

**SAMPLES OF ARTICLES FROM
UNIVERSITY OF BRIDGEPORT
PUBLICATIONS**

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**School of Engineering
Newsletter
September 2005**

Scholarships, Conferences and Research Proposal Updates

Dr. Tarek Sobh, with graduate student Sarosh Patel, recently submitted a proposal to the Robotic Industries Association (RIA) for the Robotics Research Equipment Award. The RIA award provides selected universities with donated robots and accessories for two years in order to conduct research projects on topics of interest to the RIA membership. Their project involves telerobotics (controlling robotic devices from a distance).

The School of Engineering has been awarded a scholarship in the amount of \$8,000 for 2005 - 2006 from the Pitney Bowes Literacy and Education Fund. The scholarship recipient must meet specific qualifications, and a formal presentation of the check from Pitney Bowes to President Salonen and Dean Sobh will be arranged for a later date.

Dr. Khaled Elleithy and Dr. Tarek Sobh, with Professor Toshio Fukuda from Japan, are the chairmen for the “International Joint Conferences on Computer, Information and Systems Sciences and Engineering” held December 10 – 20, 2005.

The conference is sponsored by the Institute of Electrical and Electronics Engineers (IEEE). **CIS²E 05** provides a virtual forum for presentation and discussion of the state-of the-art research on computers, information and systems sciences and engineering. The virtual conference will be conducted through the Internet using web-conferencing tools, made available by the conference. Authors will be presenting their PowerPoint, audio or video presentations using web- conferencing tools without the need for travel. Conference sessions will be broadcast to all the conference participants, where session participants can interact with the presenter during the presentation and (or) during the Q&A slot that follows the presentation.

CISSE (International Joint Conferences on Computer, Information and Systems Sciences and Engineering) 2005 Conference Wrap-Up

Dr. Khaled Elleithy and **Dr. Tarek Sobh**, with Professor Toshio Fukuda from Japan, were the chairmen for the “International Joint Conferences on Computer, Information and Systems Sciences and Engineering” (CISSE). The conference was technically co-sponsored by the Institute of Electrical and Electronics Engineers (IEEE). The conference started on Sunday, December 11 and ended on Sunday, December 18.

The conference (<http://www.cisse2005.org>) was a smashing success! CISSE 2005 was the first Engineering/Computing Research Conference in the world to be completely conducted on-line in real-time via the internet. CISSE received 255 research paper submissions and the final program included 140 accepted papers, from more than 45 countries. The presentations, papers and time schedule for live presentations over the web were available for all registrants. The presentations were also recorded and will be part of the permanent CISSE archive, which will include all power point presentations, papers and recorded presentations, at <http://www.cisse2005.org/schedule.aspx>. (Please use login: guestaccount, password: guest, to access the final program.)

A Synopsis: CISSE was a ground-breaking idea/experiment in many ways. It was the first very-high caliber research conference in engineering/computing conducted completely on-line/virtually. All aspects of the conference are managed on-line (not only the reviewing/submissions, registration, etc.) but also the actual conference. Materials (PowerPoint presentations and actual final manuscripts) were available to the participants several weeks before the conference, so they could pick and choose the presentations they wanted to attend and think about questions, etc. that they wanted to ask. Conference participants - authors, presenters and attendees - only needed an internet connection and sound available on their computers in order to be able to contribute and participate in this international ground-breaking conference. The on-line structure of this high-quality event allowed academic professionals and industry participants to contribute work and attend world-class technical presentations based on rigorously refereed submissions, live, without the need for investing significant travel funds or time out of the office. CISSE received submissions from more than 50 countries, for whose researchers, this presented a much more affordable, dynamic and well-planned event to attend and submit their work to, versus a classic, on-the-ground conference.

The CISSE conference audio room provided superb audio even over low speed internet connections, the ability to display PowerPoint presentations, and cross-platform compatibility (the conferencing software runs on Windows, Mac, and any other operating system that supports Java). In addition, the conferencing system allowed for an unlimited number of participants, which in turn granted us the opportunity to allow all CISSE participants to attend all presentations, as opposed to limiting the number of available

seats for each session. The conferencing technology we have implemented, starting with the submission & review system and ending with the online conferencing capability, allowed us to conduct a very high quality, fulfilling event for all participants.

**School of Engineering
Newsletter
March 2006**

Paper Citation Update

Tarek Sobh, Abhilasha Tibrewal and T. Chen's article entitled: "A Tool for Data Structure Visualization and User-defined Algorithm Animation", published in *The Journal of STEM Education, Innovations and Research*, has been noted as the top article since 2001, having received more than 2219 hits on the website.

**School of Engineering
Newsletter
Fall 2006**

Public Interviews Update and the new Ph.D. in Computer Science and Engineering Program

Dr. Tarek Sobh, Dean of the School of Engineering was interviewed in length by the CT Post, in articles on August 29 and September 6. The first article, entitled “Green energy may bring rewards”, covered the partnership between MTV and General Electric. Dr. Sobh’s interview included his remarks on our engineering programs, and the importance of solving energy and pollution problems.

In the second article, entitled “Working from home works well”, Dr. Sobh commented on telecommuting, and internet traffic.

Ph.D. program -- Computer Science and Engineering

The much anticipated opening of a new Ph.D. program in Computer Science and Engineering ushers in a new era at the University of Bridgeport – and for engineering and computing professionals throughout the region. The program accepted applications for its inaugural class of Fall 2006, and is accepting applications for future semesters. Nine years in the planning, it was licensed by the Board of Governors of Connecticut’s Department of Education in June 2005. “Ours is the first Engineering Ph.D. program in Fairfield County, and the only one in Connecticut, that will accommodate the scheduling needs of part-time students by making all coursework available in the evening,” reports **Dr. Tarek Sobh**, Dean of the School of Engineering. This flexibility is expected to be especially appealing to engineers and computing professionals working in corporations and industry in Fairfield and Westchester counties.

Depth and Breadth

As Dr. Sobh notes, a Ph.D. program that combines computer science and computer engineering is unusual. “Our program offers depth and breadth in both disciplines,” he says. Other unique characteristics include the program’s teaching and publishing requirements. Recognizing that many of its graduates will pursue academic careers, the program requires all students to teach two courses. “The teaching practicum is an important component,” Dr. Sobh says. “Most Ph.D.s in this field are not prepared to teach, and this experience will give our students an edge as they compete for faculty positions.” Similarly, the requirement that all students have research articles accepted for publication prior to graduation will demonstrate to prospective employers that they know how to write for scholarly publications, Dr. Sobh says. The requirement is for two articles in high-level refereed journals or one journal and two conference articles. Another highly relevant requirement for all Ph.D. students calls for two courses in global technology management.

Announcing the new Ph.D. Program in Computer Science and Engineering and the OCEAN System for Curriculum Customization



Unique Ph.D. Program is Now Accepting Students

There are many areas where the UB School of Engineering has become a leader. For the past several years, the SOE has housed the largest graduate engineering program in the State of Connecticut. The Adult Education and Enrichment Guide, in its Winter issue, states that: "The University of Bridgeport has amassed a long and distinguished history in computer science and engineering since it began offering master's degrees in 1970."

Now the UB School of Engineering adds another distinctive characteristic to its leadership role with its new Ph.D. program in Computer Science and Engineering which has been accepting applications since Fall 2006.

The Ph.D. program focuses both on academic and technical abilities of its prospective graduates, offering several areas of concentration. The list of research areas include:

- Computer architecture, VLSI and FPGA
- Design, modeling and simulation of embedded and integrated systems
- Electromechanical systems prototyping and optimization
- Robotics, automation, machine perception and sensing
- Software engineering, Web development and computational sciences
- Systems and computer security and biometrics
- Wireless and mobile computing and networking.

