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**Dear Sustainable Urban Engineering Partners:**

You don't need to look far to learn about sustainability. It's amazing to see the amount of activity which continues to grow at a seemingly exponential rate. What seemed to start with Al Gore's, "Inconvenient Truth," has turned into an entertainment juggernaut with special reports on the Weather Channel, "green episodes" of the Today Show on NBC, and a sustainability series sponsored by National Geographic – just to name a few! Fortunately, the formation of the Center for Sustainable Urban Engineering at the University of Cincinnati has been and continues to be ahead of the curve. But to maintain our position of leadership, we must continue to keep up the quality of our work and to emphasize appropriate marketing.

During the winter term, SUE hosted faculty interviews for three candidates including visitations and lectures using facilities in the Department of Environmental Health, in the School of Planning, and in the College of Engineering. Since I've been at UC, this was first time I witnessed such an interdisciplinary search effort – and it was exciting. We are still awaiting the final outcome of the search, but it is clear that SUE is drawing top candidates to apply. Plans are underway to develop two new searches to take place during the 2008-9 academic year, and we are always on the look-out for additional opportunities to encourage programs to recruit candidates with an interest in urban sustainability.

Winter 2008 has also been busy with a new round of Research Seed Grant Funding. Proposals were submitted for new grants, competitive renewals, and the formation of an IGERT-like training program. The results of the 2007 Seed Grant Competition are starting to yield fruit, and 2008 promises even more positive results!

This issue of our newsletter is filled with exciting stories about sustainability research, education, and outreach by faculty and students affiliated with SUE. The 2007-8 academic year has been a very productive time for our Center, and we can all be proud of the hard work and accomplishments shared by all.

Daniel Oerther, Director

To learn more:

[www.eng.uc.edu/SUE](http://www.eng.uc.edu/SUE) or [sue@uc.edu](mailto:sue@uc.edu) or (513) 556-3685

## SUE Places Students at the Center.



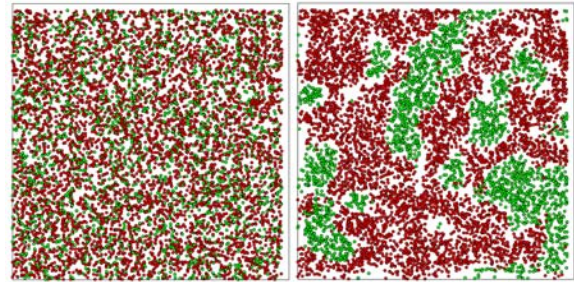
### Graduate Student Profile: Mike Federle, Chemistry

With seed grant funding from SUE, an interdisciplinary team of researchers from UC, NIOSH, and international institutions are exploring fundamentals, applications, and implications of nanotechnologies.

In the photograph above, Mike Federle, a chemistry student at UC, is holding a dye solution that is used to develop new types of dye sensitized solar cells. Federle's graduate studies are directed by Associate Professor Bill Connick in the Department of Chemistry. The SUE-sponsored project in which Federle is a key player is lead by Associate Professor Dion Dionysiou in the Department of Civil and Environmental Engineering and includes Professor George Sorial (CEE), Dr. Pramod Kulkarni (NIOSH, Cincinnati), Professor Elias Stathatos (Technological Educational Institute of Patras, Greece), Professor Erick Bandala (Universidad de Las Americas-Puebla, Mexico), and Dr. Patrick Dunlop (University of Ulster, Northern Ireland). Collectively, the team has developed low cost solar cells to convert solar light to electricity; developed devices to use solar photocatalysis for water disinfection; and are currently developing techniques to monitor the fate and transport of nanoparticles in urban environments.

Exciting results from this multidisciplinary collaboration have been presented in the journal *Solar Energy Materials and Solar Cells* as well as numerous international meetings such as the Division of Sustainability of Energy, Food and Water (American Chemical Society, 2007), the 12<sup>th</sup> Inter Conf on TiO<sub>2</sub> Photocatalysis (2007), and the 3<sup>rd</sup> International Symp on Environ Nanotechnology and Natural Organic Matter (Gwangju, South Korea, 2007).

## SUE Achieves Research Excellence.



7,500 agents of two types before (left) and after (right) undergoing a period of mobility driven by social preference and the formation of social networks.

Prof Ali Minai (Electrical and Computer Eng), Prof Jim Uber (Environ Eng), and Comp Sci graduate student Amer Ghanem are developing a multi-agent model for studying the interaction between the physical and social structure of urban systems. This research seeks to integrate GIS-based models of urban structure with multi-agent models of social network dynamics to explore issues such as the emergence of segregation, formation of slums, inefficient use of infrastructure, stability of social support systems, and the patterns of social awareness across different types of cities. The research is motivated by the idea that the city must be understood as a human system rather than merely as a mechanical entity. This view recognizes that the city's organization is driven, at least in part, by social factors and, in turn, influences these factors. Understanding this co-evolution is essential for analyzing the health – and therefore the sustainability – of cities, especially in developing countries where people depend much more on support from social networks than from inefficient (or nonexistent) public institutions.

