ensuring these working conditions is to provide adequate training and safety measures for all employees. Outreach, education, and compliance assistance will enable employers and employees to prevent on-the-job injuries and illnesses. Thus, it is proposed that grants and other forms of funding in collaboration with already implemented state compliance programs provide an incentive and resource for employers to improve safety training and measures for their facilities.

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## OSHA and the Public Employee

By Karen Haman

December 29, 1970, was a day that has impacted millions of American lives for over 35 years. It was this day that the Occupational Safety and Health Act (OSHAct) was signed by then President Richard Nixon, and the first steps towards federally standardized workplace safety were taken within six months of executive approval ("OSHA 35-Year Milestones," 2006). Since its implementation, the OSHAct has greatly reduced workplace fatalities, injuries, and illnesses in the private business sector. The accomplishments achieved by means of the act are commendable, but a notable flaw remains: federal safety regulations and coverage established by the OSHAct are not directly extended to public employers and employees. "Employer" is defined in Section 3 of the OSHAct as "a person engaged in a business affecting commerce who has employees but does not include the United States or any State or political subdivision of a State," (OSHAct, 1970). One consequence of such widespread exemption is a system of non-uniform standards that vary by geographical location. The original intent of the OSHAct was to eliminate such inconsistencies in safety programs by establishing a single entity to manage occupational safety across all industries and locations in the United States ("OSHA's Mission Statement," 2008). Employee health and safety must be held paramount across all sectors, and for this reason, standard federal OSHA protections must be extended to and enforced by public employees.

The mission of the Occupational Safety and Health Administration (OSHA) is "to assure the safety and health of America's workers by setting and enforcing standards" ("OSHA's Mission Statement," 2008). For the employees of the private sector, the result of intense safety training, inspections, and education is a nearly sixty percent reduction of workplace fatalities since 1970; workplace injury and illness rates have fallen by forty percent ("OSHA Facts," 2007). OSHA acts by maintaining safety standards, authorizing workplace inspections, and fining or citing violations ("Introduction to OSHA," 2007). The success of the program is due to "strong, fair, and effective enforcement" ("OSHA Facts," 2007). It would not be unreasonable to suggest that the program is a positive addition to private sector workplaces, and any OSHAct reform must be based on the principles of the existing program if success is to be attained.

To better understand the need for federally regulated safety initiatives in the public sector, a brief overview of coverage offered by the current system must be considered. At the state and local government levels, workers are covered by the protections of state OSHA

programs. States are free to pass whatever safety laws and regulations they wish with regard to public employees; OSHA approval of state programs is not mandatory, and no minimum standards are kept. Federal approval of state-run OSHA programs is granted if and only if the plans are deemed at least as effective as the federal OSHA program. In 2001, fewer than half of all state OSHA programs were federally approved (AFSCME, 2001); the last to be added was New Jersey in 2001 ("New Jersey," 2001). States which have not received federal approval are not subject to any sort of reprimand. Upon receiving federal approval, state funding is matched by OSHA under terms of open inspection and an agreement not to give advance notice for inspections (Stender, 1974). Federal employees are subject to the protections of the federal agencies to which they belong; apart from the U.S. Postal Service, none of these agencies may be fined for violations of health and safety standards (AFSCME, 2001). All federal agency safety programs must be consistent with private sector OSHA standards, but by executive order, these safety policies are under the jurisdiction of the federal agencies to which they belong (Stender, 1974).

Opponents of amending the OSHAct to include public employees cite "unfunded mandates" and "resource constraints" as two concerns regarding such legislation (Rabinowitz, 2002). Both concerns are very real and would require extensive deliberation and compromise to resolve. It could also be argued that public employees already receive adequate coverage, but this is untrue for employees in states with no federally approved state health and safety program (Stender, 1974). Critics of OSHA reform also point out that federal standards are the "national consensus," and are therefore no more or less effective than state-directed initiatives (Brown, 1974). Keeping all of these arguments in mind, a conservative approach to OSHA reform seems to offer the greatest benefit to the public employee.