As **Tarek Sobh**, Vice Provost for Graduate Studies and Research and Dean of the School of Engineering notes, a Ph.D. program that combines computer science and computer engineering is unusual. "Our program will offer depth and breadth in both disciplines," he says.

Among other distinctions, two years ago the university was ranked second in the nation in the production of M.S. degrees in computer science for women and fourth for men and women combined.

Our graduates have gone on to research and development careers at many of the most distinguished companies and University Laboratories locally and nationally.

The new Ph.D. program will build on this tradition of excellence.

OCEAN - The New Web Application



We are proud to inform you that our new web application, OCEAN, is now completed and uploaded to the server.



The Online Customization and Enrollment Application Network (OCEAN), developed in the School of Engineering at the University of Bridgeport, under the supervision of **Dean Sobh** and **Dr. Kongar**, is an interactive web-based application for inter-disciplinary graduate programs, concentrations, certificates and courses across the Schools of Engineering, Business and Education. OCEAN allows prospective and current students to customize their preferences in the course selection process depending on the targeted graduate concentrations, degrees, and/or dual degree programs. The application can also be utilized as an efficient advising tool by the Faculty.

REV (Remote Engineering and Virtual Instrumentation) Update

Premier engineering conference held at UB

HOW CAN ENGINEERING AND TECHNOLOGY ENHANCE ONLINE
LEARNING AND DISTANCE RESEARCH? THAT'S NEW FOR
TOMORROW'S VIRTUAL LABORATORIES? CAN REMOTE
ENGINEERING BE EFFECTIVELY USED BY RESEARCHERS, ACADEMICS,
AND PROFESSIONALS WORKING OCEANS APART FROM ONE
ANOTHER?



Those challenges drew more than 100 engineers from around the world to the University of Bridgeport from June 22 to 25 for the Sixth Annual International Conference on Remote Engineering, the world's premier consortium on distance technology. Known as the REV Conference (for Remote Engineering and Virtual instrumentation), the four-day meeting brought together engineering researchers, educators, and professionals to explore the future and application of remote engineering in industry and academia. Participants delivered papers, presented demonstrations and research posters, and shared experiences in virtual engineering.

"These individuals are the leaders of the online community around the world," said **Dr. Tarek M. Sobh**, dean of the School of Engineering and cochairman of the scientific advisory board of the International Association of Online Engineering (IAOE), which sponsored the conference.

"One of the biggest paradigms now in virtual engineering is education. It's easy if we're talking about something like an online MBA program. But what if you teach robotics?" Sobh said. "One of the things that's happening – and we're doing it here at UB, too – is we're putting lots of our machinery online so students can move equipment and work with it and understand it from across the world. It's very cool."

Based in Austria, the IAOE hosts the annual REV Conference at different institutions around the world. This year's meeting at the University of Bridgeport was the first time it has been held in the United States. – **L.G.**

School of Engineering
Newsletter
Spring 2010

CISSE (International Joint Conferences on Computer, Information and Systems Sciences and Engineering) Conference Update, REV (Remote Engineering and Virtual Instrumentation) Update; the US Army UAV (Unmanned Aerial Vehicle) Project and the Germany/UB Engineering Connection

**THE SCHOOL OF ENGINEERING ORGANIZES THE FOURTH
INTERNATIONAL JOINT CONFERENCES — CISSE 09**



Dr. Khaled Elleithy and Dr. Tarek Sobh, conference co- chairs



CISSE 2009 is the fifth conference of the CISSE series of E- conferences. According to Dr. Khaled Elleithy and **Dr. Tarek Sobh**, conference co-chairs, "CISSE is the World's first Engineering/Computing and Systems Research E-Conference. CISSE 2005 was the first high-caliber research conference in the world to be completely conducted online in real-time via the Internet."

According to Dr. Elleithy, "The final program of CISSE 2009 included 220 papers that were published in two books by Springer." A complete list of papers can be accessed at confer-ence.cisse2009.org/proceedings.aspx. The two books published by Springer are:

- Sobh, Tarek; Elleithy, Khaled, Innovations in Computing Sciences and Software Engineering, (Eds.), Springer, July 2010 (ISBN: 978-90-481-9111-6)
- Elleithy, K.; Sobh, T.; Iskander, M.; Kapila, V.; Karim, M.A.; Mahmood, A. (Eds.), Technological Developments in Networking, Education and Automation, July 2010 (ISBN: 978-90-481-9150-5)

"The faculty and the students of the School of Engineering have contributed significantly to the conference. A number of School of Engineering faculty are members of the technical committees and have reviewed many of the conference papers. Furthermore, the final program of the conference contained 14 papers authored by faculty and students from the School of Engineering," Elleithy said.

The concept and format of CISSE is very exciting and ground-breaking. The PowerPoint presentations, final paper manuscripts and time schedule for live presentations over the web had been available for weeks prior to the start of the conference for all registrants, so that the participants could choose the presentations they wanted to attend and think about questions that they might want to ask. The live audio presentations were also recorded and are part of the permanent CISSE archive, which also includes all the papers, PowerPoint and audio presentations.

The CISEE series provides a virtual forum for presentations and discussion of state-of-the-art research on computers, information and systems sciences and engineering. The virtual conference is conducted through the Internet using web-conferencing tools made available by the conference. Authors present their PowerPoint, audio or video presentations using web- conferencing tools without the need for travel. Conference sessions are broadcast to all the conference participants, where session participants can interact with the presenter during the presentation and (or) during the Q&A slot that follows the presentation. This international conference is held entirely on- line.

The Cisse conference audio room provides superb audio and video, even over low speed Internet connections, the ability to display PowerPoint presentations, and cross-platform compatibility (the conferencing software runs on Windows, Mac, and any other operating system that supports Java). In addition, the conferencing system allows for an unlimited number of participants, which in turn grants the opportunity to allow all Cisse participants to attend all presentations, as opposed to limiting the number of available seats for each session.

German engineering students visited UB

Students and faculty from the University of South Westphalia of Applied Sciences in Germany visited the University of Bridgeport School of Engineering on September 2, 2009.

The tour was designed to help the international students familiarize themselves with graduate-school opportunities in the United States, and it marked the third time representatives from the German school have visited UB in the past year.

The half-day visit included meetings with Gad Selig, associate dean for business development and professors Khaled Elleithy, Neil Lewis, Jani Pallis, and **Dean Tarek Sobh** who spoke with the group about research and study opportunities at UB.

Premier international engineering conference held at UB

How can engineering and technology address the demands of online learning and distance research? What's new for tomorrow's virtual laboratories? How can remote engineering be used by researchers, academics, and professionals working oceans apart from one another?

Michael Auer, professor of electrical engineering at Carinthia Tech Institute in Vienna, Austria, and editor-in-chief of the Journal of Online Engineering, addressed a special session on distance learning at the REV Conference, held at UB from June 22 to 25.

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"One of the biggest paradigms now in virtual engineering is education. It's easy if we're talking about something like an online MBA program. But what if you teach robotics?" Sobh said. "One of the things that is happening and, we're doing it here at UB too, is we're putting lots of our machinery online so students can move equipment and work with it and understand it from across the world. It's very cool."

Based in Austria, the IAOE was founded to encourage the wider development, distribution, and application of online engineering technologies in education and research. The REV Conference is held annually, at different institutions around the world, and this year's meeting at the University of Bridgeport marks the first time it has been held in the United States.

