Engineering
# News
Kazuo Inamori School of Engineering
Alfred University

Volume 13, Number 2 February 2012

### Upcoming Events

**February 19-25**

**National Engineering Week**

**On-campus engineering challenges and events sponsored by students for students!**

**March 24 & April 14**

**Accepted Students Days**

**Tour the campus and meet future classmates and faculty. Register at alfred.edu/congrats**

**April 20-22**

**AU's Spring Family Weekend**

**Hot Dog Day is Saturday, April 21 - parade, competitions and fun for all!**

### Engineering Programs for High School Students, Summer 2012

**June 24-28**

**Ceramic Engineering & Polymer Discovery**

**Students entering grades 11-12 participate in hands-on labs focusing on traditional ceramics, polymers and electronic ceramics.**

**June 24-28**

**Robotics Engineering Camp**

**Students entering grades 10-12 learn about science, technology, engineering and math through this VEX Robotics-based program.**

**July 22-26**

**Renewable Energy Engineering Camp - NEW!**

**Students entering grades 10-12 learn about wind and solar energy, fuel cells and nuclear energy in classes and hands-on labs.**

**July 22-26**

**Computer Engineering Camp**

**Computing experiences for both basic and advanced students aged 12-17. App and web design, computer languages and fun, too!**

**For complete information, go to alfred.edu/summer/hs.cfm**

## AU to compete in Solar Decathlon China 2013

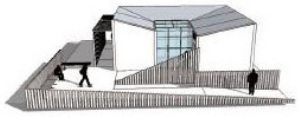
Alfred University's Inamori School of Engineering will partner with Alfred State College's Schools of Management and Engineering Technology and of Applied Technology, and Guilin University of Technology in China to form "**Team Alfred & Guilin**," one of 23 international university teams competing in Solar Decathlon China 2013.

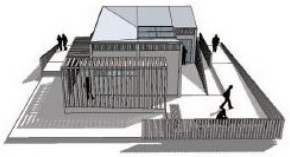
Students on all three campuses are being invited to be part of **Team Alfred & Guilin**, to work toward the design and construction of their solar concept demonstration houses. Construction begins Winter 2013.

"This is just an incredible opportunity for our students as we begin our new program in renewable energy engineering," said Doreen Edwards, Dean of the Inamori School of Engineering.

Dean John Williams, of ASC's School of Architecture, Management, and Engineering Technology echoes Edwards' sentiment: "Students and faculty in the architecture and engineering technology programs have been excited about the project from the beginning. Participating in a Solar Decathlon has been a long-standing goal and now we are collaborating as a team with colleagues across the globe."

Solar Decathlon 2013 has already involved 80 students and multiple engineering and design faculty members on all three campuses and will continue to engage similar numbers, serving as an evolving laboratory of energy engineering and advanced systems technology impacting many class curricula and independent projects.





*Team Alfred & Guilin's design reflects the traditional quadrangle courtyard house.*

*continued on page 3*

## E-LEAD scholarship initiative promotes engineering leadership education and development

Leadership and teamwork skills are needed for a successful engineering career," says Dean Doreen Edwards, Kazuo Inamori School of Engineering at Alfred University. AU's Engineering Leadership Education and Development (E-LEAD) initiative is designed to provide scholarships and leadership training to young women and men who are dedicated to making a difference.

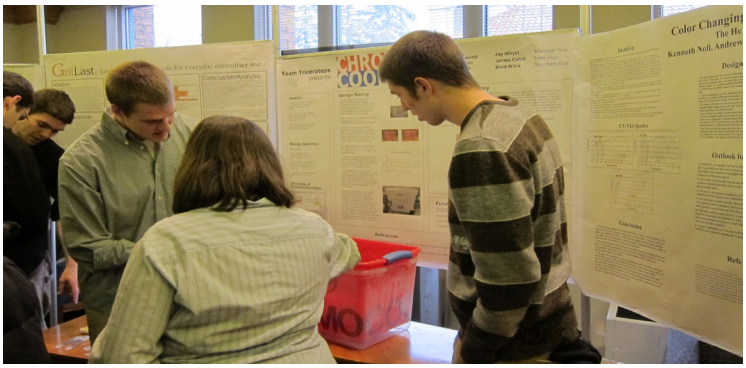
E-LEAD is a collaborative effort between the SOE and AU's Division of Student Affairs. Julia Overton-Healy, director of the Women's Leadership Center, will work with Edwards to develop the leadership component.

