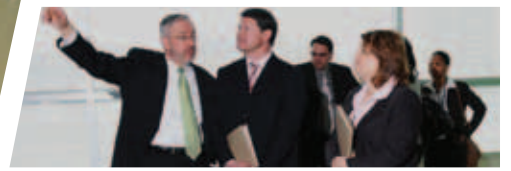






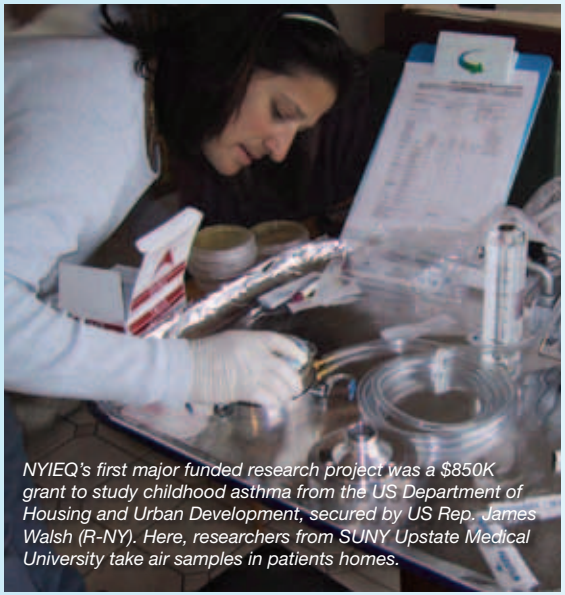




2010 Annual Progress Report

2010: A Vision, Sustained

1996: "Vision 2010" charts the course for strengthening the economy of Central New York. The regional blueprint by CenterState CEO targets key industry clusters, including environmental quality and energy systems. At Syracuse University, the L.C. Smith College of Engineering and Computer Science adopts a strategic plan aligned with Vision 2010 priorities.



NYIEQ's first major funded research project was a $850K grant to study childhood asthma from the US Department of Housing and Urban Development, secured by US Rep. James Walsh (R-NY). Here, researchers from SUNY Upstate Medical University take air samples in patients homes.

2000: CenterState CEO launches the New York Indoor Environmental Quality (NYIEQ) Center, Inc. to promote regional university-industry collaborations.

2001: New York establishes the Environmental Quality Systems (EQS) Strategically Targeted Academic Research (STAR) Center, led by Syracuse University in collaboration with the NYIEQ Center, CenterState CEO, and 10 academic and research institutions.

2002: SyracuseCoE is established by New York State as one of six statewide Centers of Excellence, incorporating activities of NYIEQ and the EQS STAR Centers.

In 2005, the groundbreaking for the headquarters building site showed the strong dedication of NYS elected officials to SyracuseCoE.

2009: SyracuseCoE and Syracuse University hosts the 9th International Healthy Buildings Conference and Exhibition, which attracts more than 1700 attendees from 44 nations.

NY Senator Kirsten Gillibrand greets Tony Collins, President of Clarkson University, at the 2010 High Tech Innovation Showcase in Washington, DC.

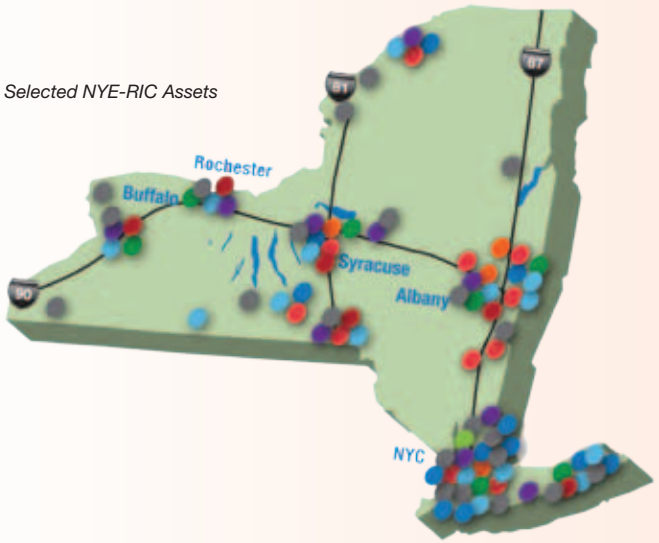
During the closing ceremony of Greenbuild 2010 - "Generation Green: Redefining Our Future" - SyracuseCoE was named the winner of the 2010 Leadership Award by the U.S. Green Building Council (USGBC) in the Non-Governmental Sector. The leadership award is given to recipients for their recognized leadership and commitment to the evolution of green building design and construction.