Drs. Sobh, Elleithy, and Lee tested a prototype of transformable Unmanned Aerial Vehicle (UAV) Design funded project in spring and summer 2009

Drs. Sobh, Elleithy, and Lee tested a prototype of the transformable Unmanned Aerial Vehicle (UAV) Design, a project funded in the spring and summer of 2009. The project was awarded close to \$60,000 by the U.S. Army Armament, Research, Development & Engineering Center (ARDEC) to develop a proto- type for a transformable Unmanned Aerial Vehicle (UAV) The project included a number of tasks:

Task 1: Investigation of wireless transmitters and receivers; investigate wireless components, transmitter, receiver, and antenna.

Task 2: System implementation; design and integrate wireless components with UAV Control.

Task 3: Wireless camera component; install the video camera on the UAV and display on a PC.

Task 4: Demonstrations; demonstrate the wireless link and camera components of the transformable UAV system.

The test of the prototype was performed in the School of Engineering's Mobile and Wireless Communications Laboratory as well as in Bridgeport's Seaside Park.

The picture shows the prototype and an experimentation carried by Ph.D. student Ali Alrashedi. According to Ali, "Working on such a high tech funded project has provided me a priceless opportunity where I had to design the control circuitry of the motors of the UAV." The picture shows Ali, working with a dummy projectile that was hanging on a string, to capture a video using a wireless camera mounted inside the tube. The video signal is sent to a base station, using a transmitter integrated with a camera. In the base station, a video receiver acquires the wire- less video signal, and then sends the signal to a PC via a video converter. In the base station (PC), the software for the video component displays the captured video, and processes it to generate a control signal. Finally, the generated control signal is transmitted from the transmitter to a receiver, using the wireless link component.

According to Dr. Elleithy, "The successful implementation of the prototype helped the University of Bridgeport, University of Hartford, UConn, and other Connecticut industries to receive a \$2.4 million grant to complete the detailed design of this project."

New Breed of Projectiles for the US Army

UB KNIGHTLINES SPRING 2010

Flying Soda Cans!

The School of Engineering is part of a group getting \$2.4 million to build a new breed of projectiles for the U.S. Army.

By Leslie Geary



Tarek Sobh, vice president for research and graduate studies, is leading UB's work on developing projectiles.

It's a bird! It's a plane! It's a soda can!?

Make that a spying soda can, thanks to the School of Engineering, which is part of a group that was recently awarded \$2.4 million to develop next-generation projectiles for the U.S. Army.

"It's very cool," said Vice President for Research and Graduate Studies and School of Engineering Dean **Tarek Sobh**.

Sobh and other UB engineering professors who are involved in the Applied Nanotechnology Consortium are developing unmanned projectiles that are no bigger than a soda can and can be

used for a variety of purposes, including combat and surveillance. “The whole concept,” Sobh says, “is to develop projectiles that can be maneuvered while in flight. This is the next generation of projectiles that aren’t as big as an airplane but are miniaturized.”

UB is responsible for developing computer-vision technologies, like algorithms and miniature cameras, which will process images in the projectiles, and communications. Once launched, the projectiles will fly at 150 miles per hour and stay aloft for 40 seconds. Because the Army will decide how to use the projectiles, Sobh and other consortium members face the task of making the devices as functional and versatile as possible.

“The communications affect both pictures and control signals that come and go from the actual projectile to the ground so we can move it around,” said Sobh.

UB also will develop miniaturized technologies. “This is a very big step for us.”

Dean Sobh to join the African Academy of Sciences (AAS) and to Chair the International Association of Science and Technology Development's Fall conference on Robotics

UB KNIGHTLINES. SPRING 2010

Book Lines

Tarek Sobh, dean of the School of Engineering and a dual citizen of Egypt and the U.S., was elected as a fellow of the African Academy of Sciences (AAS). Similar to the American National Academy of Sciences, the AAS fellowship program honors distinguished scientists whose origins belong to one of the countries in Africa and who are internationally renowned in their respective fields. Professor Sobh joins 14 other distinguished scientists of Egyptian origin who are part of this select group. You can learn more about the AAS at <http://aasciences.org>. Dr. Sobh also was invited serve as chairman of the International Association of Science and Technology for Development's fall conference on robotics in Cambridge, Massachusetts.



UB's Applied Nanotechnology Consortium Research Grant

UB Faculty Research Council Newsletter March 1, 2010

Research Grant Awards

Dr. Tarek Sobh, Vice President for Graduate Studies and Research and Dean of the School of Engineering learned recently that a \$2.4 million federal grant has been awarded to a consortium, of which UB is a primary member, to develop drones for the U.S. Army. The application was developed primarily by Dr. Sobh and Dr. Lou Manzione, Dean of the College of Engineering, Technology and Architecture at the University of Hartford, along with the University of Connecticut and the Connecticut Center for Advanced Technology. The following UB faculty are involved in the project: Dr. Sobh (PI), Dr. Khaled Elleithy, Dr. Jeongkyu Lee, Dr. Prabir Patra, Dr. Xingguo Xiong, and Dr. Hassan Bajwa. Several UB engineering students will work with the project as well. Funding for the 18-month project should be available starting July 2010. Read more about this exciting opportunity below under "Faculty Research Spotlight."

What flies through the air at 150 miles per hour, transmits video images, and is roughly the size of a soda can? If you're not sure, ask **Tarek Sobh**, the Dean of UB's School of Engineering.

The U.S. Army has awarded \$2.4 million to the Applied Nanotechnology Consortium, a group comprised of UB, the University of Hartford, and UConn, and area organizations and industry. Dr. Sobh is heading up the UB engineering research team, which includes Drs. Elleithy, Lee, Patra, Xiong, and Bajwa. He envisions that the 18-month research project will be one of many through the continued development of the Consortium. This comes on the wings of an earlier award for preliminary research, part of which was conducted at UB by Dr. Sobh and select faculty.

The Consortium is charged with the design and creation of an unmanned device that will carry a video camera over large distances in real time. The aerial drone will provide a soldier with a means of "seeing" a limited range of landscape that would otherwise be hidden from view. The device will most likely be fired from a tube, similar to those used in mortar fire. The images are transmitted back in real time, so that the viewer can see what the device 'sees' during its approximately 40 second journey.

In addition to aiding soldiers overseas, the project is also generating a lot of great press for UB. Please see both features in the Connecticut Post.

The Governor and UB launch Fairfield County's first high-tech business incubator

Gov. M. Jodi Rell and UB launch Fairfield County's first business incubator

Entrepreneurs in Fairfield County finally will have a perfect incubator close to home to launch high-tech ventures, thanks to a new partnership between UB and Connecticut Innovations (CI), the state's quasi- public authority for technology investing.



The CTech IncUBator will be housed on the UB campus. It is the first incubator in Fairfield County and the only university-based high-tech incubator in the state of Connecticut.

"In these economic times, it is more important than ever to cultivate entrepreneurial, start-up businesses— our primary engine of job creation," said Connecticut Governor M. Jodi Rell. "There is strong evidence showing businesses that participate in incubators like CTech tend to do better over the long haul, so we expect this initiative to go a long way toward ensuring the success of the next generation of high-tech leaders in our state."

Small businesses account for eight out of ten new jobs created in Connecticut every year.

Due to open this summer, the CTech IncUBator will focus on attracting participants from information technology, digital media, advanced materials, and clean tech.

"New businesses," said Governor Rell, "will benefit from a full range of resources provided by the University and CI. That includes access to mentors, UB research facilities and faculty, student interns, and pro bono or discounted business advice from partner sponsors. The incubator will be a one-stop answer shop for entrepreneurs."