Individuals applying to the Inamori School of Engineering are invited to apply for an E-LEAD Scholarship. In addition to providing up to $10,000 per year for four years, the E-LEAD scholarship will provide leadership training opportunities. The E-LEAD scholarships and associated programming were made possible by a multi-year $570,000 grant from the National Science Foundation and the generous contributions of individual and corporate sponsors.

## Exploring materials entrepreneurship on campus - CEMS 484 Engineering Operations

CEMS 484 Engineering Operations or "E-Ops" plunges seniors in SOE's materials-related majors into the world of business and manufacturing. In the class, students learn to apply business tools and their materials expertise in new product development as they bring a product to market.

Budding entrepreneurs learn techniques of quality control, plant layouts and the use of charts, the economics of manufacturing including cost estimation, cost accounting, depreciation, cash flow, tax consequences and rate of return analysis. Manufacturing and business reality is emphasized through trips to manufacturing plants, and students often bring their own manufacturing experiences from co-op or other work back to the classroom.



*CEMS 484 team presentations included longer lasting abrasive grit and color-changing UV-sensitive beer bottle glass (both recycling-friendly); a temperature-sensitive color-changing cooler, ceramic bullets, metallic glass coated tools and color-changing glass jewelry.*

In the recent class, student teams took up a variety of design projects that demonstrated creativity, innovation, and out-of-the-box thinking. Within their maximum $100/team budget they developed real products, from concept through lab testing and prototyping where possible, developed a business plan and presented their results in an on-campus "Venture Fair."

All AU SOE seniors must overcome open-ended design and manufacturing challenges (as do all engineering undergraduates in nationally accredited programs), bringing their classroom, lab, work and Co-op experiences together for successful team results.

*At left: A student team in last year's ELEC 468 demonstrate their "solar scooter," reflecting AU SOE's emphasis on "Renewable Energy Engineering" - an engineering minor since 2011 and expected to be available as a major starting Fall 2012. Pictured are EE seniors (standing, l-r) Sheldon Forbes, Julie Georgiev, and Raymundo Vazquez; and current EE grad student Yunming Chen.*

## Research opportunities promote independent exploration ARGUS and NSF-funded REU grant opportunities on and off campus

Alfred University promotes independent undergraduate research through the **Alfred Research Grants for Undergraduate Students** (ARGUS) program. These grants support student-defined research conducted in collaboration with a faculty advisor.

Current first-year engineer Ryan Heckman, an Air Force veteran, has recently been granted ARGUS support for the exploration of new design concepts for residential roof-mounted wind turbines. Heckman, a materials science major, will work with Dr. Jalal Baghdadchi, associate professor of electrical engineering, and his students to develop viable prototypes. ARGUS projects are presented at AU's undergraduate research fair held each April. More information about ARGUS can be found at **http://www.alfred.edu/argus/**.

Intense research experience can be available to undergraduates through the National Science Foundation-funded **Research Experience for Undergraduates** (REU) program. REUs are usually 10-week on-campus opportunities available throughout the United States and include a stipend and travel expenses. The full range of REU opportunities can be searched at **http://www.nsf.gov/crssprgm/reu/reu_search.cfm**.

*Stephen Rooney - REU for in-depth metallurgy research experience.*

Senior MSE Stephen Rooney, also a successful metals sculptor, sought out an REU last year for an in-depth experience in metallurgy. He spent the summer at the Colorado School of Mines immersed in a program on the development and testing of advanced Ti-5553 alloys as part of a team supervised by Dr. Michael Kaufman, head of CSM's Metallurgical and Materials Engineering Department.

## Student societies enhance professionalism

Student professional societies on campus promote camaraderie and professionalism in our diverse student body.

AU engineers participated in the Society of Women Engineers (SWE) 2011 annual conference, "WE11- Raise the Heights of Innovation," held October 13-15, 2011 at McCormick Place in Chicago, Illinois.

AU engineers attended the annual meeting of The Society of Hispanic Professional Engineers (SHPE), in Anaheim, CA, October 26-30, 2011.

Approximately 20 Keramos and Materials Advantage members attended MS&T'11, the combined annual meeting of five major materials-related professional societies, held October 16-20, 2011, in Columbus, OH.

