

ENGINEERING News

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Renewable Energy Engineering - a degree for a greener future

The Renewable Energy Engineering program at Alfred University's Inamori School of Engineering has recently received NYS Board of Regents approval. AU SOE joins a small but growing number of engineering institutions offering a Bachelor of Science degree in this emerging field.

REE, accepting its first freshman class in Fall 2013, seeks to produce the next generation of engineers and scientists to develop and perfect renewable energy systems to create a more sustainable future for our planet.

REE integrates and enhances aspects of traditional mechanical and electrical engineering courses. REE also reflects a synergy between AU's classroom teaching and research programs in fuel cells, solar power systems, wind energy and power management systems. Student in REE will have opportunities to work with faculty with expertise in mechanical engineering, electrical engineering and materials science and engineering.

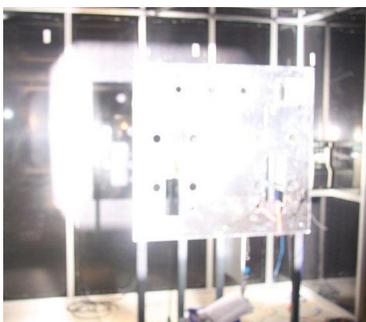
Students will have hands-on opportunities for learning device and system design through programs like the Solar Decathlon, an international competition, as well as AU's on-campus solar farm and local wind turbine installations. New laboratory facilities which enhance the program include the solar simulator, water tunnel and soon-to-be installed wind tunnel (for dynamic flow and efficiency experiments), and enhanced materials fabrication and testing capabilities for the high temperature materials used in fuel cells.

AU REE is among the few degree programs in NY State, or nationally, to focus on non-fossil fuel energy systems at the undergraduate level for this rapidly expanding professional field. AU SOE is unique in its integration of REE course and lab studies from the first year Engineering Explorations through to the Senior Design project.

AU REE graduates are expected to be well placed for careers in industry and government as renewable energy becomes more widespread and also to be well prepared for advanced degree studies in related specialized fields. As an area of concentration, REE is also expected to become a popular engineering minor program for MSE students - many will seek jobs or further studies in energy-related fields - just as a materials minor is expected to be a popular option for REE majors.



AU's Solar Decathlon Team conducts research on photovoltaic and solar-thermal renewable energy systems; see p2 for more on this multifaceted international design competition.



Solar simulator capable of illuminating a square meter. The solar simulator will be used to test photovoltaic systems performance. (Image courtesy of manufacturer, Sciencetech)

Engineering labs enhanced by \$3.6M in grants and gifts

Inamori School of Engineering students and faculty researchers have seen an immediate impact of recent NYS grants and corporate gifts totaling \$3.58M.

Capabilities in advanced high temperature characterization are being further equipped and upgraded with a Western New York Regional Economic Development Council award of \$2.9 million. The five suites of highly specialized equipment that make up the Center for High-Temperature Characterization of Materials are designed for analysis of materials that are either processed or used at very high temperatures (over 1300°C). The labs are used by undergraduate and graduate students as well as for contract research conducted for NYS companies.

High temperature materials play an important part in development of renewable energy technologies, in fuel cells, batteries, and solar cells.

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International Team Alfred-Guilin embraces the Solar Decathlon challenge

The upcoming 2013 Solar Decathlon in Datong, China, is an ongoing and practical laboratory for the Inamori School of Engineering's Renewable Energy Engineering program.

Alfred University, Guilin University of Technology (China), and Alfred State College are working together as Team Alfred-Guilin on a competitive entry in the upcoming August 2013 event. Each school is unique - combining expertise and experience, the team reflects a true spirit of international collaboration.

AU's SOE conducts research on the renewable energy engineering system (photovoltaic and solar thermal systems) and materials.

GUT has a key laboratory in New Energy & Architectural Energy Efficiency, with a focus on architecture for renewable energy.

ASC students build houses powered by solar energies.

Students and faculty collaborate with each other regularly via e-mails, phone conversations and/or Skype conferences. Several meetings involving students and faculty have been held in China. During the Summer of 2013, student and faculty teams from AU and ASC will travel to Datong to participate in the final construction and the competition.

AU's **Dr Jianxin Tang**, professor of electrical engineering, visited GUT in March 2012 and provided the electrical engineers viewpoint on photovoltaic systems.

For this academic year, Xuesong Li (pictured at left), Chongqing Electronic College, China, has taught the practical economics side of REE to AU engineers.

The Solar Decathlon, named because of the 10 scoring areas of the competition, was begun by the US Department of Energy in 2002 with just 4 universities competing. DOE responded to increasing international interest and joined with its counterparts in Spain (2007) and China (2011) to cosponsor 3 international competitions including Solar Decathlon Europe and Solar Decathlon China. Over 90 universities compete in each event.



