

# Catalyst

## Students Win Contest for Clean Water Solution

Victims of natural disasters and people in developing nations know the importance of having clean water. Purchasing and distributing bottled water can be a costly way to secure clean water, but what if getting drinking water was as easy as setting it out in the sun? Thanks to a device designed by UW Engineering students, it is.

The group of students won \$40,000 in a contest for their design to monitor water disinfection using the sun's rays. Solar disinfection (SODIS) offers a cheap way to treat water by leaving it in plastic bottles in the sun, killing bacteria and viruses. The UW device indicates when the sun's rays have done their job.

Jacqueline Linnes, a recent bioengineering PhD graduate, began working on the project with Engineers Without Borders members Chin Jung Cheng, then an undergraduate in chemical engineering and now a UW doctoral student in bioengineering, and chemical engineering senior Penny Huang. With Charlie Matlack, a UW electrical engineering doctoral student, they built an electronic sensor system using parts from a keychain that blinks in response to light. The electronics monitor how much light is passing through the bottle.



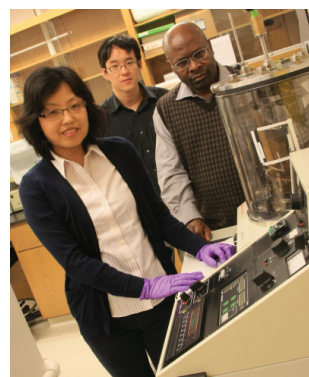
*With the sun, water bottles, and inexpensive electronic sensors, students Chin Jung Cheng, Charlie Matlack, Penny Huang and Jacqueline Linnes created a cheap way to clean water.*

Huang found materials for the indicator and a solar panel to accept the radiation range.

The competition called for designs costing less than \$10. "We were able to assemble the indicator at the cost of \$3.40 each, with the potential to decrease costs if mass-produced," said Huang. "We believe that those with less resources in developing nations can benefit from the use of this cost-effective instrument."

Read more at [www.cheme.washington.edu/news/2011/clean\\_water.html](http://www.cheme.washington.edu/news/2011/clean_water.html)

## Solar Grant Brightens Jenekhe Lab



*Postdoc Hao Xin (left) and graduate student Guoqiang Ren join Jenekhe at the thermal evaporator, which is used in solar cell production.*

The expense of solar cells is a major hurdle to solar energy as a viable source of electricity. But a new grant awarded to Prof. Samson Jenekhe and UW collaborators will search for solutions. "Hybrid Semiconductors: Overcoming the Excitonic Bottleneck in Low Cost Solar Cells," a three-year, \$1.6 million grant, brings together faculty members from the University's Chemical Engineering, Materials Science & Engineering, Chemistry, and Mathematics departments. The grant, awarded in 2010, is funded by the National Science Foundation, under its highly competitive Solar Energy Initiative.

"What we are going after is the heart of a longstanding problem of why current organic solar cells are not as efficient as those made from expensive inorganic semiconductors such as silicon," said Jenekhe. "We think that if the new hybrid semiconductor (which the group is designing) is fully realized, it" See *Solar Grant*, pg. 3

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# Message from the CHAIR

It's been two years since the last *Catalyst*, and in that time Chemical Engineering has made some exciting changes driven by the question, "How do we ensure our students have the skills and professional opportunities to succeed in this hyper-competitive world?" Through the guidance of our Advisory Board, we have aggressively focused on curriculum reform and infrastructure investment.



Dan Schwartz

Investment in the "venerable" Unit Ops lab has provided a transformational infusion of new instrumentation (photo, pg. 3). The expanded Surfaces and Colloids Lab is now required for all students. Molecular and nano-scale principles are core to our new intro to thermodynamics class, and we are offering a new course called "Molecular Engineering." These labs and courses, combined with our core curriculum, give students first-rate tools for discovering, improving, and manufacturing the highest value molecules needed by society.

We now offer ChemE students a nanoscience and molecular engineering degree option, and we have rearranged the schedule to allow students up to six months in industry after their junior year, without delaying graduation. If your company takes student co-ops/interns, please contact me.

Research infrastructure is expanding with the founding of the Molecular Engineering and Science Institute, to be located in a new building (opening January 2012) just a stone's throw from Benson Hall. Prof. René Overney holds a key position at the institute, and new hire Prof. Hugh Hillhouse (Rehnborg, pg. 3) brings expertise that broadly supports department and institute activities (News, pg. 3).