Boasting an abundance of innovative interdisciplinary research, UB is the "perfect" home for the incubator, said **Tarek Sobh**, dean of the School of Engineering and vice president for research and graduate studies. — **L.G.**

Dean Sobh named as Distinguished Professor

UB KNIGHTLINES SUMMER 2010

Faculty Lines

School of Engineering Dean **Tarek Sobh** was designated by the University Board of Trustees in March as a Distinguished Professor of Engineering and Computer Science. He is the second professor at UB to achieve this distinction. Professor Sobh has written and/or edited several books, and presented more than 75 keynote speeches. He serves on the editorial board of 12 journals and has been chair or program chair for more than 135 conferences and workshops. In addition to his role as dean of the engineering school, Professor Sobh is vice president of graduate studies and research. Since 1995, he has led the Robotics Intelligent Sensing and Control Laboratory which he established, and his leadership has elevated the University's profile in the areas of research, engineering innovation, and scholarly production among the academic community and industry.

University of Bridgeport
Knightlines
Spring 2011

UB's Faculty Research Day

UB KNIGHTLINES SPRING 2011

News Lines

Bright Ideas

Faculty Research Day showcases advances in technology, politics, and more.

Shrinivas Bhosale pointed to the black-and-white image of a human liver, focusing on the large milky blot smudging the left half of the human organ. "There's the tumor," Bhosale said. "That's what we're looking at." In fact, Bhosale, a doctoral student in computer science, and a team of researchers are looking at tumors in a radically new light: By using computer algorithms, they've been able to analyze 3D images that measure tumors' volumetric size and density. And that advanced perspective may soon help make it possible for doctors to create more effective treatments for patients with cancer.

Bhosale is conducting the research with UB mechanical engineering professor Prabir Patra; graduate students Ashish Aphale, Issac Macwan, and Kshamma Rane; and the MD Anderson Cancer Center in Houston, Texas. The team's work was among 120 projects on display during Faculty Research Day.

A celebration of ideas, the February event featured research in global banking and business, education, music, biology, engineering, international politics, and other fields. "This is a showcase of how much research there is at UB," said **Dr. Tarek Sobh**, vice president of graduate studies and research. It's a great way for faculty and students to learn more about research in other departments and find pathways to collaborate."

Nilima Shroff was among the participants who submitted research. Shroff, a technology management graduate student, and technology management professor Elif Kongar developed a system that uses barcode technology to route unused, or damaged pharmaceuticals back to industry clearinghouses for safe handling. The system is sorely needed.

According to the Healthcare Distribution Management Association, just 4 percent of products from pharmaceutical warehouses are properly recycled, disposed of, or redistributed. That creates huge hazards to the environment and to patients when massive amounts of unused pharmaceutical drugs are tossed away, illegally resold, or mishandled, says Shroff. "It is illegal, but it happens a lot," says Shroff. Across The Gallery at the Arnold Bernhard Center, where the Research Day was held, education professor Margaret Queenan presented methods teachers can use to help disadvantaged students increase their comprehension of scientific texts. Queenan's research included a letter from a student to her teacher. "It is helpful to wonder," she wrote, "because sometimes when you wonder, you find the right answer." – **L.G.**

Dean Sobh's election into the CT Academy of Science and Engineering (CASE)

UB KNIGHTLINES SPRING 2011

Faculty Lines

A case for UB's engineering dean



Engineering dean **Tarek Sobh** was invited to join the Connecticut Academy of Science and Engineering (CASE) after the select non-profit nominated him for membership.

Established in 1976 by the Connecticut General Assembly, the Academy's main objectives are to provide information and advice on science and technology to the government, industry, and people of Connecticut, and to encourage interest in science, engineering, and technology among younger students.

The Academy is limited to 400 members, all of whom must be voted into the group by a committee vote. – L.G.

NASA Lunar Competition results; CISSE (International Joint Conferences on Computer, Information and Systems Sciences and Engineering) 2010 update; RISC Lab (Robotics, Intelligent Sensing and Controls); and Dean Sobh to join the CT Academy of Science and Engineering (CASE)

UB students design lunar ditch-digger in NASA competition

BRIDGEPORT -- Digging a ditch is hard work, especially when the ditch is 250,000 miles away.

That was the problem that engineering students at the University of Bridgeport faced when they entered a design competition sponsored by NASA. The purpose of the contest was to come up with ideas for a lunar excavator that NASA engineers could use for an un-manned robotic device that the space agency hopes to send to the lunar surface in the future.

Twenty-one other colleges and universities participated in the NASA Lunabotics Mining Competition, which took place in May. The challenge, NASA said, was to design and build "a remote-controlled or autonomous excavator (lunabot) that can collect and deposit a minimum of 10 kilograms" of simulated lunar surface within 15 minutes.

Even for a machine, conditions on the lunar surface are not conducive to digging ditches, nor to anything else for that matter. Temperatures range from 250 degrees Fahrenheit at "noon" to minus 240 at night. The surface is shrouded in a thick layer of regolith -- superfine dust that seems to stick to just about every man-made surface. Then there's the airless environment that makes lubrication of parts difficult and the low gravity, which confounds earthbound testing efforts.

Plus, there's no place to fuel up, and even if there was, a gasoline engine wouldn't work there anyway because there's no air.

"We were limited to 80 kilograms and we had to keep power consumption to 30 watts," said Nicolae Gari, a student from Romania who was the team leader. It took only a few months to put together the prototype, Gari said, adding, "My laptop uses more electricity than this thing."

He said that photovoltaic solar cells could not be used because they'd have to be too large to be practical, so lithium-ion batteries were used instead.

"The density of the lunar regolith is a lot less than, say, sand on Earth -- 1.9 (grams per cubic centimeter) as opposed to 2.6 on Earth," Gari said. This is why the "buckets" are shaped the way that they are, much wider than they are deep.

Plywood was used as the framework because it's cheap, strong and easy to modify when last-minute changes are needed.

"A lot of teams from other universities got in trouble because they used steel, and they found it difficult to make last-minute changes," said Matthew Breland of Bridgeport, an undergraduate engineering student who worked on the project.

A \$4,500 NASA grant awarded by the Connecticut Space Grant Consortium, had to cover materials and travel expenses, too. The competition took place last spring at NASA's Kennedy Space Center in Florida.

"We had to pitch in," said professor **Tarek Sobh**, Dean of UB's Department of Engineering.

"There's an ongoing debate on whether this should be completely autonomous, semi-autonomous or completely manual," said Sobh.

All three have their advantages and drawbacks.

To control a lunar device from Earth, you'd have to deal with a 2.6-second delay time -- the time it takes for the radio signal to get to the device and for the device to signal back to Earth again. NASA scientists ruefully note that light might seem instantaneous on Earth, but it's agonizingly slow when dealing with astronomical distances.

"Then, you're dealing with human reaction times," Sobh said. "If you're controlling the thing from Earth, and you don't react in time, it goes off a cliff and that's the end of that."

He said that the fully autonomous approach, in which the rover is programmed to react to every conceivable situation, has a drawback, too, in that a situation might arise that the unit is not programmed to handle.

"That's why we like the semi- autonomous approach, in which you have all these sensors -- stereo cameras, infrared sensors, laser range finders and so forth -- to allow the unit to react to foreseeable situations, and then when there is a danger to the rover excavator, you'll be able to take over," he said. "And, with this approach, we might be able to find something interesting, pick it up and look at it."

The competition was won by the "MULE" entry from Montana State University, NASA said.

