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Welcome to the Spring '09 issue of iNEWS!

In this issue, you will find examples of the multidisciplinary research efforts being done in concert with industry and fostered through ICES. If you are one of our readers from industry, I trust you will discover reasons to become involved or stay involved in the pipeline ICES has created by establishing and maintaining strong relationships between researchers, industrial partners, and federal and state agencies. I realize companies are faced with new realities of these economically challenging times and their R&D is one of the first items that may be placed on the chopping block to save costs. ICES is an especially important source of external research to our industry partners in such times. Our leverage of state and federal funding helps fuel the innovation engine that ultimately grows the economy in the long term.

Our feature article on the collaboration between the Center for Sensed Critical Infrastructure Research (CenSCIR) and local Pittsburgh start-up company RedZone Robotics illustrates the way ICES-related research is creating efficient responses to infrastructure needs. In this case, CenSCIR and RedZone are creating a more efficient approach for sewer authorities to inspect and assess the condition of their sewer pipelines in a way that satisfies the desire to sustain a clean environment while meeting tight financial constraints.

The section on Center News highlights further the ways in which ICES research centers and clusters are generating new business and supporting existing collaborations with companies. This includes the development of a new start-up biomedical company that is improving catheter systems for blood clots and the further great news that Carnegie Mellon biomedical start-up company Carmell is thriving and growing. In addition, the Enterprise-Wide Optimization group and the Steinbrenner Institute continue to create and develop collaborative projects with involved industry.

In recent public statements on the Pennsylvania 2009-2010 budget, Governor Edward G. Rendell has stressed the needs to improve the state’s infrastructure, make new investments in energy production and usage, and put more Pennsylvanians to work and improve educational opportunities in the state. The funding ICES provides from the Pennsylvania Infrastructure Technology Alliance (PITA) continues to support research that addresses the needs of the Commonwealth. PITA-project stories highlighted in this issue include research using distributed sensor technology to minimize the power consumption of computer data server systems and the CenSCIR-RedZone partnership. Also included is a story on how ICES engineering faculty and area math, science, and technology K-12 teachers are collaborating to integrate engineering content into the classroom.

Turning to even more celebratory matters, spring marks the time of the year to celebrate the College of Engineering faculty awards. As many of you no doubt know, ICES is responsible for selecting the winner of the Steven J. Fenves Award for Systems Research. Professor of Biomedical Engineering Jim Antaki is this year’s recipient. His approach to designing blood pumps has marked a paradigm shift that exemplifies the spirit of the Fenves Award.

I hope that you enjoy reading this latest issue of iNEWS and that you are inspired to become more involved with ICES as a researcher, an industry partner, or a governmental agency partner. I’m looking forward to seeing even more exciting collaborations being initiated and continued this year.

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To read more about ICES, its current structure, research interests, projects, and people, please visit our website at http://www.ices.cmu.edu/.

Please feel free to contact our director, Gary Fedder, or use our on-line directory to identify contacts. We welcome your comments and your ideas.
Solo, one of RedZone’s multi-sensor robotic inspection platforms.

Photo by Chris Atwood
Sewer authorities find themselves driven by the contradictory forces of financial constraints and by pressure from environmental agencies to move toward a more proactive approach of inspecting and assessing the condition of their sewer lines. While multisensory inspection technologies are currently being developed that can provide a holistic inspection, it is still up to human inspectors to perform the slow and repetitive task of reviewing, classifying, and coding hours of the data obtained during inspection.

To address these inspection challenges, local Pittsburgh start-up company RedZone Robotics and researchers in the Center for Sensed Critical Infrastructure Research (CenSCIR) are collaborating on a Pennsylvania Infrastructure Technology Alliance (PITA) project. The goal of their collaboration is to improve the ability to assess and visualize the evolution of pipe conditions over time, as well as to create a computer interface that is able to classify and code the data obtained during these inspections.

It was a natural fit for RedZone and CenSCIR members and Civil and Environmental Engineering professors James H. Garrett, Jr. and Lucio Soibelman to team up to address these critical infrastructure issues. RedZone’s focus on multi-sensor inspection service includes developing robotic platforms to reach inaccessible pipe locations as well as providing companies with the ability to view 3D digital representations of their wastewater pipes on their computers.