SyracuseCoE originated in 1996 from visions that targeted regional collaborations in environmental and energy systems. In 2010, we celebrate achievements that fulfill original visions. We look forward to building on these successes for generations to come.

2010: Today, SyracuseCoE engages more than 200 firms, institutions and organizations to accelerate innovative technologies to the marketplace and grow jobs and wealth in Central New York. We opened our unique headquarters in March and dozens of research, demonstration, and commercialization projects have seen significant results.

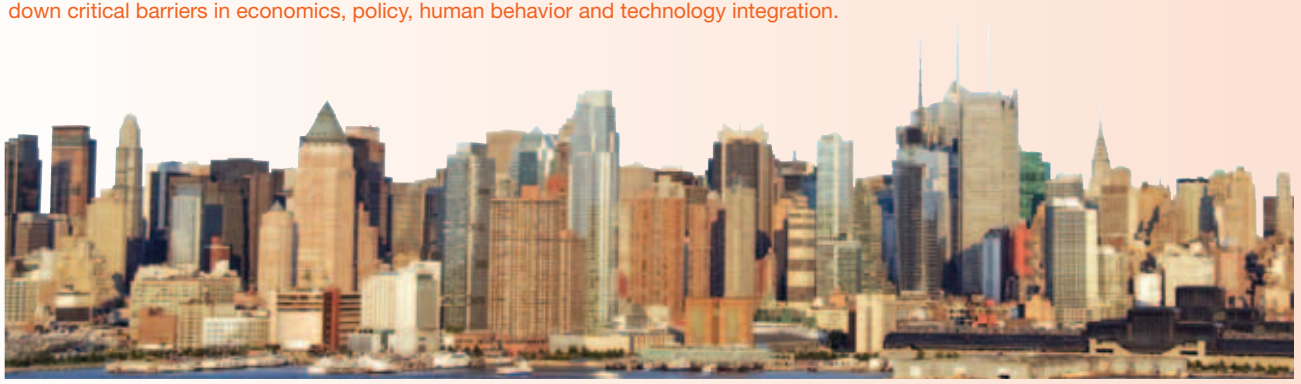
2010: The US Green Building Council (USGBC) names SyracuseCoE winner of its 2010 Leadership Award in the Non-Governmental Organization Sector in November.

Selected NYE-RIC Assets



2010 Onward: New York Energy Regional Innovation Cluster (NYE-RIC), a statewide alliance, was formed focusing on effectively developing a collaborative network to transform the "value chain" in which energy-efficient building systems of every type and on every scale are conceived, invented, developed, demonstrated, and deployed. Spearheaded by SyracuseCoE and in cooperation with the Partnership for New York City and CenterState CEO, NYE-RIC engages more than 130 firms and institutions.

Future: Through continued leadership in the creation of cutting-edge green technologies, we continue to address global challenges that affect our world each day. Our statewide alliance includes internationally recognized research and development capabilities and has unmatched expertise to speed development and deployment of game-changing innovations by breaking down critical barriers in economics, policy, human behavior and technology integration.