C

ISSE 2010 is the sixth conference of the CISSE series of E- conferences. According to Dr. Khaled Elleithy and Dr. **Tarek Sobh**, conference co-chairs, "CISSE is the world's first Engineering/Computing and Systems Research E-Conference. CISSE 2005 was the first high-caliber research conference in the world to be completely conducted online in real-time via the Internet."

According to Dr. Elleithy, "The final program of CISSE 2010 included 99 papers that will be published in one book by Springer". A complete list of papers can be accessed at confer-ence.cisse2010.org/proceedings.aspx

"The faculty and the students of the School of Engineering have contributed significantly to the conference. A number of School of Engineering faculty are members of the technical committees and have reviewed many of the conference papers. Furthermore, the final program of the conference contained papers authored by faculty and students from the School of Engineering," Elleithy said.

The concept and format of CISSE is very exciting and ground-breaking. The PowerPoint presentations, final paper manuscripts and time schedule for live presentations over the web had been available for weeks prior to the start of the conference for all registrants, so that the participants could choose the presentations they wanted to attend and think about questions that they might want to ask. The live audio presentations were also recorded and are part of the permanent CISSE archive, which also includes all the papers, PowerPoint and audio presentations.

The CISEE series provides a virtual forum for presentations and discussion of state-of-the-art research on computers, information and systems sciences and engineering. The virtual conference is conducted through the Internet using web-conferencing tools made available by the conference. Authors present their PowerPoint, audio or video presentations using web- conferencing tools without the need for travel. Conference sessions are broad- cast to all the conference participants, where session participants can interact with the presenter during the presentation and (or) during the Q&A slot that follows the presentation. This international conference is held entirely on- line.

The CISSE conference audio room provides superb audio and video, even over low speed Internet connections, the ability to display PowerPoint presentations, and cross-platform compatibility (the conferencing software runs on Windows, Mac, and any other operating system that supports Java). In addition, the conferencing system allows for an unlimited number of participants, which in turn grants the opportunity to allow all CISSE participants to attend all presentations, as opposed to limiting the number of available seats for each session. ■



School of Engineering Dean Tarek Sobh to join Connecticut Academy of Science and Engineering



Dr. Tarek Sobh, Dean of School of Engineering.

Tarek Sobh, dean of the University of Bridgeport School of Engineering and Vice President of Graduate Studies and Research, has been invited to join the Connecticut Academy of Science and Engineering (CASE).

Membership to the Academy is honorific and limited to 400 persons. Individuals must be nominated by an Academy member, and then elected into the group by its membership board.

Dr. Sobh was nominated by Alan Eckbreth, past president of CASE.

Dr. Eckbreth said he put Dr. Sobh's name forward because the UB dean "is very well equipped to help CASE promote a science- and technology-based economy in Connecticut as we continue the state's transition into high technology, highly automated, and precisely controlled manufacturing."

Dr. Sobh is a "world-class leader within his areas of knowledge. His research activities and projects within the area of robotic and electro-mechanical systems prototyping provided a framework for research scientists and engineers to address and solve various problems related to electro-mechanical and robot design and manufacturing," Eckbreth added.

Established in 1976 by the Connecticut General Assembly, the Academy's main objectives are to provide information and advice on science and technology to government, industry and people of Connecticut and to encourage youth's interest in science, engineering, and technology.

"I'm extremely honored by my nomination to this highly respected group," said Dr. Sobh. "The Academy has done much to advance science and technology in the public arena." □

RESEARCH LABORATORY LINEUP

Interdisciplinary Robotics, Intelligent Sensing, and Control (RISC) Laboratory



The Interdisciplinary RISC Lab re-sides in the Computer Science and Engineering department at the University of Bridgeport. It was formed in 1995 by its founder and coordinator, Professor **Tarek Sobh**, in order to conduct research in a variety of robotics-related fields, and as a step towards the development of commercially applicable projects. Research interests include: reverse engineering and industrial inspection, CAD/CAM and active sensing under uncertainty, robots and electromechanical systems prototyping, sensor-based distributed control schemes, unifying tolerances across sensing, design, and manufacturing, hybrid and discrete event control, modeling, and applications, mobile robotic manipulation, developing theoretical and experimental tools to aid performing adaptive goal-directed robotic sensing for modeling, observing and controlling interactive agents in unstructured environments.

Supercomputing at UB

UB KNIGHTLINES SPRING 2012

The Populist Supercomputer

Computers may be the future, but educating the next generation of high-tech professionals can be financially prohibitive for schools and other institutions that can't afford technology costing tens of thousands of dollars. That may change, thanks to School of Engineering professor Jeongku Lee and graduate student Omar Abuzagheh. By using Sony PlayStation 3 gaming devices, the two have created a supercomputer that costs no more than \$2,000. That low price tag, they say, can greatly help colleges and universities provide to their students enhanced computer science programs.

"In the market, supercomputers are very expensive

—at least \$20,000 to several million dollars," said Lee. "That makes it almost impossible for small- or medium- sized schools, or non-research-intensive institutions, to equip their computing facilities."

The American Society of Engineering Education (ASEE) agrees. It awarded Lee and Abuzagheh its prestigious Best Paper Award for their work at the organization's annual conference.

Lee and Abuzagheh's computer, ASEE judges wrote, "enables low-budget programs to offer courses with a hands-on experience. This is a huge plus to the CS [computer science] curriculum. . . . It's an excellent way to involve students at all levels."

Lee and Abuzagheh created the device by using six PlayStation 3 consoles to do parallel processing and high-performance computing.

The system, which the two nicknamed UB PS3 Cluster, can be used for physics, medical imaging, or for educational purposes. In fact, UB PS3 was put to the test in the University's School of Engineering classrooms this spring, when it was used by undergraduate and graduate students.

"The research is very timely, given budget constraints of schools across the country and the testament to the timely value of this research is the ASEE award for the best paper of the year," says School of Engineering Dean and Vice President for Research **Dr. Tarek Sobh**.

University of Bridgeport
Faculty Council Research Newsletter
April 30, 2012

UB's 2012 Faculty Research Day Update

UB Faculty Research Council Newsletter April 30, 2012

News You Can Use

A Report on UB's 2012 Faculty Research Day

UB Faculty Research Day, held on February 10, was once again an overwhelming success!

It was truly a spectacular day. We had a total of 110 research posters, submitted by 40 faculty, 61 graduate students, and 9 undergraduate students.

This is an increase from the 88 poster submissions in 2011. Participation was distributed as follows: the School of Engineering had a total of 62 posters, followed by Health Sciences (11), International College (9), and between six to eight posters each representing the Schools of Arts and Sciences, Business, Education, and the Shintaro Akatsu School of Design.

This year's 170 attendees included poster authors, as well as other faculty, Industry Advisory Board members, Incubator tenants, community leaders and partners, and venture capitalists. A number of members of the Board of Trustees were able to make time in their schedules to visit the poster session. They talked with faculty and students alike in a room that was energized with a buzz of information and discovery.

Following the morning poster session, participants were welcomed by President Neil Albert Salonen, UB's Co-Chair of the Board, Frank Zullo, Esq., and **Tarek M. Sobh**, Ph.D., Vice President for Graduate Studies and Research.



Tarek M. Sobh, Ph.D., Vice President for Graduate Studies and Research.

Keynote speaker, Keya Sadeghipour, Ph.D., Dean of the College of Engineering at Temple University, then delivered a thought-provoking presentation on "Science and Education in the 21st Century."