It is the duty of the federal government to ensure the health and safety of public employees, and the current OSHAct is in need of reform to fulfill the responsibility the federal government has to the working citizen. Federal protections in place should be amended to mandate that all states develop workplace safety programs consistent with the federal OSHA standards. The purpose of this is not to override the state's authority to protect its employees, but such a mandate would serve to hold states accountable for their policies. States which fall below the federal standards must be given incentive to improve, and federal accountability ought to be a fine source of motivation to keep up with safety standards. A system of fines should be set up to enforce this accountability, with the fine money collected applying to workplace safety initiatives. The dual state-federal coverage currently in place in about half of the states is beneficial because it adds human resources and splits funding equally between the two governing entities (Stender, 1974).

Employee health and safety should be the main concern in all workplaces, making OSHA reform a matter of urgency. Great strides toward adequate worker coverage can be taken if the federal government held state safety and health programs accountable and mandated the federal approval of all state safety plans without lowering the standards to meet the requirements. The OSHA has had marked success for over thirty-five years, and it would be reasonable to expect that an era of public employee safety and health coverage would dawn before the next thirty-five years pass.

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## Chemical Security Laws

By Matt Christensen

Chemical plants are essential to the manufacturing of products and precursors to products that are necessary for society. Unfortunately, these same chemical plants that produce vital materials and employ thousands of Americans are the cause for concern. Chemical plants contain many substances that can be hazardous to people and the environment and it is obvious that problems, such as accidental toxic material release, can occur. There is, however, another hazard inherently coupled with chemical plants: terrorist attacks. This issue of the deliberate abuse of chemicals in chemical plants with the intent of harming others has received great amounts of attention since the terrorist attacks which occurred on September 11, 2001. Currently, the issue of chemical plant security legislation is so important that it is being debated in Congress. There have been several bills introduced pertaining to the security of chemical plants. These bills involve prevention of criminal attacks on chemical plants as well as procedures followed in the case that an attack does occur. The major debate stems from two questions. First, what actions can be taken to ensure that chemical plants are not at risk of criminal attacks? Second, which of these actions (if any) are necessary based on the chance and severity of a terrorist attack and the economic feasibility?

One bill that is being debated in Congress is the Chemical Security and Safety Act of 2006. This bill was sponsored by Senator Frank Lautenberg of New Jersey (S. 2486 [109th]: Chemical Security and Safety Act of 2006, 2006). This bill was proposed, in general, to "detect, prevent, and minimize the consequences of" terrorist attacks involving chemical release that have the potential to harm people and the environment (S. 2486 [109th]: Chemical Security and Safety Act of 2006, 2006). One way in which the bill aims to prevent terrorist attacks is to have the Environmental Protection Agency (EPA) create a list of the chemical facilities with the highest risk of a dangerous chemical attack. The owners of these facilities would then have to identify the hazards that make these facilities potentially at risk for chemical release and design ways in which to prevent deliberate releases from occurring (Hendershot, 2006). In addition to prevention of terrorist attack, the bill addresses the scenario that a terrorist reaches the premise. The bill mentions the use of "buffer zones" and coordination with law enforcement (Hendershot, 2006). The use of buffer zones prevents terrorists from entering further into the facilities and coordination with law enforcement is key for catching terrorists as well as assisting in community emergency plans given that the terrorist is successful and the toxic release occurs.