Using the Repast Symphonie environment, the team's work incorporates social interaction and social network formation in conjunction with a model of agent mobility based on Schelling's classic approach. Currently, the team is working to integrate GIS capabilities into the simulator. Preliminary simulations indicate interesting emergent behavior such as the appearance of segregation patterns and the formation of modular social networks (see picture). This work is part of a larger effort on urban modeling in conjunction with Profs. Heng Wei (Civil Engineering), Michael Romanos (Planning), Carla Chifos (Planning), Lin Liu (Geography) and John Eck (Criminal Justice).

## SUE Achieves Academic Excellence.



Michael Romanos (Planning) and Carla Chifos (Planning) have cultivated a long-term relationship with professional and academic planners, architects and engineers in Curitiba, Brazil and have been capitalizing on these relationships to provide opportunities for students and faculty for learning first hand about the much touted sustainability approaches of Curitiba, Brazil. Some of the original partnerships created through the Partners of the Americas program of the 1970s with the municipality and the Instituto de Pesquisa e Planejamento Urbano do Curitiba (the Research and Urban Planning Institute of Curitiba, IPPUC), are still maintained, and many more university, non-governmental, and governmental partnerships have been created.

Several student and faculty programs have been offered through these collaborations, including: (1) a two-week study tour entitled "Sustainable Urban Development in Action: The Case of Curitiba" for up to 12 students and faculty to participate in an intensive set of lectures and site visits with a range governmental agencies that plan and implement sustainable urban development and management schemes in Curitiba (pictured above); (2) two-week participation in an annual international urban studio organized through the Architecture and Urbanism Department of the Centro Universitario Positivo involving the creation of multi-national teams of students and faculty creating sustainable urban solutions for Curitiba (past studios included participants from Montevideo, Bordeaux, Barcelona, Curitiba, and UC); and (3) field-research on sustainable regimes to protect integrated ecological and cultural resources and practices in the Atlantic Forest of Brazil (ongoing with UC and Brazilian faculty; seeking additional student involvement). For more information, please contact Carla Chifos, [Carla.chifos@uc.edu](mailto:Carla.chifos@uc.edu).

## SUE Establishes Partnerships.



**Steering Committee Profile:**  
**Sam Salem, Associate Professor of Construction Eng & Infrastructure Systems**

The nation's infrastructure assets are deteriorating and need immediate attention

and infusion of funding to meet structural, functional, health, and environmental standards. Poor road conditions and traffic congestion, corroded and collapsed bridges, overflowing sewers polluting surface water, deficient drinking water facilities that don't provide safe drinking water, aged power plants that can't meet energy demands, and leaking dams are some of the problems that are impacting our economy and quality of life.

My academic interests focus on how to streamline and manage the preconstruction, construction, and post-construction processes for civil infrastructure assets in order to provide safe, economical, and sustainable infrastructure systems. My research and teaching activities include infrastructure systems and asset management, construction project management, accelerated and fast track construction, lean and green construction, and safety and health engineering. I received my Doctorate from the University of Alberta in Canada in 1998. My dissertation addressed the life cycle analysis of alternative construction and repair strategies for infrastructure systems using a probabilistic approach. My industry experience includes working for Alberta Ministry of Infrastructure as part of a team that developed an Infrastructure Management System.

Some of my recent research projects include:

- Asset Mgmt Approach for Culvert Infrastructure;
- Use of Trenchless Technologies for a Comprehensive Asset Management of Drainage Structures;
- Accelerated Construction Decision-Making Process for Bridges;
- Implementation and Evaluation of Advanced Lean Construction Techniques;
- Improved Models for Life Cycle and User Cost Analysis;
- Performance Improvement of Pavement Markings for Roadways; &
- Psychosocial Factors and Musculoskeletal Symptoms among Construction Workers.

## SUE Establishes a Sense of Place.



**NSF-sponsored Center for Sustainable Living to be created at a Metro Cincinnati high school**

To remain competitive in the 21<sup>st</sup> century global economy, students must become competent in Science, Technology, Engineering and Math (STEM) skills. Working collaboratively across diverse technical disciplines and in conjunction with faculty of the College of Education, Criminal Justice, and Human Services (CECH), Associate Dean of Engineering Education Research Anant Kukreti has built a coalition of researchers and educators excited to adapt state-of-the-art practices from the University of Cincinnati to dramatically improve the development of STEM skills in Metro Cincinnati elementary and high school students.

SUE is pleased to be actively engaged in this collaboration through our proposal to establish the “center for sustainable living” as



a core component of a sustainability curriculum for a local high school. The over-arching theme for the center is, “how can we modify our homes to live ‘off the grid’?” The center will consist of four facilities, namely: (a) an on-line collaboratorium hosted in Second Life (pictured above, left); (b) the solar house (pictured above, right); (c) the green learning station at the Civic Garden Center as a remote, informal learning opportunity (picture left); and (d) a state-of-the-art electronic team brainstorming studio (not pictured).



Students will learn about bio-, nano-, and information technology through hands-on study of green roofs, photovoltaics, and virtual reality. Math will be taught using life-cycle assessment to evaluate cradle-to-cradle use of materials and energy. Commercial partners include: Apple, MSD, Messer Construction, Toyota, and GE.