**School of Engineering
Newsletter
Fall 2012**

UB's Engineering On-line program as first in the nation; CISSE 2011 update and UB's NASA X-Hab Innovation Grant

UB School of Engineering online master's degree program ranked No. 1 for faculty credentials and training by U.S. News and World Report

The University of Bridgeport's School of Engineering has more highly qualified instructors than any other online master's degree program, according to a new ranking released today by U.S. News and World Report.

The magazine's honor-roll ranking recognized the online graduate program for "leading the pack in faculty credentials and training."

School of Engineering **Dean Tarek Sobh**, who also is vice president for graduate studies and research at UB, called the distinction "wonderful recognition for the work we've done to offer truly distinctive and superlative online engineering education."



Sobh continued, "They are saying our faculty has the best credentials, which is wonderful. In most schools you'll find a mix of adjunct and full- and part-time teachers. But from the start, we set out to distinguish ourselves by devoting the best resources possible to our distance-learning programs. The online master's track is an integral part of the School of Engineering curriculum, not an afterthought."

UB launched its online master's degree program in 2003 to accommodate growing demand; many of the hundreds of students in the program are working professionals seeking to stay up-to-date in latest advances while balancing a career, Sobh said.

Ten engineering professors offer e- classes in the program via online videos or Blackboard, a distance-learning technology. Students can earn a master's degree in technology management or computer science within 18 to 30 months.

CISSE 2011 is the seventh conference of the CISSE series of E- conferences. According to Dr. Khaled Elleithy and Dr. **Tarek Sobh**, conference co-chairs, CISSE is the world's first Engineering/Computing and Systems Research E-Conference. CISSE 2005 was the first high-caliber research conference in the world to be completely conducted online in real-time via the Internet."

According to Dr. Elleithy, "The final program of CISSE 2011 included 103 papers that will be published in one book by Springer"[<http://www.springer.com/engineering/circuits+%26+systems/book/978-1-4614-3534-1>]. "The faculty and the students of the School of Engineering have contributed significantly to the conference. A number of School of Engineering faculty are members of the technical committees and have reviewed many of the conference papers. Furthermore, the final program of the conference contained papers authored by faculty and students from the School of Engineering," Elleithy said. The concept and format of CISSE is very exciting and ground-breaking. The PowerPoint presentations, final paper manuscripts and time schedule for live presentations over the web had been available for weeks prior to the start of the conference for all registrants, so that the participants could choose the presentations they wanted to attend and think about questions that they might want to ask. The live audio presentations were also recorded and are part of the permanent CISSE archive, which also includes all the papers, PowerPoint and audio presentations.

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The CISSE conference audio room provides superb audio and video, even over low speed Internet connections, the ability to display PowerPoint presentations, and cross-platform compatibility (the conferencing software runs on Windows, Mac, and any other operating system that supports Java). In addition, the conferencing system allows for an unlimited number of participants, which in turn grants the opportunity to allow all CISSE participants to attend all presentations, as opposed to limiting the number of available seats for each session.



UB one of four universities awarded a NASA X-Hab Innovation Grant: Sen. Lieberman hails University's latest partnership with NASA

The University of Bridgeport was selected by NASA to be one of four universities in the U.S. to participate in the 2012 eXploration Habitat (X-Hab) Academic Innovation Challenge led by NASA and the National Space Grant Foundation.

Students from UB, led by mechanical engineering professor Dr. Zheng “Jeremy” Li designed habitats and science concepts that could be used by future deep space explorers. They were responsible for designing, manufacturing, assembling, and testing all of their concepts and hardware.

A panel of engineers and scientists assessed their progress at each stage of the competition. Teams from Oklahoma State University; University of Maryland, College Park; and Ohio State University also were chosen.



Students from UB, led by mechanical engineering professor Dr. Zheng “Jeremy” Li will design habitats and science concepts that could be used by future deep space explorers.

“Obviously, it’s an honor to be among one of four U.S. universities to receive the X-Hab Challenge Grant,” said Dr. **Tarek Sobh**, Vice President for Graduate Studies and Research. “This award strengthens our ongoing partnerships with NASA: UB is a member of the Connecticut Space Grant Consortium, which funds student- and faculty-led research. Last year, UB undergraduate engineering students were awarded a \$4,500 grant to build a lunar excavator that was showcased at the Kennedy Space Center in Florida. And students over the past year have been selected for competitive NASA-sponsored re- search and internships.”

The National Space Grant Foundation covered the costs of the teams' design development, as well as their participation in testing their projects at NASA's Johnson Space Center in Houston, TX.

“It is a testament to the University of Bridgeport—its professors, faculty, and most importantly, its students—that they will have a chance to participate in shaping the future of space technologies,” said Senator Joseph Lieberman (I-CT). “This is truly an incredible opportunity for our students to continue—quite literally—reaching for the stars.”

Robot Revolution



In a laboratory on the campus of the University of Bridgeport robots are being created to help humans with all kinds of tasks. No, it's not science fiction—it's actually the work of **Tarek M. Sobh**, Ph.D., P.E., Vice President for Graduate Studies and Research, Dean of the School of Engineering and Distinguished Professor of Engineering and Computer Science.

Over the past few years, the Robotics, Intelligence Sensing and Control (RISC) Laboratory at UB has supported several faculty research projects, as well as those of more than 300 undergraduate, graduate, and doctoral students in the areas of robotics, automation, manufacturing, and computer vision. RISC is equipped for research in robotic manipulation, distributed autonomous control, machine perception and mobile robotic devices.

One of Sobh's current research projects involves the development of user-friendly robotic mobile modular platforms that move either autonomously or semi-autonomously. "It's a project that I am very proud of," says Sobh. The design provides a non-expert user with an accessible yet very robust robotic sensory platform on which to further add and develop complex robotic functions, actuators, sensing devices and task descriptions without having to design or delve deeply and create complicated software, firmware or hardware.

This "Plug-and-Play design," Sobh explains, "permits the short-term installation of cameras, lasers and other sensors, in addition to various robotic actuation devices and electromechanical components, and provides for a very simple software tool without the worry of designing communication modules between the software and hardware. It all comes together automatically,

with the code and the control strategy generated autonomously, so that a task is performed with the click of a button.”

The goal of the project is to create a modular design for activating platform sensors and task descriptions, and make this modular design available for multiple applications. For example, if there is a mobile platform or a manipulator with no mobility, different tasks can be performed, such as painting, navigation, 3-D scene recovery, map-building, welding or clean-up, and does not require the users to be robotic experts.



Tarek M. Sobh, Ph.D., P.E., Vice President for Graduate Studies and Research, Dean of the School of Engineering and Distinguished Professor of Engineering and Computer Science works with students

Sobh explains, “It is going to be like a cell phone application, which performs the tasks you need, without you being an expert in cell phones, coding or software design, or in the configuration required for the task that the application is performing. I can drag cameras, ultrasonic and infrared sensors, lasers, and add them to the platform. Then you tell the phone app what task you want to do. If you say ‘paint,’ the platform and its control strategy and code would be generated and run based on the available hardware, motors and sensors, and the robot will just do its job at maximal efficiency.”

A second project currently in the research and development phase is a robotic swarm collective intelligence behavior project that uses small non-intelligent or slightly intelligent robots that collectively perform complex tasks. The concept is borrowed from bees and ants, which have very limited intelligence and behaviors but can survive, reproduce, carry out tasks, attack and protect each other if they work in groups or with the entire colony. The overall high intelligence of the group is actually created by the simple acts and moderate local intelligence of each individual.

In the same respect, the project’s goal is to develop very simple and inexpensive robots that individually perform very simple behaviors such as catching images on a camera, moving things around, communicating with nearby peers and doing very simple laser scanning. When put together, these robots can perform very significant and complex tasks in parallel much cheaper, faster and more efficiently than one or more very complex and expensive robotic agents.