The Department of Homeland Security (DHS) is also combating the risk of terrorist attack on America's chemical plants. Section 550 of the Homeland Security Appropriations Act of 2007 gives the DHS the authority to put into law regulations on specific chemical facilities in the United States (Department of Homeland Security Part III, 2007). Section 550 requires that these high risk facilities prepare Security Vulnerability Assessments in order to recognize hazards within the facility and implement a plan, referred to as a Site Security Plan (SSP) in order to meet regulations. Section 550 went into effect June 8, 2007 (Department of Homeland Security Part III, 2007). Another portion of the section that did not go into effect on this date is "Appendix A." Appendix A, often referred to as the "final rule," is a list of chemicals that are deemed hazardous by the DHS and some revisions on threshold limits for the chemicals listed within Appendix A. If these chemicals are possessed or will be possessed by facilities beyond the threshold level, then these facilities are subject to the submission of a "top screen" (Department of Homeland Security Part II, 2007). A top screen is essentially an analysis finding if the facility has a risk management plan and determining the results of a worst case scenario resulting from a flammable or toxic release (Peebles, 2008).

It is evident that there is a security risk involved with the many chemical plants in the United States (and the world for that matter). Unfortunately, enforcing bills will be very costly to the American taxpayers and may be an unnecessary task to some extent. It is important to enforce some bills, such as the Chemical Safety and Security Act of 2006 (which actually was never passed), which points out the facilities with the highest risk and forces them to take action.

It is necessary that facilities take precautions to greatly reduce the risk of terrorist attacks by means of turning chemical plants into chemical weapons that can cause harm to human beings and the environment. It is, nevertheless, important that a perspective on the probability of chemical attacks occurring is never lost and that unnecessary bills are not passed which could cost taxpayers precious dollars. It is more important that the DHS advocates awareness by such means as required seminars and the availability of online information coupled with necessary regulations than passing a plethora of legislation and wasting taxpayer money on an issue that, although has its importance, may be somewhat overrated.

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## Smart Legislation? Improving Chemical Security.

By Anna Jordan

In 2007, legislation to ensure the protection of chemical facilities from terrorist or criminal acts was enacted through Section 550 of the Department of Homeland Security Appropriations Act. In this section, the Department of Homeland Security (DHS) was given the authority to form rules and regulations for managing “high-risk” chemical facilities. Within 60 days, the DHS had issued a provisional set of rules for the Chemical Facilities Anti-Terrorism Standard (CFATS) that set forth risk-based performance standards for chemical facilities. The CFATS outlines a Chemical Security Assessment Tool that is to be used by affected businesses to assess their risk based on specific chemicals and their “standard threshold quantities (STQ).” This Chemical Security Assessment Tool includes two steps: a Top-Screen analysis, which uses existing data on worst-case toxic and flammable release scenarios and chemicals stored on site, and a Vulnerability Assessment, which identifies assets and applies threat scenarios (chemical release, theft, and sabotage) to all chemicals identified through the Top-Screen analysis. Upon completion of the Vulnerability Assessment, the DHS employs specific regulation for the chemical facility pertaining to storage and transport of all affected chemicals.

Several thousand comments from parties such as private chemical companies and U.S. Representatives and Senators, were communicated to the DHS in the 60 days after Section 550 of the DHS Appropriations Act was issued. In this unusually short turnaround time, many parties expressed concern over topics like the definition of a chemical facility, chemicals included on the “Chemicals of Interest list” and their STQs, and the inclusion of inherently safer process design as part of the risk-management criteria. Overall, opponents to the legislation stated that the CFATS was drafted carelessly due to the short deadline imposed by the DHS Appropriations Act, and its approval would result in an inefficient process for addressing the security of chemical facilities and developing risk management plans.