“At RedZone, we build robots and have many engineers here, but not many civil engineers. Since our products function exclusively in a civil engineering domain, CenSCIR brings the domain expertise and state-of-the-art technology in that area.”

-Scott Thayer, Chief Technology Officer, RedZone Robotics

With its work on sensor systems, processes, and technologies, CenSCIR has developed for RedZone a computer interface that has the ability to interpret and classify the data obtained by RedZone’s robots. This interface is driven by an algorithm developed with the help of Soibelman and Garrett’s former Ph.D. student Wei “Vivian” Guo that allows for pattern recognition. This reduces the time required for the human inspector who no longer has to review and code the data. The interface allows a human user to simply manipulate and search the large visual data set that has already been classified and coded by the computer. The algorithm allows the computer interface to automatically detect and recognize critical areas or regions of interest for sewer condition assessment and defect reporting.

Article continued on next page...
Thayer explains that the algorithm developed by CenSCIR allows for “consistency in coding in order to meet pipeline assessment certification program (PACP) requirements, as well as an on-demand processing capability for a higher volume of data.” Thayer’s ultimate goal is the integration of this computer interface technology into RedZone’s project development.

CenSCIR is also collaborating in this research with another local Pittsburgh company, InspectTech, which has expertise in providing condition assessment reporting for bridge inspectors and has provided software platforms for CenSCIR’s prototype system. This partnership will allow InspectTech to increase the visualization tools it is developing for bridge inspection and other forms of physical infrastructure by incorporating the core features for data navigation and visualization developed by CenSCIR.

**How Solo (one of RedZone’s multi-sensor robotic inspection platforms) works:**

1. Solo continuously collects images as it moves through the sewers.
2. It uses these to maintain a “mean image”.
3. Checks this “mean” against the image it just captured.
4. When the algorithm finds a defect, the image is flagged for a more thorough human review.
New Fabrication Process
Builds Nanostructures

Nanoscale research has dominated the field of science in the past decade, as the ability to produce and manipulate matter at the nanometer scale has been developed. Most fabrication methods have relied on “bottom up” methods, where nanometer structures are grown, or formed, from tiny, nanoscale catalysts or seeds. These “seeds” are the by-product of macroscopic processes and have tremendous variability in dimension and composition as well as random locations. Limiting nanoscale science is the ability to grow or form nanoscale structures in a precisely controlled manner, such that their dimensions, location and composition are well controlled.

David Ricketts, assistant professor of electrical and computer engineering, and his collaborators are addressing this problem with the development of a new tip-assisted nanofabrication process, enabled by the recent acquisition of a custom designed nanofabrication system. Their approach uses tiny electrons from a very sharp tip to “crack” or “break” molecules down from a gaseous form into a solid structure. By directing the tip over a substrate, his research team is able to build structures with nanometer control, much like one would write on a sheet of paper with a pen. 3D structures are made possible by drawing layer on layer of material, building up the structure in atomic sheets.

Their work seeks to develop precisely defined nanometer structures in silicon and other semiconducting materials for applications in sensors, optics and electronic devices.
NeuroInterventional Therapeutics, Inc. (NIT) – a local, start-up company founded in 2007 by ICES Associate Research Professor Ender Finol – recently received $200,000 in seed funding from the Pittsburgh Life Sciences Greenhouse (PLSG) for prototype development. NeuroInterventional Therapeutics designs and manufactures advanced catheter systems used to find, trap, and extract blood clots in a wide range of cerebral vessels, and where necessary, deliver therapeutics to the diseased site after clot removal. Its mission is to maximize patient recovery or to actually save patients’ lives where today’s treatment is often inadequate, as is often found in the case of victims of stroke.

