



Homecoming 2008 – Greening a Garden at Phipps Conservatory and Botanical Gardens

On a beautiful Saturday morning in October, an enthusiastic group of Carnegie Mellon alumni returning for Homecoming 2008 was treated to an engaging presentation by Richard Piacentini, executive director of Phipps Conservatory and Botanical Gardens, about the exciting and pathbreaking green renovations completed and underway at Phipps. The Steinbrenner Institute, with the help of alumna Missy Unkovic (S'68), hosted a breakfast program which featured Mr. Piacentini's presentation followed by a panel discussion, including Professor Khee Poh Lam of the School of Architecture, and his students Stephanie Fonticoba (A'09) and William Small (A'09). Professor Lam and his students participated in planning part of the renovations and expansion of Phipps.

Under the leadership of Richard Piacentini, who has been executive director since 1994, Phipps Conservatory and Botanical Gardens has undertaken the most ambitious program of renovation and expansion in its history. In 2005, Phipps opened the new Welcome Center entrance, the first LEED (Leadership in Energy and Environmental Design) certified building in a public garden, and state-of-the-art, energy efficient production greenhouses. In 2006, Phipps opened the Tropical Forest Conservatory and started planning the Sustainable Landscapes Center.

Mr. Piacentini described the design process leading to the new facilities, including the involvement of Carnegie Mellon faculty members and students from the School of Architecture, and he provided an exciting visual tour. In the panel discussion following his presentation, Professor Lam discussed the sustainable curriculum and course projects in the School of Architecture, and turned to Stephanie and William, both 5th year students, who worked jointly and with the Phipps design team to develop plans for the new Center. A sample design image from their project is shown to the right.

The Steinbrenner Institute was fortunate to have Missy Unkovic - who has been involved with Phipps for 25 years as a volunteer in multiple capacities - help with organizing the event and serve as mistress of ceremonies. She was appointed chair of the Board of Trustees and Executive Committee in 2005, served as such until 2007, and continues to serve on the Board and Executive Committee. During her tenure as board chair, Unkovic helped Phipps to open the new production houses and the Tropical Forest Conservatory. In addition to her work at Phipps, she holds leadership positions on the boards of several other non-profit organizations in Western Pennsylvania. Thank you Missy!

Selected Content:

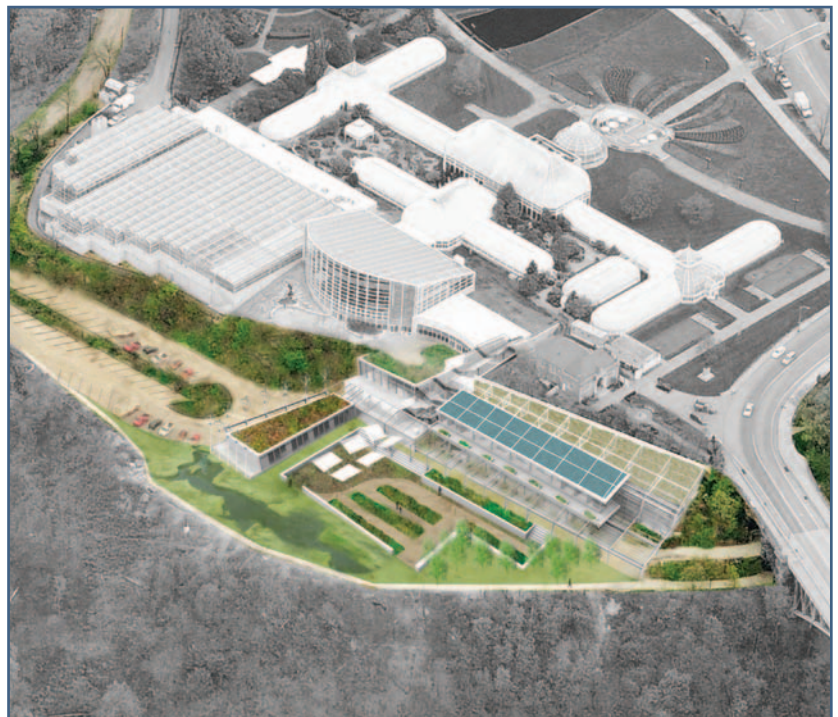
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Design image for environmentally progressive renovations at Phipps Conservatory. Courtesy of Khee Poh Lam.

2009-2010 SEER Graduate Fellowship are Announced

One of the primary missions of the Steinbrenner Institute is to promote graduate level research on timely environmental and energy related initiatives. This spring, the Steinbrenner Institute announced the four 2009-2010 fellowship recipients who were selected from a pool of 14 excellent proposals. The 2009-2010 fellowship recipients are introduced below.

Emily Fertig, from Engineering and Public Policy, will be researching “An Engineering-Economic Optimization of Compressed Air Energy Storage (CAES) to Enhance Wind Power Reliability.” In her research, Emily will model the economic and technical performance of wind farms paired with compressed air energy storage (CAES) to mitigate the fluctuations in wind power generation. The proposed research takes an approach that is more integrative than previous research on wind power/CAES systems. In examining a broader scope of parameters that affect the economic feasibility of these systems, the proposed work represents an important step towards the possible implementation of the technology as a means to provide reliable wind power and help lower the greenhouse gas emissions of the electricity industry. Emily’s faculty advisor is Jay Apt (EPP/Tepper).

Catherine Izard, also from Engineering and Public Policy, will investigate “Economic and Emissions Effects of Climate Change Policy on the Iron and Steel Industry in the United States.” In this project, Catherine will develop a method for evaluating the impact of various types of climate policy on the iron and steel industry in the United States. This project will combine the results of trade, economic and physical flow models of the U.S. and major iron and steel trading partners. The results of her research will help determine the best role for the iron and steel industry in a climate policy, given the unique physical dynamics and competitiveness concerns of the industry. Catherine’s faculty advisors are Chris Weber (CEE) and Scott Matthews (CEE/EPP).