AU SOE student Avery Sandler, 4th from right, and Craig R Clark, Dean of the School of Applied Technology, Alfred State College, met with colleagues from Solar Decathlon Team Alfred-Guilin (l-r, Xie Minxin, Zhong Guodong, Zheng Yuan, Huang Qiurun, and Li Zhangping of Guilin University of Technology, China) in Datong, China. At far right is SD China 2013 Guide Liu Lifang.



For this academic year, Xuesong Li (center), Chongqing Electronic College, China, has taught the practical economics side of REE to AU engineers.

MSE students win competitive scholarships

Two students of the Alfred University Inamori School of Engineering have been recognized for their talent and scholarship winning substantial awards.



Junior Stephen Rooney (at left), a double-degree student (sculpture and MSE), is the winner of the 2012 Ellwood Group Inc. Annual Metallurgy Scholarship - a \$15,000 scholarship award plus a paid summer internship. Rooney found the opportunity listed on Blackboard, where many engineering scholarship opportunities are posted. Says Rooney, "I normally find scholarships in glass or ceramics industry for [AU] students, so finding the Ellwood Group scholarship was a big surprise. I was looking for something in metals, so I jumped on it."

Beyond being an excellent student, Rooney credits his 2012 REU at the Colorado School of Mines and continuing involvement in AU's National Casting Center's metal casting facility (and the practical metallurgy learned there) as having contributed to his success in winning this award.

Senior Samuel Miller was awarded the 2012 Lewis C. Hoffman Scholarship by the Electronics Division of the American Ceramic Society. Miller received a \$2,000 scholarship for the current academic year.

Miller's essay on environmentally benign electronic ceramics, total grade point average, SAT/ACT scores, and a faculty recommendation letter were all criteria factored into the selection of the winner.

Why Choose Engineering?

E-LEAD and SWE help young women find out!

Students, faculty and alumni united on February 21, 2013, to introduce a group of 28 young women, all high school juniors (plus their guidance counsellors, teachers or parents) to the realities and advantages of choosing an engineering career.

Women in Engineering Discovery Day is an annual part of National Engineers Week (February 17-23, 2013) in the Inamori School of Engineering at Alfred University. This year the program was planned by the women and men of AU's Engineering Leadership Engineering and Development program (E-LEAD), and involved members of the Society of Women Engineers (SWE), SOE faculty and alumni, and AU's Judson Leadership Center.

Dr Doreen Edwards, Dean of the Inamori School of Engineering, and **Dr Christine Heckle** (AU'92), Corning Inc., discussed "Women in Engineering" and "Engineering after Graduation" from academic and personal standpoints before the group separated for campus tours, lab demonstrations, and hands-on activities in materials science and engineering. Participants learned about robotics and were invited to participate in an Egg-Drop Design Competition - the challenge being to land an egg safely after dropping off the AU Carillon - prizes being presented for the most successful designs at the evening "Engineering Picnic" hosted by ASME.

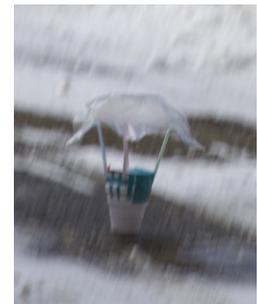
Throughout the day, current AU engineers were available as guides and to answer questions. Students participating this year included Amanda Troy, Noah Quinlan, Heather Stevenson, Meredith Laubert, Ryan Mahon, Ashley Burdett, Doug Sassaman, Courtney Smith, Claire Dvorak (SWE), and Ruby Wisniewski. Thanks also are due to Dr. Julia Overton-Healy, Director, Judson Leadership Center; Susan Kowalczyk, Collections Manager, Schein-Joseph Museum; and panel presenters from AU's Career Development Center, Public Safety, Residence Life, and Center for Student Involvement. Program coordinator was Marlene Wightman, SOE Director of Continuing Education and Outreach.



Engineering is ... Teamwork



Engineering is ... Testing



Engineering is ... Success!

E-LEAD: Engineering Leadership Education and Development

Engineering challenges in the real world are complex and multi-disciplinary; leadership, team building, and networking skills are essential for success.



*E-LEAD freshmen: (l-r)
Ruby Wisniewski, Ashley Burdett,
Noah Quinlan, and
Meredith Laubert.*

The Engineering Leadership Education and Development program (E-LEAD) promotes leadership skills training through seminars, workshops, a two-credit course and outreach to high school students. E-LEAD's community building component involves peer mentoring and networking events. E-LEAD is one of the Judson Leadership Center programs.