In the last several months, the Carnegie Mellon bioplastics start-up company Carmell Therapeutics Corporation has moved its offices to Allegheny General Hospital on Pittsburgh’s North Side and has added another researcher to its staff. Previously housed in Mellon Institute on Carnegie Mellon’s campus, Carmell will now be conveniently located to conduct related research at Allegheny General at which co-founder James Burgess practices neurosurgery. In addition, former Carnegie Mellon researcher Dr. Miri Rabinowitz is now working as a scientist at Carmell. Co-founder Professor Phil Campbell-ICES Research Professor and also Carmell’s Chief Scientific Officer—says Miri will be working closely with Dr. Jason Smith, Carmell’s senior engineer and former post doctoral fellow at ICES, on the development of their blood plasma-based plastics products.

This fall, the ICES Biotechnologies Cluster welcomed two post doctoral fellows, George Subrebost and Santanu Chandra. Subrebost is working with ICES Research Scientist Alan Rosenbloom on the development of a bedside intravenous glucose sensor that allows for continuous monitoring, as well as on the creation of a medical assist device that will facilitate intubations and improve upon intubation issues. Chandra is working in Ender Finol’s Vascular Biofluids and Biomechanics Lab (VBBL), concentrating on the modeling, simulation, and analysis of patient specific Abdominal Aortic Aneurysm (AAA) with a focus on predicting rupture potential using computational and imaging techniques.
Researchers Publish on Environmentally Friendly Surface Coatings

In two recent journal articles, researchers with the Center for Environmental Implications of NanoTechnology (CEINT) reported that polymeric surface coatings used to functionalize the surfaces of nanoparticles also decrease their reactivity and toxicity. These papers were published in the American Chemical Society Journal Environmental Science & Technology. Both studies were authored by Tanapon Phenrat, who recently earned his Ph.D. in civil and environmental engineering at Carnegie Mellon and is currently a post-doctoral researcher in CEINT. Dr. Phenrat was advised by Dr. Greg Lowry, associate professor in civil and environmental engineering and director of CEINT@Carnegie Mellon, and Robert Tilton in chemical engineering.

The first study demonstrates that coatings, such as polyaspartate - a polypeptide biopolymer, decreases the neurotoxicity of Fe0 nanoparticles used for environmental remediation. The coatings are used to emplace the particles in a groundwater aquifer. The second study provides a mechanistic understanding of how surface coatings affect the reactivity of Fe0 nanoparticles with the groundwater contaminant trichlorethylene. This mechanistic understanding allows for development of surface modifiers for optimal performance as a remedial agent. Together, these discoveries allow for engineering surface coatings that simultaneously enhance the performance of nano-sized remediation agents and decrease the risks posed by exposure to humans and other organisms.

*Published articles are:


Bi-annual Meetings Foster Company and Academic Collaboration

The Enterprise-wide Optimization (EWO) group meets twice a year to give the participating faculty and Ph.D. students from Carnegie Mellon and the University of Pittsburgh, as well as representatives from participating companies, the opportunity to discuss results that have been found since the last meeting. The participating companies - including ABB, Air Products, BP, Dow Chemical, ExxonMobil, NOVA Chemicals, PPG, Petrobras, Praxair and Total - supply case studies in the areas of planning, scheduling and supply chain optimization to the university students and professors to research and determine optimization of the companies’ supply-chain operations. In the past six months, the EWO group has held meetings in September and earlier this month. In March, the EWO meeting included a special session on stochastic programming for enterprise-wide optimization with a tutorial on formulations, computational methods and modeling tools. The speakers were Professor Jeff Linderoth from Wisconsin and representatives from the modeling systems GAMS and AIMMS. The meeting continued with reports on the current projects.

Companies that might be interested in joining the EWO group in fiscal year 2009 should contact Ignacio Grossmann. The membership fee to this group is $12,500 for members of the CAPD and $17,500 for non-members. A description of the EWO project can be found in http://egon.cheme.cmu.edu/ewocp/.