Mechanical Engineering student Elizabeth Traut will research “How Does Energy Policy Affect Vehicle Design?” Elizabeth will construct a theory- and data-driven mathematical model of vehicle design responses under alternative market and public policy scenarios, using the model to address three questions: (1) What emerging alternative vehicle technologies will be competitive? (2) How will public policies currently under consideration affect vehicle design outcomes? (3) What factors and uncertainties are most critical to determining future outcomes? Elizabeth’s faculty advisor is Jeremy Michalek (MechE).

Finally, Civil and Environmental Engineering student Jessica Wilson will study “Brominated Disinfection By-Products in Drinking Water: Impacts from Shale Gas Production in Pennsylvania.” The goal of this research is to investigate the effect on drinking water sources in southwestern Pennsylvania from natural gas extraction, specifically the relationship between increased bromine concentrations in source water and increased haloacetic acid concentrations in finished water. Jessica will use capillary electrophoresis methods to measure total haloacetic acid concentrations in finished water at two drinking water plants along the Monongahela River where source water bromine will be measured continuously at the water intakes using ion specific electrodes. This monitoring will be coordinated with the Pennsylvania Department of Environmental Resources monitoring of the total dissolved solids in the river and its tributaries. Jessica’s faculty advisors are Jeanne VanBriesen (CEE/BME) and Kelvin Gregory (CEE).

Previous recipients of the Steinbrenner Graduate Fellowships include:

2008-2009

- Melissa Chan, Engineering and Public Policy, “Assessing Future Supply Curves for Coal in Light of Technological and Environmental Uncertainties”
- Varun Dutt, Engineering and Public Policy, “Human Problems of Forecasting in Dynamic Systems”
- Sharon Wagner, Engineering and Public Policy, “The Feasibility of Using Parabolic Trough Solar Technology to Increase Renewable Energy”

2007-2008

- Anny Huang, Engineering and Public Policy, “Life Cycle Energy and Environmental Impacts of Extended Product Responsibility Policy”
- Heather Wakely, Civil and Environmental Engineering, “Alternative Transportation Fuels: Infrastructure Requirements and Environmental Impacts for Hydrogen and Ethanol”
- Yan Xu, Civil and Environmental Engineering, “Development of Novel Contaminant Source Tracking with Modular Microbiology”

Professor Chris Hendrickson Reviews Everglades Restoration Project

By Professor Chris Hendrickson, Carnegie Mellon Civil and Environmental Engineering

For over a century, water resource management in south Florida sought to drain the Everglades wetlands, provide water for economic development and protect the urban areas from floods and fire. The natural wetlands dried up, considerable soil subsidence occurred and wildlife populations declined. Launched in 2000 as a partnership among the state of Florida, the federal government and local groups, the Comprehensive Everglades Restoration Plan (CERP) is intended to reverse the decline of the Everglades wetlands and serve the water needs of the South Florida economy. It is the largest environmental restoration program in the world at the present time.

The restoration is challenging because of competing demands for limited water, the problems of insuring adequate water quality (especially with the widespread use of fertilizer in the area), growth in the local human population, the invasion of exotic species, the uncertain impact of global climate change and the numerous interest groups and parties involved in South Florida. The restoration plan involves a variety of projects and actions, including water storage structures, seepage controls, improved management practices for fertilizer, engineered wetlands for water quality improvement, and removal of man-made obstacles to water flow into the Everglades.

For the past four years, Chris Hendrickson of Civil and Environmental Engineering has served on the oversight review panel on progress towards restoration of the Everglades natural areas in Southern Florida. The panel was mandated by Congress to provide independent scientific review of the restoration progress and is organized by the National Research Council of the National Academies. Peer reviews were published in 2006 and 2008. The reports range widely, from issues such as water quality and depth management of Lake Okeechobee to project scheduling and cost estimation. The reviews provide an opportunity for external reflection from an independent panel of experts, but also an opportunity for the restoration managers to step back from day-to-day responsibilities and consider overall progress towards restoration.

Unfortunately, the review panel concluded 'that the CERP is bogged down in budgeting, planning and procedural matters and is making only scant progress toward achieving restoration goals.' With a new administration in Washington and a recent agreement from the State of Florida to purchase agriculture land from US Sugar in the historic Everglades, the panel and the restoration participants are hopeful that progress will be made.



NRC Review Panel for Comprehensive Everglades Restoration Plan. Chris Hendrickson is second from the left in the first row standing.

Focus the Nation: National Teach-In on Global Warming Solutions

By Vanessa Schweizer, Carnegie Mellon graduate student in Engineering and Public Policy

The National Teach-In, an educational initiative on global warming solutions, occurred at more than 800 universities and colleges across the country, including Carnegie Mellon, in early February 2009. In 2008, this initiative was called “Focus the Nation,” (FTN) and Carnegie Mellon retained this name for consistency for this year’s event. The Carnegie Mellon campus teemed with FTN activities led by Engineering & Public Policy graduate student Vanessa Schweizer with the support of the student environmental group, Sustainable Earth.

In addition, seven faculty from the Schools of Architecture, Business, Public Policy, and the Carnegie Institute of Technology including Volker Hartkopf, John Hooker, Dale Hershey, Lester Lave, Lee Branstetter, Cliff Davidson, and Keith Florig led participants through a number of discussions about global warming solutions including high-performance buildings, consumption patterns of goods and services, cap and trade policy, and the siting of new electric generators.

FTN kicked off on February 4 with a keynote address by renowned energy economist Peter Tertzakian, author of *A Thousand Barrels a Second: The Coming Oil Break Point and the Challenges Facing an Energy Dependent World*. Tertzakian’s talk, “Beyond A Thousand Barrels a Second: The Changing Nature of Energy,” described the world energy challenge of the 21st century. Tertzakian explained that aside from the problem of climate change, the energy demands of the developing world will require societies that use the most energy per person – North Americans – to end their “energy obesity.” He advocated that both cleaner energy sources and greater energy efficiency must be widely adopted and further developed in the near future.