The CFATS defines a chemical facility as “any facility that plans, or plans to possess, at any relevant point in time, a quantity of a chemical substance determined by the Secretary to be potentially dangerous or that meets other risk-related criterion identified by the Department.” At first glance, this definition would include industrial chemical facilities, but schools, university laboratories, restaurants, and other establishments that are uncharacteristic of the type of facilities thought to be targeted by this legislation. Additionally, the Chemicals of Interest list includes many common chemicals, such as propane, with STQs that could result in the inclusion of private residences, such as farms. Opponents feel that as a result, the DHS is underestimating the number of Top Screen Analyses that it will receive and therefore, the risk-management process would be slow and counterproductive to the initial intent of the legislation. In the Appendix to the CFATS Final Rule, the DHS addresses these issues by modifying the Chemicals of Interest list and their STQs. For example, the DHS has removed the “Any Amount” criteria for chemical STQs, and has removed many chemicals, such as urea, that were subsequently identified as low-risk chemicals. Although the DHS did not modify its definition of a chemical facility, it did reiterate that, “If a facility possesses that chemical at the specified amount, the Department expects that the facility will complete a Top Screen.” These actions indicate that given the short amount of time available for drafting legislation, the DHS is willing to consider public comments and modify the CFATS accordingly. With future modifications, the CFATS should become more streamlined and effective in evaluating risk of chemical facilities.

The CFATS uses existing flammable and toxic release risk management data, as well as possession of high-risk chemicals, as a basis for establishing risk-management plans that pertain to criminal or terrorist attacks. Many opponents state that inherently safer design techniques should be mandated by the CFATS in order to truly manage risk posed by chemicals stored on site. Often, the desire to include inherently safer design technologies and techniques is included in chemical security legislation in overly broad terms, such as “Design, operation, and maintenance of safe facilities include use of inherently safer technology to the

"maximum extent practicable," such as in the Chemical Security and Safety Act of 2006. Inherently safer design has been left out of the CFATS because its inclusion would be counter-intuitive to providing a well-defined and widely applicable piece of legislation that would be simple for businesses to implement. Defining inherently safer design techniques in the CFATS as they apply to a multitude of chemical components and processes would not only require an immense amount of research on identifying alternative (safer) processes, but it would also be limited in its significance to the chemical process industry. Inherently safer design technologies will not always be cost-effective and the benefits received for implementing such technologies are not guaranteed to be anything more than marginal. As an alternative, the DHS should not mandate, but promote, the use of inherently safer design technologies through programs that encourage private businesses to invest time and money into mitigating security risks by implementing these techniques. Development of such programs can't happen overnight, but commenters should start expressing desire for the DHS to pursue such an option.

The CFATS may have been developed in an unusually short amount of time, but it was not drafted carelessly. The DHS has shown that it is willing to consider comments and suggestions pertaining to improvements of its legislation and its implementation through addressing initial problems with the overly broad Chemicals of Interest list and their STQs. They have also shown that they are ready and willing to consider and evaluate all facilities that may have risk of criminal attack in order to maintain the initial intent of this legislation, which is to protect the public health and safety and the environment from intentional chemical attack. If there is anything that the DHS has yet to address, it is the encouragement, not requirement, of private businesses to include inherently safer design techniques in mitigating the effects of a criminal or terrorist attack.

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## Faculty and Undergraduate Student Awards

### Faculty:

Tonya Peebles:

College of Engineering 2007 Award for Exceptional Service

Charles Stanier:

2007 Walter A. Rosenblith New Investigator Award

Alec Scranton:

2007 Regents Award for Faculty Excellence

2008 University of Iowa Foundation Distinguished Professor of Chemical & Biochemical Engineering

Umran Dogan:

Landon Award, April 2008

### Undergraduate Students:

Rachel Levine:

Goldwater Scholarship

Adam Beranek-Collins:

CBE Excellence in Undergraduate Research (\$200 junior poster award)

Karen Haman:

CBE Excellence in UG Research (\$80 junior runner up poster award)

Olga Jennings:

CBE Excellence in UG Research (\$80 runner up poster award)  
Best CBE UG poster award from the COE

Stacy Sommerfeld:

CBE Excellence in Undergraduate Research (\$300 senior 1<sup>st</sup> place poster award)

Nichole Daringer:

CBE Excellence in UG Research Award (\$120 senior 2<sup>nd</sup> place poster award)

Bryan Schnicker and his team:

Awarded funds for ChemE Car project development

Tyler Gunn:

Excellence in UG Research – AIChE Regional Conference  
AIChE Regional Paper Contest – First Place