Special Issue on Enterprise-wide Optimization Published

Edited by Kevin Furman and EWO Faculty Director Ignacio Grossmann, the November 2008 issue of Computers & Chemical Engineering (volume 32, issue 11, pp. 2479-2838, 24 November 2008) focused exclusively on enterprise-wide optimization (EWO). The issue included a total of 20 papers, with four written by industrial authors (Air Products, Dow Chemical, ExxonMobil, Honeywell). Papers dealt with supply chain issues, solution approaches to scheduling problems, and operational issues.
PITA Collaboration Brings Engineering Curriculum to the Schools

Imagine a Carnegie Mellon lab bustling with activity. Excited voices are heard as lab partners work through an activity; one partner instructs the other to add water to a powder in a clear plastic cup. A professor wanders over to the group and suggests that the water be added more slowly as they stir the solution continuously. As a thick, gelatinous substance begins to form, the lab partners emit a sound of satisfaction as they recognize an every day polymer developing in the cup.

Despite the recognizable classroom description, this is not an ordinary class in Chemical Engineering Teaching Professor Annette Jacobson’s lab; on this day, the students are middle and high school teachers. They are participating in Connecting Science with Engineering and Technology (C-SET), a PITA-funded professional development program for area science, technology, engineering, and math (STEM) educators.

The goal of the C-SET project is to create a collaborative effort between Carnegie Mellon engineering faculty and area STEM teachers in order to prepare introductory engineering content in modular form which teachers can use in their classrooms. On Saturday workshops held at Carnegie Mellon, faculty and teachers come together to discuss their needs in the classroom, as well as providing teachers with a closer look at the actual practice of engineering.

“The goal of this project is to ultimately construct web-based activities that are easily available to teachers to supplement math and science courses with engineering-related content,” describes Jacobson. Judith Hallinen, director of the Leonard Gelfand Center for Service Learning and Outreach, expands on the importance of the collaborative aspect of the program: “It is important to establish communication with teachers during the development of the activities to ensure the content is useful and relevant to the students’ needs.”

During the 2007-2008 academic year, Carnegie Mellon hosted three teacher workshops and obtained feedback from over 32 teachers representing 19 public and private school systems in southwestern Pennsylvania. Teachers were given the opportunity to interact with Carnegie Mellon’s Open Learning Initiative (OLI), web-based delivery technology which provides coursework available online to students and teachers. Initial work focused on the creation of a module to help teachers understand how and why engineers might be concerned about heat transfer.

Workshops also included a lecture given by ICES Adjunct Fellow John Wesner on “What is Engineering?” In 2008, the topic of macromolecular products provided hands-on activities for teachers to use in the classroom. Teacher feedback helped Jacobson and her team understand the grade levels and courses that would be supported by the specific content included in the macromolecular product activities.

The Carnegie Mellon C-SET team includes Professor Jacobson; Ms. Hallinen; Assistant Professor of Chemical Engineering Kris Dahl; Vice Provost for Education Indira Nair; Associate Director of the Colloids, Polymers and Surfaces (CPS) Program Rosemary Frollini; Associate Director of the CPS Program Dr. Susana Steppan, Professor Wesner; and Carnegie Mellon student Chris Shull who helped to create the online learning modules.

To extend the impact of the program, a grant from the Siemens Foundation provided support for workshop materials and for stipends for middle and high school teachers who assisted the C-SET team by reviewing proposed classroom activities.
Sensors Used to Manage Energy in Computer Data Centers

According to an Environmental Protection Agency (EPA) report published in August 2007, data servers for computer systems account for nearly 1.5% of total electricity consumption in the United States, at a cost of approximately $4.5 billion per year. At current trends without intervention, electricity usage could nearly double by 2011. In addition, IT infrastructures waste 415 million tons of coal per year with 864 million tons of CO₂ greenhouse emissions. Better management of these systems would allow the reduction of their overall consumption of energy resources. It will also reduce the risk of power outages by lowering peak power demand and dramatically decrease carbon dioxide emissions.

Funding from the Pennsylvania Infrastructure Technology Alliance (PITA) has allowed Electrical and Computer Engineering professors Bruno Sinopoli, Bruce Krogh, and Greg Ganger to address the problem of minimizing the power consumption of these data systems, which will allow companies to save money and promote sustainable computing. Sinopoli describes the advantages of partnering with companies through PITA: “Partnering with companies allows us to work on real models and testbeds. Furthermore, it guarantees a smoother transition of the technology to the industry.”