On February 5, students, faculty, and staff watched a webcast entitled, “Solutions for the First 100 Days,” which was co-produced by the National Wildlife Federation. The broadcast featured Oberlin’s Distinguished Professor of Environmental Studies and Politics David Orr; CEO of Natural Capitalism Hunter Lovins; Chair of the Board of Directors for Plains Justice Diane Dillon-Ridgley; Billy Parish and Betsy Taylor of the 1Sky campaign; and Wahleah Johns of the Black Mesa Water Coalition. The webcast can be viewed at <http://www.nationalteachin.org/launchwebcast.php>.

On February 6, Carnegie Mellon hosted a day of events focusing the community on solutions to global warming including panel presentations by dozens of university and local sustainability leaders. Session topics included “America’s Environmentalism in Action: Your Environmental Road Trip, 50 States of Eco-Exploration,” featuring Mark Dixon; “How to live car-light or car-free in Pittsburgh,” featuring Stephen Patchan from Pittsburgh’s Department of City Planning and Scott Bricker of Bike Pittsburgh; and “Clean power generation? Not in my backyard!” featuring Carnegie Mellon professors Keith Florig and Lester Lave. The day’s festivities closed with a Sustainability Mixer providing students and community members with the opportunity to socialize and network. Finally, as was the case last year, U.S. Representative Mike Doyle reached out to Carnegie Mellon students concerned about these issues. Although he could not attend this year’s FTN, he broadcast a brief statement about his commitment to climate change legislation. Representative Doyle’s statement can be viewed at <http://www.vimeo.com/3079888>.

Please visit www.nationalteachin.org for more information about the national project.



Peter Tertzakian in meeting with Carnegie Mellon faculty members and students, and local media representatives.



Student “Sustainability Mixer”.

SEER Media Summit Participants Debate the Future of the News Media

By *Chriss Swaney, Carnegie Mellon College of Engineering Public Relations Director*

A November 2008 Media Summit sponsored by the Steinbrenner Institute and the College of Engineering focused on the future of the news media.

The continuing growth of news dissemination on the internet, and the different economic model associated with internet news, has negatively impacted the profits of most major media outlets. Last fall, a panel of veteran journalists discussed how organizations succeed in this atmosphere of change and regeneration.

Allan Dodds Frank, president of the Overseas Press Club; Steve Hamm, senior writer of Business Week Magazine; Nitya Venkataraman, producer of digital media at ABC News and freelance journalist Michael Yablonski tackled tough issues involving the competitive challenges faced by both print and broadcast news organizations.

The panel agreed that one key factor for success is to use new technology to build networks of social media to capture a wider range of stories. Panel members stressed the need for both editors and reporters to become comfortable using these new digital mediums to better see, understand and react to the environment and to better understand the needs of consumers. More than 45 percent of all news consumed today comes from online sources, including cellphones and other mobile devices. The panel members estimate that online usage could double within the next five years.

“No matter how much technology is out there, we are still looking for great stories and great storytellers,” said Frank. His sentiments were echoed by Hamm who said he still relies heavily on communication specialists to feed him interesting research materials or novel inventions.

And Hamm and Venkataraman, both Carnegie Mellon alumni, said they enjoyed receiving story ideas from their alma mater.

The fall 2009 Media Summit will feature media experts discussing how publications are changing the way they report and write stories.



Steve Hamm, senior writer of Business Week Magazine.



Allan Dodds Frank, president of the Overseas Press Club.



Nitya Venkataraman, producer of digital media at ABC News.



Michael Yablonski, freelance journalist.

Urban Design Build Studio Creates an Urban Homestead for Wilkinsburg

By Professor John Folan, Carnegie Mellon Department of Architecture

Beginning in the fall of 2008, the Urban Design Build Studio (UDBS) - a community based design/build group affiliated with the School of Architecture at Carnegie Mellon - engaged the Borough of Wilkinsburg in a year long participatory design process. The process, which will culminate with Phase One construction of the Hamnett Homestead Sustainable Living Center (HHSLC) in the summer of 2009, has focused on cross-disciplinary collaboration, democratic decision making, and knowledge building within the community.

The work in Wilkinsburg embraces the reality of decreasing residential population, increasing physical abandonment, and existing environmental liabilities. In the analysis phase, students and faculty collaborated with the community to identify and analyze existing typological conditions and formulated alternative systems of modification in the context of the Borough's Comprehensive Masterplan and Economic Synthesis Studies. The systems analysis focused specifically on the ecology of the site, human relationships, and the relationship between people and the environment as components of integrated building design. The work sought to proactively anticipate the logic of events, present and future, through flexible, sustainable strategies, with expressed emphasis on defining methods of localizing energy cycles by maximizing the ecological capacity of vacant urban sites.

As an outcome, the participatory process yielded the identification of a specific focus area for the development of a catalytic prototype project. In May of 2009, the UDBS began developing the HHSLC as an urban homestead. The adaptive re-use project will utilize harvested materials from abandoned buildings that have been deconstructed in the Hamnett Homestead neighborhood. Those materials will be used in the construction of a community pavilion and multi-story greenhouse that are components of a larger adaptive re-use program that will be implemented on site over a five-year period. All planning and construction strategies utilized in the realization of the project are explicitly biased toward improving energy efficiency and performance of existing structures. The new structures will be monitored for thermal performance, affordability, and replicability during the fall of 2009 and will be occupied by the Institute for Ecological Innovation (IEI), a non-profit, 501c3 Corporation that seeks to model and disseminate sustainable planning strategies and accessible regenerative technologies in challenged urban areas.

The faculty project director is John Folan, T. David Fitz-Gibbon Professor. Collaborating faculty include Stephen Lee and Bob Bingham. The students working on this project are Elizabeth Cohn, Nelly Dacic, Jared Friedman, Christopher Gallot, Spencer Gregson, Charles Helmstetter, Ubolsiri Racharaks, Donald Reeves, Patricia Rivera, Greg Tanski, Alyssa Topinka, and Jerome Williams.



Rendering of the proposed community pavilion at the HHSLC.



Future home of the Institute for Ecological Innovation.