When put together, these robots can perform very significant and complex tasks in parallel much cheaper, faster and more efficiently than one or more very complex and expensive robotic agents.

Returning to the painting example, Sobh continues, “If you want to paint a room, instead of deploying one smart and very expensive robot, you will have fifty or a hundred smaller and very cheap ones, with limited aptitude. In this case, the small robots would each have location sensors, simple communication modules, and vision capability to be able to move away from each other and start painting their little part of the wall in parallel. You will have the entire room painted in a fraction of the time as one robot, and at a much smaller price tag too.”



The potential applications for swarm intelligence are not only industrial. According to Sobh, swarm intelligence could have significant applications in the defense sector. For example, swarm intelligent robots could replace human reconnaissance in hostile or unfamiliar locations, performing the observation and examination of certain places or buildings. These smaller, simpler robots would be minimally equipped with simple processors, controllers, and small cameras. Through ongoing, real-time communication between the robots and a human-staffed “control center,” the swarm could relay critical information, and could also be reconfigured and redirected to different tasks as the situation dictates.

The sustainability of robotic reproduction is also being researched in the RISC lab. In unstructured environments that are inaccessible or harsh for humans, mechanized machines are not only needed to perform certain duties, but they are needed to create other specialized mechanized machines. If two robots, i.e., “mom and dad,” have access to raw materials like iron, plastic, cameras, sensors and so on, they can use them to create a “baby” robot for specific tasks.

“It is a colony project with the idea to ‘procreate’ within the automation area, where robots with a limited number of tasks and sufficient raw materials can create a sustainable environment that includes assembling and programming other robots to perform new tasks,” says Sobh. To some, this idea might be reminiscent of intelligent machines depicted in futuristic movie classics like *The Terminator* and *The Matrix*, but the possibility is on the horizon and has the potential to provide significant support to human endeavors in a variety of environments and for a variety of purposes.

Sobh is just wrapping up a major research project as part of the Applied Nanotechnology Consortium, conducted with Khaled Elleithy, Ph.D., Associate Dean of Graduate Programs and Professor of Computer Science, and Engineering and Hassan Bajwa, Ph.D., Assistant Professor of Electrical Engineering. Following an earlier award for preliminary research partly conducted at UB by Sobh and select faculty, the U.S. Army awarded \$2.4 million to the Applied Nanotechnology Consortium, a group comprised of UB, the University of Hartford, the University of Connecticut, and area organizations and industry. Dr. Sobh led the UB engineering research team, through the 18-month research project designed to develop army drones.

UB faculty were responsible for developing computer vision technologies—cameras and algorithms—that process images in the projectiles, and communications. The Consortium was charged with the design and creation of an unmanned device that will carry a video camera over large distances in real time. The aerial drone will provide a soldier with a means of “seeing” a limited range of landscape that would otherwise be hidden from view. The device will most likely be fired from a tube, similar to those used in mortar fire. The images are transmitted back in real time, so that the viewer can see what the device “sees” during its approximately 40 second journey.

Finally, Sobh is working in the area of sustainability with Elif Kongar, Ph.D., Assistant Professor of the Departments of Mechanical Engineering and Technology Management, and an expert in disassembly and green engineering. The idea behind their research is to create an automatic disassembly and recycling system for a product at the end of its life. Sobh brings the possibility of autonomous robotic and sensory activity to take the “dead” product and disassemble it automatically, repairing and/or reusing the good components, and discarding the remaining components.

Rethinking Recycling

A team of researchers investigates an automated way to reuse, recycle and remanufacture electronic components.

Have you ever stopped to think about what happens to your cell phone, desktop computer, TV or other electronic device after you've discarded it? The question of what to do with old equipment has long piqued the interest of academia and industry alike, generating numerous journal articles and the commerce of disassembly, recycling and disposal. Part of the interest is in the recovery of valuable components while other interest lies in the proper treatment of hazardous parts.

With the continuous development of technology in today's world, the total life span of electronic products is no more than a few years . . . The economically and environmentally sustainable option is to reuse these components in technically valid products. —Elif Kongar

The disassembly of end-of-life products, i.e., products that have a useful life but for which there is little to no demand, is an established industry, and cost recovery is partly managed by recycling and reusing viable materials and components. Some may think that's the end of the story. "Not so fast," says Elif Kongar, Ph.D., Assistant Professor of Technology Management and Mechanical Engineering at the University of Bridgeport. "While there are many recycling centers and companies that specialize in this disassembly, these operations are complex, time-consuming, and expensive. Some cost recovery occurs through the resale of valuable materials, such as silver and copper, and reusable subcomponents. Still, multiple uncertainties render the process to be a costly one because it is labor intensive," she explains.

Green engineering through sustainability and disassembly is now being looked at in a new way by Kongar and her research partners **Tarek M. Sobh**, Ph.D., P.E., Vice President for Graduate Studies and Research, Dean of the School of Engineering and Distinguished Professor of Engineering and Computer Science at UB; Surendra M. Gupta, Ph.D., Department of Mechanical Engineering and Industrial Engineering at Northeastern University; and a doctoral engineering student at UB. "The whole paradigm of green engineering is 'reuse, recycle, and remanufacture,' and that is just what we are trying to do with the end-of-life electronic products, but through an automatic electronic method," says Sobh.

Kongar further explains, "With the continuous development of technology in today's world, the total life span of electronic products is no more than a few years. Most of the time, products are being discarded before their materials degrade. The economically and environmentally sustainable option is to reuse these components in technically valid products. The main problem is that actual disassembly operations are very complex, time-consuming and expensive to run with human labor." The process of assembly is straightforward: the blueprint is created and implemented, but disassembly is not that process in reverse.

The team proposes a new model for disassembly that employs robots and introduces the use of an online dynamic genetic algorithm to conduct an "intelligent" survey and assessment of modular components, followed by the coordination of the disassembly process. According to Kongar, this allows for a time-effective assessment of both typical and uncommon alterations

that may have been made after product purchase through repair, upgrade or to meet personal preferences.

The disassembly “cell” consists of an industrial robotic manipulator fitted with a webcam, and a PC enhanced with additional hard drive and RAM that is programmed with component segmentation and range-sensing visual algorithms. The algorithm streamlines this process to maximize flexibility while minimizing the time needed to complete the disassembly task.

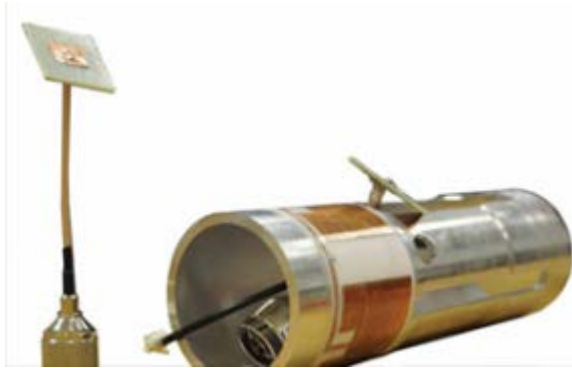
Preliminary results obtained through the development and testing of a prototype are promising. While little research has been conducted on this environmentally driven and economically promising method, it may be exactly what is needed to be able to manage the volume of end-of life products that seems to be growing exponentially in this era of technology explosion.

A technical description of this model can be found in an article published in the March 2012 issue of the Journal of Intelligent and Robotic Systems, “A Robotic- Driven Disassembly Sequence Generator for End-of-Life Electronic Products.”