The research team’s approach is unique because it considers both the server – which manages where and when to execute tasks required by multiple users - and the CRAC (computer room air conditioner) units – which manage temperature control of the data system and keeps it from overheating. Unlike other approaches to energy consumption which consider these systems separately, this research addresses both systems together as a “data center” in the pursuit of energy efficiency and reduction. Sinopoli explains: “This is a fundamental approach because solving the two problems separately leads to less than optimal solutions.”

Also unique to their approach is the use of a sensor network to monitor the environmental conditions of the data center. PITA funding has allowed the team to expand upon their work with sensors in the Data Center Observatory – an operational and instrumentable data center located on Carnegie Mellon’s campus and created originally with the enthusiastic support and resources of fourteen companies. Resources received include funding, hardware donations, and the expertise of technical industry leaders.

PITA funding has allowed the team to leverage this industry support and connect more completely with the efforts of the Carnegie Mellon Sensor Andrew project and equip the data center observatory with a wireless sensor network, able to sense temperature, humidity, and vibrations. Specifically, they have been using the Firefly, a low-cost wireless sensor network platform capable of data acquisition. They are fully integrating the data center sensor network platform with the Sensor Andrew project, which has installed sensors throughout the university to show smart-infrastructure effectiveness.

“Partnering with companies allows us to work on real models and testbeds. Furthermore, it guarantees a smoother transition of the technology to the industry.”

-Bruno Sinopoli
James Antaki is Named 2009 Steven J. Fenves Award Recipient

ICES Director Gary Fedder recently announced that James Antaki, professor of biomedical engineering, is the recipient of the 2009 Steven J. Fenves Award for Systems Research. The Steven J. Fenves Award for Systems Research is presented annually to individuals for their contributions to systems research in areas that are relevant to the College of Engineering and ICES.

Professor Antaki receives this award in recognition of his applications of systems engineering to the design and optimization of medical devices in general, and cardiovascular devices in particular. Professor Antaki is responsible for a paradigm shift in the design of blood pumps by replacing trial-and-error approaches with rigorous systems engineering that integrates biomedical engineering, computational fluid dynamics, electromagnetics, control system design, and software engineering.

He is a world leader in systems engineering of medical devices, and his contributions have led to life-extending artificial hearts and left ventricular assist devices for adults, toddlers, and infants with cardiac deficiencies.
HONORS & DISTINCTIONS

Other Recent Honors & Distinctions

Electrical and Computer Engineering Professor Ronald D. (Shawn) Blanton has been named a fellow of the Institute of Electrical and Electronics Engineers (IEEE) for his contributions to the testing of micromechanical systems and integrated circuits. Blanton coordinates the microelectromechanical (MEMS) testing research being conducted within the ICES Microsystems Research Cluster.

ICES Research Faculty Ender Finol has been appointed to the Editorial Board of the Journal of Endovascular Therapy for the 2009-2010 term.

Last fall, the American Institute of Chemical Engineers (AIChE) added Rudolph R. and Florence Dean University Professor of Chemical Engineering Ignacio Grossmann to the list of “One Hundred Engineers of the Modern Era” in recognition for mixed integer nonlinear programming (MINLP) and for model formulation and solution for process design and operation. In addition, Christos Maravelias, an alumnus of the Chemical Engineering Department received the 2008 W. David Smith, Jr. Graduate Student Paper Award from the AIChE for the paper he wrote with Grossmann. Grossmann heads the Enterprise-wide Optimization Collaborative Project, which is housed within ICES.

Marija Ilic, professor of electrical and computer engineering and public policy and CenSCIR member, received an honorary academic chair from the Delft University of Technology in The Netherlands for her work in modernizing the world’s electricity infrastructures. She was named chair of Control of Future Electricity Network Operations in the Department of Technology, Policy and Management, and her appointment runs from November 2008 through 2013.