Each meeting attracts over 4,000 engineers from government, industry and academia; for student attendees these gatherings present unique opportunities for professional networking, career exploration, and connection with internships, full-time jobs, or graduate programs!

In March 2012, AU SOE will be represented at the IEEE Region I Student Conference in Hartford, CT.

Student sections including Materials Advantage (combined student membership in ASM, TMS and ACerS), IEEE, and ASME are active on campus as are the engineering honor societies Keramos and Tau Beta Pi.

*SWE at WE11 (l-r): Stefanie Chang (Sr-ME), Kathryn Esham (So-GES), Alison Schlobohm (Jr-CE), Claire Dvorak (Jr-CE) and Laura Haas (Jr-BMES); also attending was Devyn DeVantier (Jr-MSE).*


*AU at SHPE'11 (l-r) Roberto Hernandez (Jr-ME), Andres Garcia (Fr-MSE), Raymundo Vazquez (Sr-EE), Sheldon Forbes (Sr-EE), Luke Jaeger (So-BMES), Sebastian Cespedes-Ortiz (Sr-EE), and Roberto Cruz (So-EE).*



## Solar Decathlon

*continued from page 1*

Edwards remarked, "First, the students will work collaboratively and internationally, and that's the way engineers of the future will work. The three schools bring different strengths to the team, and the students will have to learn how to utilize all the various resources most effectively.

"Second, students will see what they've designed actually implemented, not just here in Alfred, but also in China. It's an ideal way for engineering students to understand how a project moves from the conceptual stage to a final product."

Two identical structures, one in Alfred and one in Guilin, will be built for practical testing of all mechanical and electrical systems, as well as the assembly and disassembly procedures.

Some AU students will have an opportunity to travel to China during the project, with GUT students traveling to Alfred to work with their counterparts. For the summer 2013 competition, teams from GUT, AU and ASC will work together to disassemble the Guilin house for transportation, reassembly, and testing on-site in Datong, China.

Beyond the support of the academic institutions, "Team Alfred & Guilin" has pledges of support from sponsors including Johns Manville Cooperate R&D in Littleton, CO (insulation materials, solar roofing, and solar shingles); Rigidized Metals in Buffalo, NY (zero energy wall in front of the glass structure near the entrance); Solar Liberty in Buffalo, NY; New York State Energy Research and Development Authority (NYSERDA); CREE in Durham, NC (LED lighting); and New York State Electric and Gas Cooperation (NYSEG).

The inaugural U.S. Department of Energy Solar Decathlon was held in 2002 and featured 14 U.S. teams. In 2005, the competition became international when Canadian Solar and the Universidad Politécnica de Madrid were accepted as two of 18 teams. This internationalization continued in 2007 and 2009, when the 20 teams included teams from Canada, Germany, and Spain. In 2011, the U.S. Department of Energy Solar Decathlon will include teams from Canada, Belgium, New Zealand, and China.

Also in 2007, the United States and Spain signed a memorandum of understanding to allow the creation of Solar Decathlon Europe 2010; the next event is planned for 2012, when Solar Decathlon Europe will host 20 teams from 15 countries and four continents.

Solar Decathlon China will continue in the same tradition, hosting teams from 11 countries and 5 continents.

## Solar "Farm" - a practical lab for alternative energy

Alfred University's Science Center's new solar farm produces almost 50kW of clean solar power - a large step toward AU's goal of 100kW of solar power on campus by 2014!

The panels, installed during 2011 using funds from a NYSERDA grant, cover a large fraction of 75,000 sqft roof area and can generate approximately 8% of the average energy requirement of the facility. Installation was performed in collabortion with Solar Liberty of Buffalo, NY.

Students from all levels, from circuit design to advanced electrical machinery, use the facility to learn hands-on, practical, lessons about the utilization of solar energy in the context of complex building systems and device subsystems, such as for LED lighting, battery storage, and DC appliance design.

AU has also installed solar panels to generate 17kW on the roof of "Ann's House," a 48-bed "green" residence hall which has been submitted for LEED (Leadership in Energy and Environmental Design) certification.

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## AU's Women in Engineering Day 2012

Twenty-three young women from 16 high schools in western New York and Pennsylvania, gathered at Alfred University on February 23, 2012, for a day-long introduction to engineering as a career choice.