Student Activists Enact a Power Shift to Combat Climate Change

By Alicia Marrie, Carnegie Mellon undergraduate in Chemical Engineering

This February, thanks to a contribution by the Steinbrenner Institute, 43 Carnegie Mellon students joined 12,000 youths from across the nation at Power Shift 2009 in Washington, DC. Power Shift is a four-day youth summit on global climate change. The conference series brings student activists together to discuss climate change and what we can do on our campuses and in our communities to bring combat it.

The conference schedule was packed with interesting sessions on a variety of issues relating to global climate change. Panels and workshops on Saturday and Sunday (February 28 and March 1) explored topics on climate change relating to politics and policy, campus organizing, communications, grassroots organizing, education, green jobs and the economy, health, and environmental action. These sessions were led by a variety of activists and professionals, including Ralph Nader. In addition to educational sessions, Power Shift also facilitated discussions between students from the same region, allowing them to work with each other on intercampus projects. Evening activities included a variety of keynote speakers including Congresswoman Donna Edwards and the founding president of Green For All, Van Jones.

After two days of discussion and education relating to climate change, the summit ended on Monday (March 2) with a Lobby Day and a rally at which Congresswoman Nancy Pelosi addressed the students. Students from Carnegie Mellon, along with others from around Pennsylvania, met with both Senator Arlen Specter and Senator Robert Casey to discuss what legislation we would like to see in combating global climate change, in addition to demanding investment in a green economy. Students also had an opportunity to meet with senators and representatives from their home states.

Leaving Power Shift 2009, I could tell that, like me, my fellow Carnegie Mellon students were inspired to bring the momentum of Power Shift back to school with them. Already, two students who attended Power Shift have begun a new green initiative on campus. Rachel Inman and Nancy Lao have created a Green Team of students focused on leading sustainability efforts on the Carnegie Mellon campus. I look forward to seeing the kind of passion for the environment that I saw at Power Shift on our campus as students raise awareness and initiate change at Carnegie Mellon.

The trip to Power Shift 2009 was also sponsored by the Office of the Dean of Student Affairs, Sustainable Earth, Student Senate, and the College of Engineering (CIT).



Carnegie Mellon students at Power Shift 2009 in Washington, DC, February 2009.

Carnegie Mellon Helps to Develop the Green Workforce

As national interest in green jobs expands, Carnegie Mellon is engaged in a number of activities related to green job planning, training, and development at the local, regional, and national levels.

The Center for Water Quality in Urban Environmental Systems, led by Professor Jeanne VanBriesen of Civil and Environmental Engineering, is working with leaders of several Pittsburgh trade unions to engage their members in her research on advanced sensing for water distribution systems. The involvement of union members in her field research brings needed expertise in order to implement customized installations for research, provide an opportunity for training union members in installation and maintenance of new technologies, and give students the chance to learn from skilled trade workers.

Professor Steve Lee of Architecture has forged similar partnerships with trade unions in his design-build project entries in the U.S. Department of Energy Solar Decathlon competitions in 2003, 2005, and 2007. He continues these partnerships in his current design-build courses and projects in the Pittsburgh area. (See John Folan's article on the Urban Design Build Studio in Wilksburg.)

Executive Director of the Western Pennsylvania Brownfields Center Deborah Lange is cooperating with Heritage Community Initiatives in Braddock, Pa. to provide environmental technician training. The program, funded by the U.S. Environmental Protection Agency's brownfield initiative, targets the un- and under-employed who live in neighborhoods that have been impacted by brownfields and provides a 'tool box' for the graduates to become technicians who can perform sampling and analysis tasks associated with remediation projects. The first training session, completed in March 2009, graduated 22 trainees. The second session in May-June 2009 had 25 adult learners enrolled.

Last fall in Philadelphia, Steinbrenner Institute Faculty Director Dave Dzombak participated in a panel discussion on "The Greening of the American Workforce" at the U.S. Chamber of Commerce Institute for a Competitive Workforce Summit on "Driving the Debate: Education and the American Workforce." The panel discussion was part of the opening plenary session, illustrating the keen national interest in exploring and expanding green jobs in the 21st century. Other participants included Ms. Sandi Vito, acting secretary of the Pennsylvania Department of Labor and Industry; James Whaley, president of the Siemens Foundation; Any Van Kleunen, executive director of the Workforce Alliance; and Thomas Ginsberg, deputy business editor of The Philadelphia Inquirer as moderator. Dzombak discussed the important role of universities in green jobs training and development, and the range of partnerships and programs that universities have that are aimed at middle skill jobs.



Students get prepared for their field exercise.



Students work on a brownfield in the shadow of US Steel's Edgar Thompson Plant in Braddock, PA.

Carnegie Mellon Well Represented at National AASHE Conference

Vanessa Schweizer, a graduate student in the Engineering and Public Policy Department, represented the Steinbrenner Institute at the conference. Eight students and faculty members, and two staff members from Carnegie Mellon, participated in the second biennial Association for the Advancement of Sustainability in Higher Education (AASHE) conference last November in Raleigh, North Carolina. The theme for this year's conference was "Working Together for Sustainability: On Campus and Beyond."

The goal of the AASHE conference is to invite students, faculty, and administrators from across higher education institutions to come together and demonstrate how colleges and universities can be leaders in creating an environmentally sustainable future. The conference itself was designed to help showcase the depth and range of sustainability initiatives at colleges and universities in North America.

M. Shernell Smith from Student Affairs, who advises the Eco-Reps program, collaborated with colleges from other institutions in facilitating a workshop on "Peer to Peer Sustainability Outreach from A to Z." In addition, about 60 attendees from higher educational institutions around the world gathered at a pre-conference workshop on "Living Laboratories for Sustainability" to discuss their experiences with running and creating living labs.

Living laboratories embody "user-inspired research," where end users (at the individual and community levels) frame research questions and, at times, jointly conduct research to find solutions. Campus-wide and regional partnerships strengthen the relationships between research, education, and real-world impact. Although the Steinbrenner Institute is only in its fifth year, it served as an example of a well-established institution for Carnegie Mellon's "living" research labs.