Despite an economy that poses challenges for the state of education, I am confident Chemical Engineering is on track to produce future graduates who will be world-beaters, like our alumni highlighted in this issue. Visit our website [www.cheme.washington.edu](http://www.cheme.washington.edu) regularly for much more departmental news. ■

## Rehm Award Benefits Junior with Raised GPA

A new ChemE award gives one determined undergraduate something any student could use — money.

The Rehm Award, established in the fall of 2010, gives \$2500 to the ChemE senior with the most improved GPA earned in the junior academic year. Thomas Rehm (BS '52, PhD '60) created the award to motivate more than just the highest-performing students to excel in their studies. "Top students who get scholarships and fellowships already have high grades," said Rehm. "This award is intended to motivate those students who might have struggled in their early college years to see that there are rewards for hard work and good study habits."

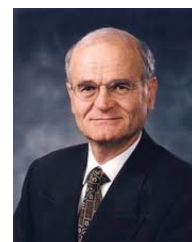
Teaching for over 37 years at the University of Denver and the University of Arizona, Rehm saw how important it was to address study issues early on, especially for undergraduate students. With this award, Rehm hopes to further support the development process of undergraduates.

The first Rehm Award recipient will

be announced in autumn 2011. The GPA improvement of this year's juniors will be calculated using GPAs in autumn, winter, and spring ChemE courses. ■

## Benedek Wins 2011 Diamond Award

Chemical Engineering alum Andrew Benedek (PhD '70) has been named the 2011 Diamond Award recipient for Entrepreneurial Excellence. He revolutionized the water treatment industry by developing membrane technology that filters out all bacteria and most viruses through thin tubes containing billions of micropores.



Benedek formed his own company, ZENON Environmental Inc., in the 1980s; the company's technology is used in 440 wastewater and drinking-water plants across the world. He has also received numerous awards for his work in wastewater treatment, and is developing new companies and technologies devoted to the improvement of alternative energy. ■

## Les Babb Reflects on Career



Dr. A. Les Babb, professor emeritus of chemical engineering, retired in 1991, but his contributions to the department and the health of many are still felt. Babb pioneered the development of artificial kidney systems, but he is most proud of developing the first kidney machine for home dialysis. "We helped so many people worldwide," Babb said in a recent interview. He was elected to both the National Academy of Engineering and Institute of Medicine.

"My career was extremely enjoyable. I have no bad memories," said Babb. One of his favorite memories was the establishment of a kidney center downtown, where

many people could be dialyzed at the same time.

Even in retirement, Babb keeps himself busy. "I've been reading a lot, some books I should have read long ago," he said. "I'm very happy in retirement. I look back on my career and am grateful for all the opportunities I had and for all those who made those opportunities available to me."



## Rehnberg Chair Promotes Faculty Excellence

The Harry A. and Metta R. Rehnberg Chair, established in 1982 to enhance research and teaching, has provided the opportunity for two ChemE professors to shine.

**John Berg**, a Rehnberg chair since 1982, used the chair's funds in the early 1980s to add ChemE 455, Interfacial and Colloid Science, to the curriculum. "This was a somewhat revolutionary concept then, but has since become an important component in chemical engineering curricula across the country, and is now a required course in our program as we move toward more emphasis on nano and molecular concepts," said Berg.



*Prof. Berg works with undergraduate Keegan Wincewicz on the particle micro-electrophoresis apparatus, in this 2004 photo.*

Hundreds of graduate and undergraduate students have studied under Berg, and he continues to enrich the lives of students and alums. "I stay in touch with many by letters, e-mail and phone, and through their visits to my office. This is one of the most gratifying aspects of the job."

### Solar Grant *(continued from pg. 1)*

could combine the high efficiency associated with silicon solar cells with the low cost associated with printed plastic solar cells."

The grant supports several graduate students, who will benefit from the experience. "This project will train the next generation of scientists and engineers needed to develop the highly interdisciplinary fields of energy science and technology, which require knowledge of chemistry, physics, materials science, mathematics, and engineering," Jenekhe added.