The 2008-2009 George Tallmann Ladd Research Award was given to Mohammad Islam, assistant professor of materials science & engineering and chemical engineering, and David Ricketts, assistant professor of electrical & computer engineering, in recognition of their research, professional accomplishments, and potential. The G.T. Ladd Award is made to a faculty member within the Carnegie Institute of Technology in recognition of outstanding research and professional accomplishments and potential.

In November, Mechanical Engineering Professor Philip LeDuc participated in the National Academies Keck Future Initiatives Conference on Complexity, which is a selective conference sponsored by the National Academies and the Keck Foundation.

Civil and Environmental Engineering professors and ICES-affiliated faculty H. Scott Matthews and Deanna Matthews received a $25,000 environmental research grant from AT&T and were named AT&T faculty fellows in industrial ecology. The grant will support their work on “The Role of Information and Communication Technology in Carbon Risk Management.” Scott Matthews is involved with the Sensor Andrew Project within the Center for Sensed Critical Infrastructures (CenSCIR). Deanna Matthews has been involved strongly with the planning and execution of the ICES outreach program, Summer Engineering Experience for Girls (SEE).

The 2008 Philip L. Dowd Fellowship Award has been awarded to Jose Moura, professor of electrical & computer engineering. The Dowd Fellowship is awarded to a faculty member within the Carnegie Institute of Technology to recognize educational contributions and to encourage the undertaking of an educational project such as textbook writing, educational technology development, laboratory experience improvement, educational software, or course and curriculum development.

Electrical and Computer Engineering Assistant Professor Priya Narasimhan was recently named the winner of the 2009 Emerging Female Scientist Award announced this week by the Carnegie Science Center of Pittsburgh. She was recognized as a leader and innovator in developing embedded and mobile technologies.

Luca Parolini, a Ph.D. student in the Electrical and Computer Engineering Department, has received a one-year research fellowship for $50,000 from APC by Schneider Electric. Parolini is being honored for his research with advisor Bruno Sinopoli, assistant professor of electrical and computer engineering, on improving data lab efficiency.

ICES Research Professor Eswaran (“Sub”) Subrahmanian and Physics Professor and Associate Director of ICES center CM’EM Michael Widom were elected to the rank of AAAS Fellow by the American Association for the Advancement of Science (AAAS). They received their certificates and rosettes in February 2009. Subrahmanian is being honored for his distinguished contributions to design theory and methodology and their implications for design support systems and for bridging theory, practice and education in engineering design. Widom, physics professor and associate director of the ICES center CM2EM is being honored for elucidating the thermodynamic and dynamic features of complex metallic alloys, especially quasicrystals, by developing and applying theoretical paradigms that are sophisticated and innovative.
CenSCIR’s Smart Infrastructure Research Recognized by Media

At a time when the government still predominantly funds traditional road and bridge infrastructure projects, the Center for Sensed Critical Infrastructure Research (CenSCIR) has been focusing on the potential for more technologically-focused projects for infrastructure monitoring and maintenance. In a February 3 article in *Business Week*, CenSCIR Faculty Co-director James H. Garrett, Jr. was quoted as saying: “This kind of smart infrastructure isn’t going to put concrete into place, but it could help us put it there more efficiently and keep it there more effectively.”

This “smart” technology, which includes wireless sensors embedded in various infrastructure systems, “could provide real-time feedback on structural integrity,” as Garrett points out in a recent *Pittsburgh Tribune-Review* article. In addition to helping engineers to know how best to apply resources to a critical problem, it would allow for better management of infrastructure systems and ultimately, save the government money by providing a more informed and efficient method of maintenance.

Nisha Shukla’s Nanoparticle Catalysts Research Highlighted

Nisha Shukla and her research team’s work on the synthesis of nanoparticle catalysts with high selectivity and activity was recently highlighted on nanotechweb.org. Her team has developed a number of simple synthesis procedures that produce metal and alloy nanoparticles with control of particle size and shape, and they have prepared some resulting unique materials with core shells. Shukla was also invited to write an article on nanocatalyst which appeared recently in *Nature Materials* (volume 8, number2).