The conference acknowledged the importance of highlighting and reinforcing the partnership nature of what Carnegie Mellon does in its national and international sustainability initiatives. It was evident to the Carnegie Mellon representatives that the institution's sustainability leadership was due in part to its vision and commitment to interdisciplinary approaches and collaborations across all departments, schools and communities.



Some of Carnegie Mellon's participants at the second biennial Association for the Advancement of Sustainability in Higher Education (AASHE) conference last November.

Alumni Spotlight

MELANIE VRABEL (MS CHEMISTRY, 2005)

“Look outside the box for career options and pursue what truly interests you.”

This is the advice Carnegie Mellon graduate Melanie Vrabel has for current students and recent graduates. While she did not follow a traditional graduate education path at Carnegie Mellon, Vrabel made choices along the way that prepared her for her current work as a chemist and project manager in the Design for the Environment (DfE) Program at the Environmental Protection Agency (EPA). (More information on the DfE can be found at <http://www.epa.gov/dfe>.)

It was Professor Terry Collins' Green Chemistry class at Carnegie Mellon that inspired Vrabel to explore ways to use her knowledge of chemistry and interest in environmental policy to make an impact and allow her to play a part in the green chemistry movement. Vrabel holds a masters of science in chemistry from Carnegie Mellon University, where she used Fe-TAML® activator technology to break down natural and synthetic estrogens, and various pharmaceutical compounds, in water.

While working on her masters in chemistry, she began taking environmental policy classes in the Heinz School. After completing her masters, Vrabel applied, was accepted, and intended to start a policy program in the Heinz School. At this point, however, an opportunity arose for her to work at the EPA, and she took it.

In her role as a chemist for the DfE, Vrabel works with formulators to develop chemically safer products as a part of the DfE Formulator Recognition Program. The common objective of DfE partnerships is to integrate health and environmental considerations into business decisions. As a voluntary program, DfE brings all interested parties (manufacturers, suppliers, government, NGOs, etc.) together to achieve sustainability in chemical products.

DfE uses the technical tools of the EPA's New Chemicals Program to understand the environmental and human health profiles of every chemical ingredient in a product and allow for only the safest to be used that will also produce a high-performing product. DfE's label was developed in 1997 and draws upon chemical and environmental expertise across the EPA. DfE has partnered with major product manufacturers, such as Clorox, SC Johnson, Colgate-Palmolive, Method, Dial, and Corporate Express (now Staples), and it is engaged with retailers who support the DfE program. DfE-recognized products receive preferential shelf space in Wal-Mart, Target, and Home Depot stores. It currently recognizes over 1000 products that are safer for human health and the environment.

Vrabel says, “While I am not in the lab, I am a part of the green chemistry movement. I personally work with companies to help them formulate safer products. When I complete my review of each ingredient in a product, I can often times suggest



alternative chemicals that are safer for human health and the environment. As I see the number of DfE products growing from approximately 200 when I started in 2006 to over 1000 in 2009, I can see that my work is making an impact.”

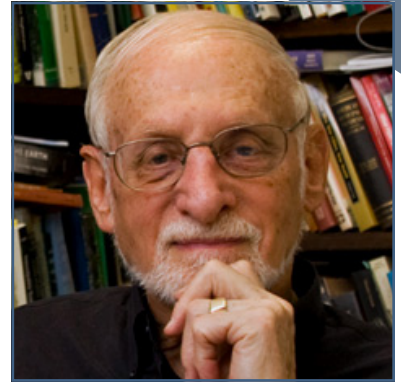
Vrabel is also the project manager of the report development and hazard assessment portion of the Flame Retardants in Printed Circuit Boards partnership. This partnership was developed to identify and evaluate commercially available flame retardants and their environmental, human health and safety, and environmental fate aspects in printed circuit boards. Little information exists concerning the potential environmental and human health impacts of the materials which are being developed as alternatives to those used today that are based on brominated epoxy resins. Environmental and human health impacts can occur throughout the life cycle of a material, from development and manufacture, through product use and finally at end of life of the material or product.

Vrabel's work addresses the needs of the stakeholders in this process: “In addition to understanding these potential impacts associated with flame retardant chemicals, stakeholders have expressed a particular interest in understanding the combustion products that could be formed during certain end-of-life scenarios. This information will be presented to allow industry to consider these impacts along with cost and performance of circuit boards as they review alternative materials and technologies.”

To Carnegie Mellon students now grappling with which career path to follow, Vrabel says: “My advice is to just be open to what really motivates you and be willing to pursue your true passions. Of course that may involve some risk, but you want, ultimately, to be happy with your career. I was open to pursuing different ways that I could use my green chemistry knowledge, I was ready to switch educational directions in order to do so, and now I'm working my dream job at the EPA.”

Faculty Spotlight

PROFESSOR JOEL A. TARR



This fall when the Society for the History of Technology awarded me the Leonardo da Vinci Medal, I was astonished, since I have never considered myself to be a “real” historian of technology. Unlike many in the field I have neither an engineering background nor training in the field. In fact, the field did not even exist when I did my undergraduate work. My major focus is the city. I am an urbanist interested in how technology, especially urban networks, impacts the urban fabric and affected the city environment both in the past and today.

In my teaching and writing I describe the city as an “Artifact of Technology and the Environment,” providing a powerful lens through which to illustrate the impacts of technology. I attribute the development of my interest in urban technology primarily to three factors: my early upbringing in Jersey City, an industrial city possessing many physical attributes of technology and technological networks; the shaping effect of my experience at Carnegie Mellon University; and my residence in, and fascination with, the city of Pittsburgh.