THE SYRACUSE CENTER OF EXCELLENCE INNOVATION ECOSYSTEM

Central to SyracuseCoE's mission, vision, and purpose, the **Innovation Ecosystem** encourages and funds collaborative projects that develop new environmental and energy systems products and services. These projects generate **research**, **demonstrate** new technologies, **commercialize** innovations, and educate the workforce and the community through **outreach**.

Concentrating on **clean and renewable energy**, **indoor environmental quality**, and **water resources**, the Innovation Ecosystem improves built and natural environments—the places in which we live, work, learn, and play.

SyracuseCoE's three specialized teams focus on **research**, **industry collaboration** and **sustainable community solutions**. In research, we are at the forefront of groundbreaking new green and clean technologies, leveraging world-class R&D facilities from the iconic, high-performance, LEED–Platinum-designed "living laboratory" that is the SyracuseCoE headquarters to the state-of-the-art labs of our partners. We drive and accelerate innovative research to the marketplace through strategic industry collaborations regionally, nationally, and internationally. We create sustainable community solutions by deploying and implementing new technologies and bringing the latest knowledge on environmental sustainability to the public through educational and training programs.

Indoor Environmental Quality

Clean & Renewable Energy

Water Resources

Research

When the blue arrow is shown, a story is an example of a SyracuseCoE targeted, collaborative research project.

Outreach

When the yellow arrow is shown, a story is an example of a SyracuseCoE workforce development or public outreach project.

Demonstration

When the orange arrow is shown, a story is an example of a SyracuseCoE green and clean technology testing and demonstration project.

Commercialization

When the green arrow is shown, a story is an example of a SyracuseCoE green and clean technology commercialization project.

Syracuse Center of Excellence | 727 East Washington Street, Syracuse, NY 13210 | 315-443-4445 | Fax 315-443-1329 | info@syracusecoe.org

Carrier Corp. President Geraud Darnis leads a group of representatives of SyracuseCoE industry, academic, and government partners in a ribbon-cutting ceremony at the Willis H. Carrier Total Indoor Environmental Quality (TIEQ) lab at the SyracuseCoE headquarters.

Annual Progress Report 2010

On the COVER:

SyracuseCoE Board Members and Officers

Peter G. King (Chair)
Managing Partner and CEO, King + King Architects, LLP

F. Mathew Zlomek (President)

Hugh Henderson (Secretary)
President, CDH Energy Corporation

SyracuseCoE Board Members

Richard Cauchon
Corporate Initiatives,
Sensis Corporation

Anthony Collins
President, Clarkson University

Susan Crossett
Vice President, Economic Development and Community Investment,
National Grid USA

R. Leland Davis
President and COO, O'Brien & Gere

Robert DelZoppo
Corporate Technology Director, SRC

Seth Dunn
Americas Policy Leader – Renewables, GE Energy

S. Richard Fedrizzi
President, CEO, and Founding Chairman,
US Green Building Council

Steven R. Goodman
Vice President of Research and Dean of the College of Graduate Studies,
SUNY Upstate Medical University

Marilyn Higgins
Vice President of Community Engagement and Economic Impact,
Syracuse University

Patrick Jackson
Director, Global Energy, Corning

Jatin Khanpara
Vice President, Technology and Components Global Engineering,
Carrier Corporation

Gina Lee-Glauser
Vice President of Research,
Syracuse University

Orrin B. MacMurray
Chairman, The C&S Companies

John McAuliffe
Syracuse Program Director, Honeywell, Inc.

Cornelius B. Murphy Jr.
President, SUNY College of Environmental Science and Forestry

James Olcott
Energy Department Manager,
The C&S Companies

Norm Scott
Professor, Cornell University

Rob Simpson
President and CEO,
CenterState Corporation for Economic Opportunity

Kevin Stack
President, Northeast Green Building Consulting, LLC

Laura Steinberg
Dean, L.C. Smith College of Engineering and Computer Science,
Syracuse University

Lawrence Wetzel
Chairman, Air Innovations

SyracuseCoE Officers

Edward Bogucz
Executive Director, SyracuseCoE

Peter Freer (Treasurer)
Principal, Firley, Moran, Freer & Eassa

MESSAGE FROM THE CHAIRMAN

PETER G. KING, MANAGING PARTNER AND CEO, KING + KING ARCHITECTS

If 2009 was the year that put SyracuseCoE on the international stage as host of the Healthy Buildings conference, 2010 was the year we capitalized on our newfound elite status at the forefront of the sustainability movement.