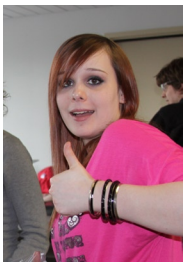
The annual event was part of National Engineering Week (February 19-25, 2012) - a week to celebrate the positive contributions engineers make to society with engineering demonstrations, competitions and social activities at almost all engineering institutions in the United States.

The young women were welcomed to campus by hosts Dr. Doreen Edwards, Dean of the Inamori School of Engineering; Dr. Linda Jones, AU associate VP and head of the NYS College of Ceramics (both accomplished engineers in materials science); and Dr. Julia Overton-Healy, Director of AU's Leadership Program and Women's Leadership Center.

Interacting with current engineering undergrad and graduate students as well as faculty and staff, the women participated in demonstrations and hands-on experiments in renewable energy technologies, ceramic processing, investigation of materials at ultra-low temperatures (and enjoyed "Liquid Nitrogen" ice cream), remote-controlled robotics, and glass properties.



The group explored advanced ceramic technologies in today's electronic, mechanical and biomedical systems at the Inamori Kyocera Museum of Fine Ceramics.



The women then split into groups to brain-storm solutions to the classic "egg-drop" problem and then tested their designs against gravity from the observations deck of AU's Davis Memorial Carillon. Prizes were given for the most successful solutions.

According to Forbes.com [*With more women in the workforce, what fields should they consider? (Hint: study engineering.)*, Jenna Goudreau, 02.17.10], after being a corporate CEO, the most appealing career for women is engineering. Women comprise only about 12% of all engineers, yet it's one of the best-paying and fastest-growing fields, as well as being among the most satisfying career choices. Thumbs-up for Engineering!

## Engineer/Artist selected for juried competition

Dual degree student Stephen Rooney (Sr-MSE/Sculpture) was among the successful artists chosen for the September 2011 "64 Arts National Juried Art Exhibition" at the Buchanan Center for the Arts in Monmouth, IL.

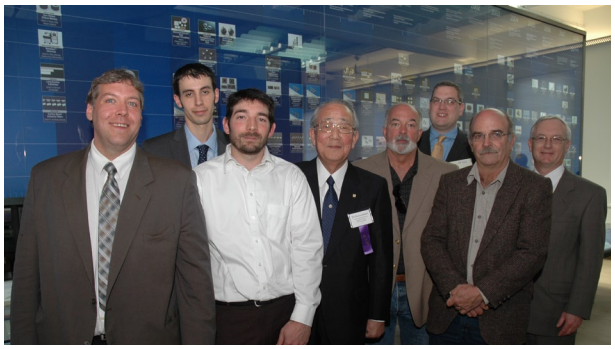
The annual Exhibition highlights quality visual artworks from artists across the country; 64 artists are selected from all entries.

The selected piece, "Iron Roll," is a work in cast-iron. Rooney, who recently returned from an RUE experience in metallurgy (see page 2), plans to continue in materials research.

*"Iron Roll", by Stephen Rooney, cast iron, 2011 (approx 18 inches)*



## Inamori Kyocera Museum wins architectural award



*Dr. Kazuo Inamori, founder and chairman emeritus of Kyocera Corp., one of the world's manufacturers of high-tech ceramics (center) congratulates the design and engineering team on their completion of the award-winning Inamori Kyocera Museum of Fine Ceramics at the May 2011 dedication.*

The Inamori Kyocera Museum of Fine Ceramics won the highest honors for an interior design in an annual Design Excellence competition sponsored by the American Institute of Architects (AIA), Buffalo/Western New York chapter.

The striking blue glass display cabinets contain objects that highlight the history of ceramic materials, from 24,000 BCE up to today, where fine (also known as advanced or engineered) ceramics are an enabling technology in countless everyday items - from computers and cell phones to fuel cells, solar panels and biomedical implants.

The project was submitted to the competition by Wendel Duchscherer Architects & Engineers of Buffalo, NY.

Interior design was done by Roche & Co., Ltd. Wendel was the mechanical, electrical, plumbing, fire protection and structural consultant. General contractor was LeChase Construction, with O'Connell Electric Company.