In 1967, I accepted an assistant professorship at Carnegie Mellon with a joint appointment in the new colleges of Humanities and Social Science and the School of Urban and Public Affairs (SUPA, now the Heinz College). Pittsburgh, at that time, bore some similarities to Jersey City. The Pittsburgh industrial and technological milieu reminded me of my roots and greatly influenced me, and I decided to study the impact of transportation technology on the city and its region. The Transportation Research Institute (TRI) had been founded within the engineering college in the 1960s to provide research on new modes of urban transit. I began participating in their seminars and soon, they provided funding for my historical transportation work. At the same time a group of engineers from several disciplines within the engineering college were attempting to broaden engineering and apply its insights to public policy by taking an interdisciplinary approach.

In 1977, this program evolved into what is now the Department of Engineering and Public Policy, and I received an appointment in the department. Working with a group of engineers studying public policy issues such as urban transit, air and water pollution, and energy provided me with a new historical paradigm for my research. The critical concept was Retrospective Technology Assessment (RTA), based upon the belief that history could inform contemporary, technology policy, and we received funding from the National Science Foundation (NSF) to do a retrospective technology assessment of the evolution of wastewater technology in American cities.

From this point on, my career followed the thread of the impact of technology on the city and its environment. In the late 1970s and 1980s, the NSF and the National Oceanic and Atmospheric Administration (NOAA) funded my study of the history of air pollution, long-term pollution of East Coast estuaries, and industrial waste disposal. In addition, a multi-year grant for a university

wide-program in Technology and Society from the Andrew W. Mellon Foundation provided support for a range of courses at the university, several of which were co-taught by historians and engineers.

Funding was also provided for a small grants program for studies of technology and society and for history graduate students recruited into a new Ph.D. program in applied history (now History & Policy) that Peter Stearns and I created in 1980.

These programs and my research had some common elements, including a belief that history could be useful as a problem-solving discipline, as well as a field to supply needed perspective. Problem solving fit well with our applied history program, and graduate students were encouraged and trained to think along those lines from an interdisciplinary perspective by taking on a public policy problem for a “client” and subject it to analysis. In 1991, I incorporated the project course concept into the undergraduate history and policy program where it became the capstone experience for students in that track.

By the late 1970s, my interest in the impacts of technology on the city had made me aware of the limited attention by urban historians to this critical theme. I began editing special issues of several journals focusing on this theme, as well as publishing with Gabriel Dupuy a special issue of *Les Annales de la recherche urbaine* dealing with “Les reseaux techniques urbains.” In 1988, Temple University Press published these papers under the title, *Technology and the Rise of the Networked City in Europe and America*, now considered a pioneering book in the field.

In the 1990s, environmental issues came to the fore, and I edited with colleagues special issues of urban and environmental history journals, focusing on the urban environment. In 1997, Jeff Stine of the Smithsonian and I prepared an article entitled “At the Intersection of Histories: Technology and the Environment” that we hoped would expand the consideration of the environment in the history of technology. This expectation has been realized with the formation of Envirotech as an interest group of the Society for the History Technology, a quarterly newsletter, awards for the best article and books in this domain, and a forthcoming book of envirotech essays. At Carnegie Mellon, the NSF funded an interdisciplinary proposal for a study of brownfields and their relationship to urban infrastructure - a research project that evolved into the current Brownfield’s Center.

I never viewed technology as a stand-alone factor but rather as a constant interactor with the natural and build environments, as networks and systems spread within and beyond the city.

Visit www.cmu.edu/steinbrenner/tarr-why-technology-5.09.pdf to read the extended version of this article.

Colcom Foundation Funds Environmental Research and Education

The Colcom Foundation has been active in supporting environmental research and educational endeavors at Carnegie Mellon. Those benefitting from the recent grant funding include the Steinbrenner Institute, which has been giving researchers and students the opportunity to explore the dimensions of the U.S. environmental carrying capacity. Also benefitting is the Center for Atmospheric Particle Studies (CAPS), which has been able to create a mobile laboratory for its research on the health effects of airborne particulate matter.

Environmental carrying capacity refers to the population size that a region – from a small ecosystem to larger scales – can sustain with limited natural resources and without degrading the environment for present and future generations. With funding from Colcom, the Steinbrenner Institute is leading an effort at Carnegie Mellon to collect initial data and information for analyzing the U.S. environmental carrying capacity. The students in two Spring 2009 courses assisted with this research.

An Engineering and Public Policy course led by professors Paul Fischbeck and Lorrie Cranor and a Civil and Environmental Engineering class led by Professor Cliff Davidson have given undergraduate engineering students the opportunity to research various aspects of the question of the limits of U.S. carrying capacity. The students examined metrics and policy, resources (energy and natural), consumption (population and resources), ethical concerns and policy levers; and to study domains relevant to carrying capacity, such as biodiversity and geoenvironment. In addition, a workshop for researchers and students is being planned for fall 2009.

With \$250,000 in funding from the Colcom Foundation, the CAPS mobile laboratory has upgraded its existing equipment, purchase new equipment, and create work space for researchers. These upgrades, which were completed in March 2009, include the conversion of a Ford box truck into a mobile laboratory platform equipped with electrical service, a compressor for providing clean air to instruments, a mobile smog chamber, and vacuum service. The CAPS mobile laboratory will have an official launch in the summer of 2009.

The CAPS laboratory will be used for field testing, including ambient monitoring, emissions testing and characterization, and on-location smog chamber experiments similar to the experiments conducted in the CAPS lab. Future plans for the mobile laboratory include sampling aircraft emissions in conjunction with the Air National Guard, ambient sampling with the University of Pittsburgh Graduate School of Public Health to quantify the detrimental effects of air pollution on public health along the Monongahela River, ambient sampling near the Squirrel Hill Tunnel, and testing emissions from biomass burning from forest fires and deforestation at the U.S. Forest Service's Fire Sciences Laboratory in Missoula, Montana.

The Colcom Foundation was created in 1996 to provide a forum for the examination and discussion of the major causes and consequences of overpopulation and its impact in environmental sustainability.

Carnegie Mellon Students Deliberate on Their Role in Addressing Climate Change

On Tuesday, April 7, over 60 students participated in a two-hour Campus Conversation on the issue of Climate Change and specific ways that Carnegie Mellon can and is addressing this issue. Participants had access to a 46-page background document outlining the science of climate change and the role that our nation's colleges and universities can play in addressing climate change. They also received a 2-page flyer outlining Carnegie Mellon's sustainability agenda and related topics, such as a proposed carbon offsets program.