Flying Soda Can

What flies through the air at 150 miles per hour, transmits video images, and is roughly the size of a soda can? If you're not sure, ask Khaled Elleithy, Ph.D., Associate Dean of Graduate Programs and Professor of Computer Science, and Engineering.

In 2008, the University of Bridgeport, together with the University of Hartford, the University of Connecticut, the Connecticut Center for Advanced Technology and four other private-sector companies began to develop what became a \$2.4 million U.S. Army research project. The multi-organization research group was operated under the auspices of the Applied Nanotechnology Consortium. Elleithy conducted the research along with **Tarek M. Sobh**, Ph.D., P.E., Vice President for Graduate Studies and Research, Dean of the School of Engineering and Distinguished Professor of Engineering and Computer Science, and Hassan Bajwa, Ph.D., Assistant Professor of Electrical Engineering. "The main goal of the project was to come up with an inexpensive solution to unmanned reconnaissance for military application that could cover more ground and minimize risk to troops," says Elleithy.



The "flying soda can," as the Connecticut Post named the device in an article, is officially called an Unmanned Aerial Vehicle—UAV. The main involvement of UB's team was to develop a miniature camera system and sophisticated computer algorithms to facilitate real-time video transmission from the flying device to a base station. Elleithy explains, "We had to design and develop conformal antennas for the flying device that operate on 2.4 and 5 Gigahertz. We also had to ensure security of communications from third party hacking."

Research outcomes have a range of possible military and civilian applications, such as surveillance of an area affected by a natural disaster, such as an earthquake. The "flying soda can" is an inexpensive solution to the challenge of capturing and transmitting real-time images with minimum risk to human life. Most of the UB research was conducted through Elleithy's Wireless and Mobile Communications (WMC) Laboratory, tasked with advancing the state-of-the-art in wireless and mobile communications.

UB's High-tech Business Launch Pad and Alumni Connections

Graduation doesn't always mean saying good-bye. For these alums, personal ties to alma mater are stronger than ever.

Pity. Until today, **Tarek Sobh's** wife had been fond of his former student. Now, Sobh joked, his spouse was feeling less than enthusiastic about Andrew Rosca '99.

The problem, it seemed, stemmed from a well- intentioned birthday gift gone awry.

Sobh is the vice president of graduate studies and research and dean of the School of Engineering; Rosca was one of his star students, and as they discovered years ago, their passion for technical things extends to a shared fascination with aerodynamic automobiles whose perfectly calibrated engines accelerate to more than 60 miles per hour in less time than it takes to swat a fly.

So last summer Rosca, a computer engineering alumnus, devised a plan to celebrate Sobh's birthday by bringing his former teacher to a hot and dusty track in New Jersey, where they'd spend the day learning to drive Lamborghinis, Porsches, and Ferraris.

Sobh was delighted. "I could die!" he joked.

His wife? Less than amused. Nonetheless, Sobh and Rosca set off, recording devices in hand (Sobh posted an inside-a-Ferrari clip on YouTube) to tear up the asphalt and channel their inner-Mario Andrettis.

And so it goes with Sobh and Rosca, whose decade- plus friendship has been shaped shared enthusiasms, collaborative research, mutual respect—and occasional hair-raising high jinx.

"Did you know," Sobh asks a visitor, "Andrew's a licensed pilot, too? He's invited me, but my wife said no."

In any case, the two have kept busy enough since they first met in 1998, when Rosca, then an undergraduate transfer student from Romania, enrolled in Sobh's Engineering Economics course. "He was very smart, extremely hard working. He had good presentation and communication skills, and he was an amazing team player," recalls Sobh. "Many students are smart, but he was exceptionally generous with his peers."

Impressed, Sobh invited the young student to collaborate with him outside of the classroom. "He basically pulled me into other things he was doing," laughs Rosca, who was summarily handed a stack of research papers to review for a conference that Sobh was organizing.

All went smoothly until Rosca got to the paper “by a couple of guys from NASA.” With every passing page, he grew increasingly uncomfortable. “I’m reading it, thinking, ‘This doesn’t sound meaningful. It doesn’t make sense,’” he recalled. “But then again, who am I to tell guys from NASA that they don’t know what they’re talking about?”

The experience made him rethink his own place in the professional world, and what he might have to contribute. He’s currently a director at a hedge fund in Stamford and founder of various companies. When Rosca shared his concerns with Sobh, “he just laughed and said, ‘You’d be surprised.’ It was quite surprising that someone would have that much confidence in me.”

Other projects followed: there was the early model Bluetooth device they worked on in Sobh’s Wireless & Mobile Communications Lab; CISSE—an online gathering of engineers, researchers, and scientists— that Sobh hosts each year (Rosca developed the conference management system); and most recently, LaunchPad.

Aimed at entrepreneurial types, LaunchPad encourages UB faculty and students, as well as outsiders, to submit ideas for start-up companies. The duo is quick to point out that this is different from the University’s Ctech IncUBator, which supports start-up businesses that already have been established. “It’s a step before incubators,” says Sobh, using a metaphor that’s evocative of that hot New Jersey race track. “It’s an accelerator.”

As it turns out, Rosca and Sobh have been kicking around ideas for LaunchPad for quite a while. As conceived, the two will decide which ideas are worthy of LaunchPad support. That includes funding from angel investors they’ve lined up and, potentially, from UB as well. They’ll also pick students and faculty who want to be involved, and based on their skill sets, assign them to any idea that’s picked for support. In exchange, those participants will become equity partners.

At least that’s the basic premise. The finer points were laid out on a recent afternoon, when Sobh and Rosca formally introduced LaunchPad in a ceremony held in one of the Engineering Building’s lecture halls.

“I know from my time at UB,” said Rosca shortly before addressing about two dozen people who’d shown up to learn more, “that there are a lot of students with skills and untapped talent on campus, and we need to make better use of them.” As he speaks, Rosca sounds a lot like Sobh describing him not so long ago.



The next idea: Rosca and Sobh discuss their latest venture.



Where it all began: Sobh (left) used to teach Rosca in UB's classrooms. Now they are a team.

**University of Bridgeport
Faculty Council Research Newsletter
April 2013**

UB'S 2013 Faculty Research Day Update

UB Faculty Research Council Newsletter April 2013

News You Can Use

A Report on UB's 2013 Faculty Research Day

On February 1, 2013 a crowd of over 170 packed the University of Bridgeport's Schelfhaudt Gallery to view 116 research posters and talk with their authors for the 2013 Faculty Research Day.

The annual event, which showcases faculty and student research, consists of a morning poster session, followed by a keynote speech, lunch with breakout sessions, afternoon poster talks by selected faculty, and concludes with an awards reception. Since its inception in 2011, the number of poster submissions has increased every year, with this year's 116 posters consisting of 48 submitted by faculty, 59 by graduate students, and 9 by undergraduate students. Participation was vast and included posters from each of these academic units: School of Arts and Sciences, School of Business, College of Public and International Affairs, School of Engineering, all Health Sciences programs, School of Education, and the Shintaro Akatsu School of Design.



(l-r) Co-Chair Zullo, **VP Tarek Sobh**, Provost van der Giessen

Attendees included poster authors as well as other faculty, Industry Advisory Board members, community leaders and partners, and venture capitalists. A number of members of the UB Board of Trustees were able to make time in their schedules to visit the poster session. They talked with faculty and students alike in a room that was energized with a buzz of information and discovery.

Following the morning poster session, participants were welcomed by Frank Zullo, Esq., Co-Chair of UB's Board of Trustees, **and Tarek M. Sobh, Ph.D.,**