## Recent faculty honors and awards

**Olivia Graeve**, professor of materials science, was honored by the Society of Hispanic Professional Engineers (SHPE) as the 2011 recipient of the Jaime Oaxaca Award, the highest national award presented by the Society.

The award was presented at SHPE's Technical Achievement Recognition ceremony on October 29, 2011, in Anaheim, CA. The Jaime Oaxaca Award is given annually to recognize "selfless and outstanding contributions to the fields of engineering and science to the Hispanic community over an extended period of time." Graeve was honored by SHPE in 2006 as "Hispanic Educator of the Year."

**S.K. Sundaram**, Inamori Professor of Materials Science, is one of 166 researchers world-wide selected in 2011 as senior members in SPIE, an international society for optics and photonics.

Sundaram was chosen for his "achievements in millimeter wave material diagnostics and sensing." His major areas of research interests include THz/millimeter wave science and technology, multi-scale materials processing, live-cell spectroscopy for rapid screening, and ultrafast materials science and engineering. He is internationally recognized for his interdisciplinary approach to research.

**Arun K. Varshneya**, emeritus professor of glass science, was honored by the Indian Ceramic Society at its 75th anniversary meeting in Agra, India, in December 2011. Varshneya presented the platinum jubilee lecture, a keynote of the gathering.

## First-year "Exploration" offers diverse engineering experience

"Engineering Explorations" presents the first year engineer with a new engineering vocabulary and a new set of engineering tools – both conceptual and hands-on – for engineering problem solving and communications.

Students choose two Engineering Explorations - biomaterials (ENGR 111), ceramic (ENGR 112), electrical (ENGR 113), glass (ENGR 114), materials science (ENGR 115), or mechanical (ENGR 116) engineering. Each six-week course also helps the student refine their selection of major and minor programs.

*Current explorations: Above, CEMS - behavior and properties of traditional clay-based ceramics; at left, EE - embedded systems design and characterization of photovoltaics; upper left, MSE - diverse classes and behaviors of materials and property investigation.*

*Late Spring explorations: BMES - formulation of bone replacement bioglass for mechanical and bioresponse testing; GES - colored glass preparation and its optical characterization; ME -mechanical design simulation and basic motor control for robotics.*

## Co-op offers real world experience

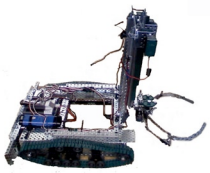
Working in the corporate world of research or manufacturing cannot be recreated in a classroom. AU SOE undergrads find that experience through Co-op – putting their classroom knowledge to work in the lab or factory.

These 5-8 month appointments (usually a semester plus a summer) also bring a good paycheck and the opportunity to explore different work environments at nationwide locations. Co-op is excellent for creating networking opportunities with AU engineering alumni - who benefited from their own co-op experience - and professionals from various technical fields.

Educational benefits are just as impressive, as co-op students are immersed in new technologies, often with one-on-one instruction from industry experts!

*Pictured: Co-op at CertainTeed Corp. IG, Chowchilla, CA - James Chrabaszcz (left); at alumna-founded Ceralink, Inc, Troy, NY - Catherine Sahi (right).*

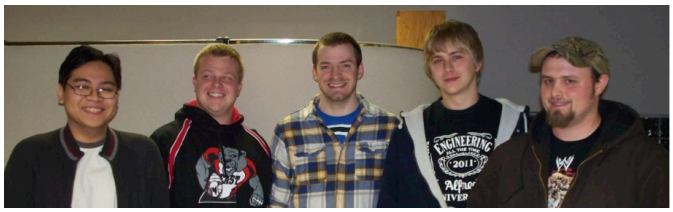
## Saxon Robotics competes in VEX Collegiate Challenge



Saxon Robotics travelled to the VEX Robotics Challenge hosted by California University of Pennsylvania (California, PA) on November 18, 2011. The team competed against challengers from Pennsylvania, Maryland and Illinois in the one-day event.

The Collegiate Challenge Competitions, which are held throughout North America, all utilize the same arena design and objects. Winners move on toward an International Collegiate Championship.

Alfred University will host the "Battle of The Saxons," a VEX Collegiate Challenge, on March 31, 2012, in the Powell Campus Center Knight Club.



*Saxon Robotics team members: ME's Carl Liboro, Jon Stockum, Marc Perkins, Shane Thompson, and Josh Horning.*