The conversations followed the protocols of a Deliberative Loop®, a technique which Professor Robert Cavalier of the Philosophy Department has used to lead campus discussions on a variety of issues. Participants were asked to fill out a pre-survey designed to gather demographic information and initial attitudes toward the issue of climate change. *Continued on page 15...*

A Farewell to Bob Dunlap (1937-2009): Steinbrenner Supporter and Advisor

Dr. Robert W. Dunlap, former faculty member in the College of Engineering, founding department head for Engineering and Public Policy, member of the Board of Trustees, and supporter of the Steinbrenner Institute, passed away January 5, 2009, at St. Joseph's Hospital in Tucson, Arizona from complications following surgery. He was 71.

Bob Dunlap started his career at Carnegie Mellon as an assistant professor of metallurgy and materials science in 1967. His outstanding teaching won him the university's top prize for undergraduate teaching - the Ryan Award - in 1972. In the early 1970s, he conceived of the idea for a joint, undergraduate program offering a double major: the first major in a traditional engineering major and the second in social science, economics, quantitative decision-making and management. With Professor Gordon Lewis of the School of Urban and Public Affairs and with the support of Dean of Engineering Herb Toor, he prepared a successful proposal to the Sloan Foundation to enable the launching of a new program, the first in engineering and public affairs. "More than any other single person Bob Dunlap was responsible for the creation of what is now the Department of Engineering and Public Policy," said Professor Granger Morgan, head of EPP. "This is the leading academic department in the world working on technology and public policy."



Bob Dunlap (left) talks with Cliff Davidson (right) at the 2008 Steinbrenner Corporate Partnership Meeting.

During his time on the faculty at Carnegie Mellon, Bob Dunlap became increasingly involved in environmental issues relevant to the steel industry, as well as issues affecting the environment in a broader context. He left the university to help start an environmental engineering consulting firm, Environmental Research and Technology (ERT) with several former students.

Dr. Dunlap left ERT in 1985 and founded Remediation Technologies (RETEC), a firm which quickly became an industry leader in the field of environmental remediation, pioneering new techniques for the remediation of hazardous waste sites across the country. Through a merger, the company became ThermoRETEC in 1999, where Bob continued to serve as chief operating officer until 2001.

From 2001-2009, Bob Dunlap was a principal consultant for the Environmental and Financial Consulting Group, Inc., a New York-based firm supplying investment banking and consulting services to the engineering service industry, and also served as a trustee of Carnegie Mellon.

Bob Dunlap brought his passion for environmental issues and the need for alliance between technological development and humanitarian values to his service on the Board of Trustees. In 2002, he chaired a trustee committee that examined the state of environmental education and research at Carnegie Mellon and produced a report entitled "Green Design/Green Future: Education, Research and Action for a Sustainable World – A Strategic Thrust for Carnegie Mellon University." In the report, the trustees challenged the university "to change the ways the world thinks and acts about the environment, through our educational and research methods and results, through the issues we raise, and through the outcomes we produce." Another member of the committee was Lowell Steinbrenner. The vision that the committee set forth inspired Lowell and Jan Steinbrenner to make a subsequent gift that became the first step toward achieving the vision and goals of the 2002 trustee report.

Bob Dunlap and Lowell Steinbrenner worked closely together as advocates for advancement of environmental education and research on the Board of Trustees, and in serving as counselors to administrators, faculty, and staff in the startup of the Steinbrenner Institute. Bob's wisdom, knowledge, and advice will be greatly missed by all involved with environmental education and research at Carnegie Mellon.

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Bob is survived by his wife of 50 years, Ann Caris Dunlap; his sons, Robert of Stockholm, Sweden, David of Tucson, Arizona, Richard of Paris, France; five grandchildren; and his sister, Deane Krasow of Atlanta, Georgia.

“Current Climate Policy Does Not Go Far Enough!”

EPP Professors Argue before Congress

A team of researchers from the Department of Engineering and Public Policy (EPP) has expressed to the U.S. Congress that a cap and trade policy alone is not enough to achieve large greenhouse gas reductions (GHGs) by the middle of the century. The policy brief, entitled “Cap and Trade is Not Enough: Improving U.S. Climate Policy,” was produced by Constantine Samaras, Jay Apt, Inês Azevedo, Lester Lave, M. Granger Morgan and Edward Rubin is available on the Steinbrenner Institute website (under “Publications and Policy Papers”).

A cap and trade program would put a limit on the amount of GHGs emitted each year, and require large producers or users of fossil fuels, such as oil companies, utilities and manufacturers, to have permits for each ton of GHG released into the atmosphere. These permits are traded among companies, allowing companies that have made reductions to sell their leftover permits to companies that need more. While the debate over climate policy in Congress heats up, recent climate bills contain cost containment or “safety valve” measures that prevent the price of GHG permits from rising substantially.

“If GHG permits are relatively inexpensive, utilities will likely just purchase additional permits rather than make large scale investments in low-carbon power plants,” says co-author Constantine Samaras, a research fellow in EPP. “Potentially higher prices might be required to foster the big changes we need in the way we make and use appliances and automobiles,” Samaras explains. “We should be augmenting cap and trade proposals with strong standards to induce low-carbon investments in the near-term.”

The policy brief argues for aggressive standards in the electric power, building and transportation sectors as an addition to a cap and trade program. “We believe standards that require power companies to continuously reduce the average carbon dioxide emissions of the electricity they sell over time can serve as a market signal and driver of innovation toward a low-carbon economy,” says co-author M. Granger Morgan, head of Carnegie Mellon’s Engineering and Public Policy Department.