Through collaboration, Jenekhe hopes to advance the effort for solar energy solutions. "Ultimately, the results will underpin the transformative advancement of low-cost photovoltaics in new generations of low-cost solar cells with high power conversion efficiency. They will make a significant contribution to the ultimate solution to the energy and environmental challenges we face as a society," he said.

Berg has received numerous awards including a Guggenheim Fellowship, the University of Florida's Distinguished Professor Award, and UW College of Engineering 2010 Faculty Innovator: Teaching and Learning Award.

Even after more than 45 years at the UW, don't expect Berg to stop anytime soon. "I plan to continue doing what I love for a bit longer," he said. "I continue to find teaching at both the undergrad and grad levels to be as fun as ever."

**Hugh Hillhouse**, Rehnberg chair and associate professor, is poised to make his own impact in solar energy and nanomaterials. Hillhouse joined the UW in 2010, coming from Purdue University. He learned firsthand what makes for a successful Rehnberg chair—earning his master's studying under Berg. "The skills that I learned from John and the other UW faculty members were extremely formative for me, and they have had a profound impact on my academic career," Hillhouse said.



*Hillhouse*

Now as a Rehnberg chair, Hillhouse hopes to transform green energy. "My research group and I truly hope to pioneer new engineering approaches that will help us meet our energy demands economically while also being good stewards of the environment." ■

## ChemE News

Prof. **Shaoyi Jiang's** research contributed to the success of Semprus BioScience, a biomedical company. Jiang has also been named senior editor for *Langmuir*, a sciences journal.

Modumetal, co-founded by **John Whitaker** (PhD '03), produces nanolaminated alloy. It was named a top 10 new technology company for 2009 by *Inc. Magazine* and Alliance of Angels "2010 Company of the Year."

The department welcomes new **Advisory Board** members: Mary Armstrong, vice president of environment, health and safety for the Boeing Company, and Prof. Kathleen Stebe, chair of chemical and biomolecular engineering at the University of Pennsylvania.

Prof. **John Berg's** textbook *An Introduction to Interfaces and Colloids: The Bridge to Nanoscience* was published in 2010.

Graduate student **Joseph Baio** won the 2011 Student Award for Outstanding Research from the Society for Biomaterials.

Profs. **Jim Pfaendtner** and **Danilo Pozzo** are modernizing the undergraduate Unit Ops lab (photo) with a \$200,000 grant from the National Science Foundation.



*TA Michael Robinson sets up a new bioreactor in the Unit Ops lab.*

For more news, visit [www.cheme.washington.edu/news/index.html](http://www.cheme.washington.edu/news/index.html)

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# Catalyst

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## Palmer and Pope Honored with Distinguished Alumnus Awards



*Palmer*

Two alums have been named the R.W. Moulton 2011 Distinguished Alumnus for their accomplishments.

**Harvey Palmer** (PhD '71), Award in Academia, has been dean at Rochester Institute of Technology's Kate Gleason College of Engineering since 2000. Palmer transformed the curriculum through new programs, including a doctoral degree in microsystems engineering, and undergraduate degrees in chemical and biomedical engineering. "Being recognized by the ChemE faculty affirms that I have lived up to the promise, reflecting well on a program, department, and university that I hold dear," said Palmer.



*Pope*

**Bill Pope** (MS '49, PhD '58) held faculty positions at Brigham Young University, but his contributions to the diamond industry earned him the Award in Industry. Pope founded the Megadiamond Corporation, a supplier of synthetic diamond grit, and Dimicron, a company exploring medical applications of diamonds in joints. Pope passed away in November 2010 at the age of 88.

Read more alumni news at [www.cheme.washington.edu/alumni/profiles.html](http://www.cheme.washington.edu/alumni/profiles.html)

## Kermit Garlid Remembered

Professor Kermit Garlid passed away in September 2010 at the age of 81. In his 40 years at the University, he served as professor of chemical engineering, associate dean of the College of Engineering, vice provost of the University, and chair of nuclear engineering.



Bruce Finlayson, former chair of chemical engineering, remembers Garlid as being an effective administrator and an admired instructor. "I always found him thoughtful, considerate, and supportive," said Finlayson. Contributions to the R.W. Moulton Scholarship Endowment, which benefits ChemE undergraduates, are being accepted in Garlid's honor.

## Stay Connected!

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[www.cheme.washington.edu/alumni.html](http://www.cheme.washington.edu/alumni.html)