As recognized experts, SyracuseCoE and our members were featured in articles in *The Boston Globe* and *The New York Times*, and our industry and university partners received numerous national honors and grant awards for innovative practices. That list included a $500,000 grant from the federal government to support SyracuseCoE projects to improve energy efficiency and indoor environments.

This year, our public/private partnerships continued to flourish, proving once again the power of collaboration. These alignments with, among others, Siemens, Interface Americas, SUNY Stony Brook, and National Grid expand our capabilities in clean and renewable energy, indoor environmental quality, and water resources.

During 2010 we saw the Near Westside Initiative—a LEED Neighborhood Development project right in our backyard—take wing as new green home construction and abandoned commercial building renovations began in earnest, breathing life into a once-forgotten part of Syracuse.

This progression was the result of strong relationships, dedicated partners, visionary thinking, and an unparalleled level of expertise. It takes planning and leadership to keep this momentum going, which is why, in 2010, we turned our attention to board development and educational initiatives to encourage the next generation of environmentally minded citizens and business leaders. To that effect, we launched the Graduate Fellowship Program and joined SUNY Stony Brook's New York Energy Policy Institute.

In 2011, we will continue to implement meaningful sustainable practices and green and clean technologies in built environments and communities, give greater focus to research that leads to demonstration and commercialization, and maximize the use of the SyracuseCoE HQ as an incubator and living laboratory.