E-LEAD, supported in part by NSF funding, also offers some scholarship opportunities to undergraduates with a commitment to developing and implementing outreach and mentoring programs, including Women in Engineering Discovery Day.

Currently, there are 6 women and 5 men in the program. In addition to participating in skills seminars and on-campus tutoring and mentoring, 2nd and 3rd-year students are enrolled in ENGR 301 -Engineering Leadership: Principles and Practice for E-LEAD, taught by Dr. Julia Overton Healy, Director of the Women's Leadership Center. All students are currently enrolled in ENGR 370 - Engineering Leadership Project.

International study and international students enliven AU SOE

Engineering Study Abroad has been an active program for Alfred University engineers since the 1960's, when the earliest exchange agreements were worked out between AU and engineering institutions in Germany, England, France and Spain. On these campuses, AU engineers can receive credit for materials science and ceramic science coursework directly applied to their degree requirements. Similarly, students from these institutions can earn credit in the Inamori School of Engineering toward their degrees.



Currently, three SOE undergrads are studying at the University of Sheffield, England. Four European students are enrolled in mechanical and materials science engineering courses at AU: 3 from the Ecole Nationale Supérieure de Céramique Industrielle (ENSCI), Limoge, France and 1 from James I University, Castelon, Spain.

All AU students have access to 144 universities around the globe for semesters abroad and specialized studies.

Artemas Steere, Kathryn Esham and Eric Teller by the War Memorial, a Sheffield landmark, on an orientation "treasure hunt" tour of the city.

Professional meetings enhance networking opportunities, leadership skills

The Inamori School of Engineering encourages students to be active in professional activities, on campus and through the national engineering societies. Attendance can inspire future career paths, whether toward industry or graduate school, and enhance professional awareness and visibility.

Career opportunities may be found through on-site employment centers and networking through alumni and faculty contacts, as well as friends made while on AU Co-op or a corporate internship.

This year, SOE had student delegations to WE12 (Society of Women Engineers, Houston, TX), MS&T'12 (a joint meeting of the 5 major materials-related societies, Pittsburgh, PA), and SHPE 2012 (Society of Hispanic Professional Engineers, Fort Worth, TX)

SWE student attendees reported amazing networking and career opportunities -- over 175 companies at the Career Fair were interviewing students for all fields of engineering.

A student attendee at SHPE 2012 landed an internship in the automotive industry, while students attending WE12 reported interviewing with firms in aerospace and other industries.



SWE members outside the Houston Aquarium (l-r): Emily Allan, Meredith Laubert, Mary Hibbert, Claire Dvorak, Katherine Shoemaker, and Lydia Boutelle. Also attending WE12 but not pictured: Alison Schlobohm, Catherine Sahi, Laura Haas, and Devyn DeVantier.



SOE students attending MS&T'12: Front row (l-r): Dylan Divine, Sam Miller, Catherine Sahi, Dalton Divine, Devyn Devantier. Back Row (l-r): Kyle McDevitt, Nick Roberts, Eric Tower, Alex Turner, Eddie Potter

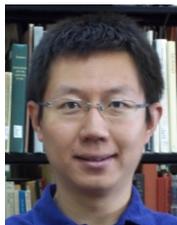
Grants and gifts

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With \$500K funding from the NYS Regional Economic Development Council Initiative, SOE is installing a solar simulator and a wind tunnel (Fall 2103), as well as expanding advanced manufacturing capabilities.

Advanced manufacturing is particularly essential to competitiveness in battery and fuel cell materials research.

As an example, MSE assistant professor **Dawei Liu**, a new faculty member contributing to the materials science aspects of Renewable Energy Engineering, is employing solution-based manufacturing strategies to develop more environmentally benign, readily



Dawei Liu

scalable, and high temperature tolerant lithium ion battery electrodes. Improved facilities enhance further grant competitiveness.

Corning Incorporated has donated a water tunnel, valued at \$80K, for use in studying dynamic fluid flows around solid objects. It's already in used in ENGR 116, Mechanical Engineering Explorations Lab, and ENGR 102, Computer Aided Design.

A \$100K George I Alden Trust grant enabled upgraded computer capabilities to control the new Fortis 3-D printer to utilize its fine tolerance (about 100 microns) resulting in a product finish equivalent to a finely sanded part, closing the loop from computer-aided design to rapid prototyping to dynamic testing using either wind or water tunnel.

The 1st-year SOE students will have opportunity to use the solar simulator, water tunnel, and wind tunnel to test the performance of materials and objects for different applications.



Students experiment with the water tunnel. From l-r, Allison Jernigan, Ben Thomas, and Stephanie Scheib.