The authors also argue for the promotion of strategies that separate utility profit from the amount of electricity sold, tighter standards on buildings and appliances, and fuel efficiency standards that at least double the miles per gallon over current vehicles. Some of the provisions recommended in the policy brief are included in the draft climate bill recently offered by U.S. Rep. Henry Waxman (D-Calif.), chairman of the Energy and Commerce Committee, and U.S. Rep. Edward J. Markey (D-Mass.).

“Without decoupling electricity revenues from sales, utilities can not be expected to widely promote energy efficiency, since they are losing money by doing so,” describes co-author Ines Azevedo, a Ph.D. candidate in EPP. “While efficiency could save up to 20 percent of consumers’ electricity while saving money, market barriers often prevent this from happening. Appliance and other standards are needed to allow consumers to take advantage of such savings,” Azevedo says.

“To achieve the large emissions reductions required to ensure that atmospheric concentrations of carbon dioxide do not reach levels considered by many scientists to be disastrous, additional measures beyond cap and trade will be necessary. We need to build low-carbon power plants, give incentive to utilities to invest in efficiency, and significantly reduce the energy use of our appliances, buildings and vehicles,” report Carnegie Mellon researchers.

SEER Faculty Serve on National Research Council Committees

Many Steinbrenner Institute faculty members from Carnegie Mellon have been devoting their time to serving on the National Research Council (NRC). The Council draws its members from the world's top scientists, engineers, and other professionals who volunteer their time without compensation to serve on committees and participate in research activities on issues important to the nation.

The National Research Council functions under the auspices of the National Academy of Sciences (NAS), the National Academy of Engineering (NAE), and the Institute of Medicine (IOM). Its mission is to improve government decision making and public policy, increase public education and understanding, and promote the acquisition and dissemination of knowledge in matters involving science, engineering, technology, and health.

Carnegie Mellon faculty and administrators serving on NRC committees include:

- Paul Fischbeck, who chairs the committee on “Alaska’s Oil and Gas Pipeline Infrastructure: Risk Assessment Peer Review” and serves as a member of the committee on “Ranking FDA Product Categories Based on Health Consequences, Phase II;”
- Carnegie Mellon President Jared Cohon, who chairs the committee on “Health, Environmental, and Other External Costs and Benefits of Energy Production and Consumption”
- Scott Matthews, who serves on “Health, Environmental, and Other External Costs and Benefits of Energy Production and Consumption;”
- Mitchell Small, who serves on the committee for “Review of the Department of Homeland Security’s Approach to Risk Analysis;”
- Lester Lave, who serves on the committee for “America’s Energy Future: Technology Opportunities, Risks, and Tradeoffs;”
- Baruch Fischhoff, who serves on the committee for “Behavioral and Social-Science Research to Improve Intelligence Analysis for National Security;”
- David Dzombak, who serves on the committee for “Nutrient Control Actions for Improving Water Quality in the Mississippi River Basin and Northern Gulf of Mexico;”
- Chris Hendrickson, who serves on the committee for “Independent Scientific Review of Everglades Restoration Progress” (more on this project can be found on page 3 of this issue);
- Edward Rubin, who serves on the committee for “America’s Climate Choices: Panel on Limiting the Magnitude of Future Climate Change”

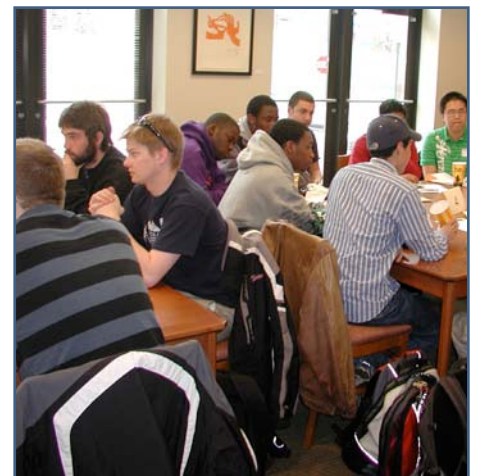
Carnegie Mellon Students Deliberate (Cont.)...

Continued from page 12...

They were divided into small group settings for a structured discussion, and moderators included members of CMU’s Phi Beta Kappa Society. After over an hour of discussion, they gathered in a plenary session for a Q&A with a resource panel. Afterwards, participants completed a post-event survey. The results of this survey will be analyzed and made available to interested parties, including Carnegie Mellon’s Green Practices Committee.

Campus Conversations is sponsored by the Office of the Dean of Student Affairs. The Campus Conversation on Climate Change was sponsored by Focus the Nation, the Pittsburgh Climate Initiative, the Southwestern Pennsylvania Program for Deliberative Democracy, and the Steinbrenner Institute.

For more information on this event and other Campus Conversations, please visit caae.phil.cmu.edu/cc/polls/



Campus Conversation on climate change, April 2009.



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Best Policy Paper Goes to Environmental Engineering Professors

Professors Chris Weber and H. Scott Matthews have received the Best Policy Paper Award from the journal Environmental Science and Technology (ES&T) for their paper, "Food-Miles and the Relative Climate Impacts of Food Choices in the United States". Dr. Weber is a research assistant professor in Civil and Environmental Engineering and Dr. Matthews is an associate professor in both Civil and Environmental Engineering and Engineering and Public Policy.

Despite significant recent public concern and media attention regarding the environmental impacts of food, few studies in the United States have systematically compared the life-cycle greenhouse gas (GHG) emissions associated with food production against long-distance distribution, aka "food-miles". Weber and Matthews address this in their research and suggest that dietary shift can be a more effective means of lowering an average household's food-related climate footprint than "buying local."

Their paper finds, for example, that the environmental benefits of eating less red meat and dairy turns out to be a better way to reduce greenhouse gases than switching to an all-local diet, according to their life-cycle assessment. Shifting less than one day per week's worth of calories from red meat and dairy products to chicken, fish, eggs, or a vegetable-based diet achieves more GHG emissions reduction than buying all locally sourced food.

For more information on this story, please visit the Steinbrenner Institute's March 4 press release at <http://www.cmu.edu/steinbrenner/News/index.html>.



Professor Scott Matthews and Professor Chris Weber investigating local and non-local food choices.

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