Dr. Shukla, who is special faculty at ICES, as well as an institute fellow with the National Energy Technology Laboratory, Institute for Advanced Energy Solutions, focuses her research on nanoparticle synthesis, characterization, and applications in the area of catalysis.
RECENTLY AWARDED ICES GRANTS

NSF Funds Research to Improve Organic Semiconductors Performance

The National Science Foundation (NSF) recently awarded $500,000 for the research project entitled “Novel Molecular Engineering and Processing Approaches for High-Performance Organic Transistor Devices: The Role of Polymer Structure & Morphology.” This project, affiliated with the Center for Nano-Enabled Device and Energy Technologies (CNXT), includes Professor of Materials Science and Engineering Lisa Porter as the project’s principal investigator, as well as faculty investigators Tomasz Kowalewski from Chemistry, Michael Bockstaller from Materials Science and Engineering, Yi Luo from Electrical and Computer Engineering, and Vice President for Research Richard McCullough.

This interdisciplinary project grew out of the recent and intense growth in the research and development of organic semiconducting materials for electronic applications. These materials possess semiconducting and other physical properties. This makes them particularly desirable for mechanically flexible electronics in such forms as transistors and solar cells, and they have found widespread commercial application as light-emitting diodes (LEDs) for displays. However, unlike inorganic semiconductors (e.g., silicon and gallium arsenide), which form the basis of most modern electronic devices, the speed of electrical transport through organic semiconductors is substantially lower. This disadvantage can be outweighed by their potential for inexpensive manufacturing techniques as well as their versatility.

“We want to understand the role the internal structure of semiconductor polymer structures plays on electrical transport in organic transistors. The goal of the project is, ultimately, to produce better structures with enhanced performance through inexpensive, solution printing techniques.”
-Lisa Porter

CENSCIR FACULTY

Burcu Akinci, funded by National Institute of Standards and Technology (NIST), “Identification of Functional Requirements and Possible Approaches for Self-Configuring Intelligent Building Systems”

James Garrett, funded by National Institute of Standards and Technology (NIST), “Requirements for Creating and Measuring Computer-Processable Versions of Engineering Codes and Standards”

Lucio Soibelman, funded by Bosch, “Automatically Disaggregating the Total Electrical Load in Residential Buildings”

CM²EM FACULTY

Amit Acharya and Luc Tartar, funded by the Office of Navel Research (ONR), “Towards a mathematical theory of fatigue damage and failure”

STEINBRENNER FACULTY

Dave Dzombak, funded by Colcom Foundation, “Exploring the Dimensions of U.S. Environmental Carrying Capacity”

Deborah Lange, funded by Heritage Health Foundation, “Brownfields Job Training Grants”
Corporate Partnership Program Holds First Annual Meeting

In the past year, the Steinbrenner Institute formed and held the first annual meeting of the Steinbrenner Institute Corporate Partnership (SICP) as a way to develop new opportunities for collaborative projects with companies. The meeting attracted 30 participants representing 22 different companies, presenting in three themed sessions, including carbon footprinting, sensing for water and infrastructure management, and green buildings and energy efficiency. The mission of the SICP is to conduct cooperative world-class research in environmental science, technology, management, and policy to provide innovative solutions to environmental challenges in the metals, chemicals, construction/buildings, energy, and other industrial sectors. Companies qualify for membership in the SICP by supporting research in one of the centers associated with the Steinbrenner Institute at the annual level of $10,000 or more per year.

Sustainability Conference to be Held in April

The Steinbrenner Institute will co-host Engineering Sustainability 2009: Innovations that Span Boundaries on April 19-21 at the David L. Lawrence Convention Center, in Pittsburgh, PA with the University of Pittsburgh Mascaro Center for Sustainable Innovation. The conference will bring together engineers and scientists from academia, government, industry, and non-profits, and will focus on the following areas: green building; sustainable distributed power; sustainable urban drinking water, storm water, and wastewater infrastructure; sustainable design of transportation grids; and using principles of sustainability to foster innovation and economic development.

Engineering Sustainability 2009
Innovations that Span Boundaries
April 19-21, 2009
David L. Lawrence Convention Center
Pittsburgh, PA