## SUE Creates Opportunity.



**Annual Meeting of the Ohio Society of Professional Engineers sponsored by SUE on May 16-17, 2008**  
**Dan Oerther, CCOSPE President**

This spring, more than one hundred professional engineers from across the State of Ohio will take part in the first regional meeting sponsored by SUE. We have taken the lead in developing opportunities for adult practitioners of engineering to learn how they can use concepts of sustainability as part of profit-generating business practices. This conference will provide professional engineers with 10.5 hours of continuing professional development.

Activities at the conference include plenary presentations by Dean of Engineering, Carlo Montemagno on Engineering Education in the 21<sup>st</sup> Century as well as plenary sessions organized by Prof. Cynthia Tsao on Lean and Green Construction Projects and Prof Art Helmicki on Sustainable Transportation Infrastructure.

On the afternoon of Friday, May 16, some of the best assets at UC will be on display with eight simultaneous tours including: cooperative education by Associate Provost Kettil Cedercreutz; modern IT for workplace connectivity by Director of Distance Learning Eugene Rutz; the solar house by Prof Mike Kazmierczak; an introduction to SUE by Prof Margaret Kupferle; President Zimpher's commitment to climate change by University Architect Beth McGrew; ethics 101 by Prof Rich Miller; women and minorities in engineering by Associate Dean Anant Kukreti; and unanticipated outcomes of engineering decisions by Dr. Pam Heckel.

To learn more, or to register see:  
[www.ohioengineer.com/programs/professional\\_programs.htm](http://www.ohioengineer.com/programs/professional_programs.htm)

## **Of Interest to SUE Affiliates.**

### **Development of a Minor in Sustainable Urban Engineering to be administratively housed in the Department of Civil and Environmental Engineering.**

George Sorial, Assistant Head for Academic Excellence in the Department of Civil and Environmental Engineering, is leading a campus-wide effort to create a 30 credit hour minor/certificate in Sustainable Urban Engineering. The proposed format includes two or three core courses, selection of courses from a limited list which reflects the importance of the triple bottom line mentality for sustainability, additional courses from a diverse list which meets the broad values of the Breadth of Knowledge initiative of GenEd, and a cumulating experience in design and implementation of a multi-disciplinary team project. While the initial effort is being lead by Civil Engineering, the intention is to create a program which can be successfully completed by students from diverse backgrounds including planning, political science, economics, environmental studies, and other programmatic areas of the University. If you are interested in participating in the creation of this minor, please contact George.Sorial@uc.edu for additional information.

### **Development of a proposal to the NSF IGERT program entitled, "Sustainable Urban Transportation and Water Systems," lead by Daniel B. Oerther.**

A team of SUE affiliated faculty lead by Dan Oerther and including Eric Maurer, Carla Chifos, Bill Connick, Tiina Reponen, and Margaret Kupferle developed and submitted a preliminary proposal to the NSF IGERT competition in April 2008. The team should hear back by mid-summer if the preproposal is invited for submission of a full proposal. At that time, all faculty affiliates of SUE will be notified and invited to participate in a proposal development exercise. The current submission is designed to attract extramural funding to support 40 person-years of highly interdisciplinary doctoral study. The primary scientific objective of the proposal is to evaluate policy and technological solutions for challenges arising from the expansion of interstate 75 and the replacement of the Brent Spence Bridge.

### **Larry Falkin and the Mayor's Steering Committee for**

SUE advisory board member, Larry Falkin, has successfully worked with a diverse stakeholder group including 20+ community leaders and more than 150+ community-based technical experts and interested parties to create a Climate Action Plan for the City of Cincinnati (details available at: <http://www.cincinnati-oh.gov/cmgr/pages/-17666-/>). The plan was unanimously approved by the steering committee on April 24, and is expected to be approved by Cincinnati City Council. An ambitious document outlining a path to dramatically reduce Green House Gas (GHG) emissions from the residents, businesses, and government of the City of Cincinnati, Mayor Mark Mallory and Cincinnati City Council have taken a position of leadership on this important issue. Dan Oerther was a member of the steering committee which was chaired by Vice Mayor David Crowley. Public comment on the document is encouraged, and current plans include the Mayor appointing an implementation steering committee to continue the effort.

### **Slate 61 takes office.**

As reported in the Thursday, April 24, 2008 edition of The News Record, Ryan Rosensweig, 4<sup>th</sup> year student in marketing and operations management, and Sean Lee, 3<sup>rd</sup> year finance student, were elected as part of Slate 61 to become the president and vice president of the UC student body for the 2008-9 academic year. The platform for Slate 61 included confidence in safety, connected community, and collective services that put students at the center. As reported in the Monday, April 14, 2008 edition of The News Record, "Rosensweig and Lee said that they are committed to being the base for a student-led sustainability initiative at the University of Cincinnati..." This is exciting news for SUE, and faculty affiliates of the center are encouraged to initiate and continue an ongoing dialogue with these students to provide sustainability education and a sustainable physical plant at UC.