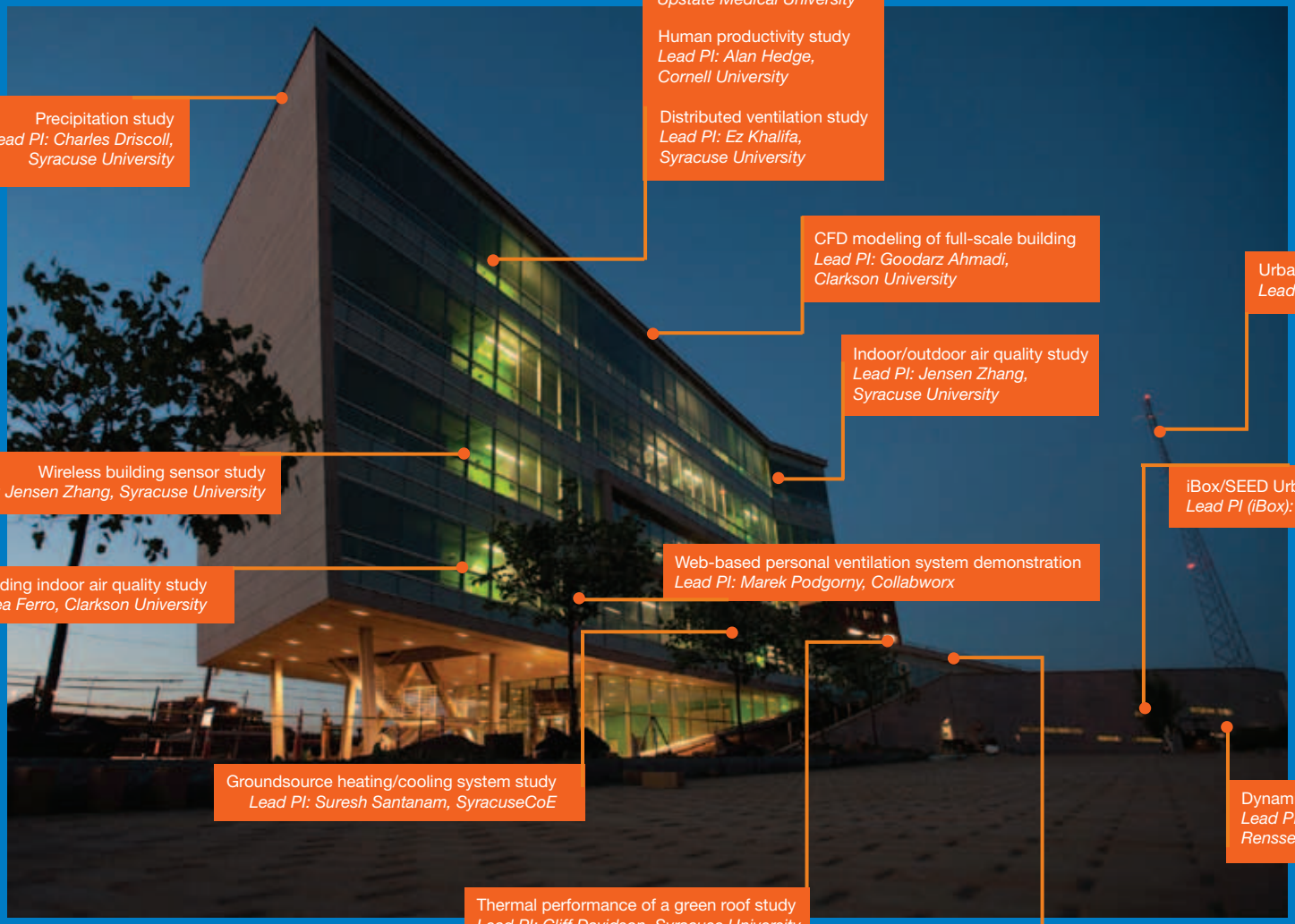
Commitment, creative thinking, hard work, and progressive practices define our staff, members, and collaborators. Through their dedication, SyracuseCoE will fulfill its mission to revolutionize the way the world lives, works, and learns.

Here's to a Green and Clean 2011!

SYRACUSECOE HQ BUILDING RESEARCH PROJECTS

The SyracuseCoE Headquarters Building is a test bed for environmental and energy technologies and building innovations, with laboratory and office space for research and business collaborations on products and services in SyracuseCoE's core focus areas of clean and renewable energy, indoor environmental quality, and water resources.

The following research projects were ongoing in and around the building in fall 2010:



Daylighting and Human Performance study
Lead PI: Usha Satish, SUNY Upstate Medical University

Human productivity study
Lead PI: Alan Hedge, Cornell University

Distributed ventilation study
Lead PI: Ez Khalifa, Syracuse University

Precipitation study
Lead PI: Charles Driscoll, Syracuse University

CFD modeling of full-scale building
Lead PI: Goodarz Ahmadi, Clarkson University

Urban ecosystem monitoring
Lead PI: Phil Hopke, Clarkson University

Indoor/outdoor air quality study
Lead PI: Jensen Zhang, Syracuse University

Wireless building sensor study
Lead PI: Jensen Zhang, Syracuse University

iBox/SEED Urban Farm & Greenhouse project
Lead PI (iBox): Kevin Lair, Syracuse University

Web-based personal ventilation system demonstration
Lead PI: Marek Podgorny, Collabworx

Green building indoor air quality study
Lead PI: Andrea Ferro, Clarkson University

Groundsource heating/cooling system study
Lead PI: Suresh Santanam, SyracuseCoE

Dynamic solar façade demonstration
Lead PI: Anna Dyson, Rensselaer Polytechnic Institute

Thermal performance of a green roof study
Lead PI: Cliff Davidson, Syracuse University

Greenroof and water quality study
Lead PI: Charles Driscoll, Syracuse University

PI = Principal Investigator

Learn more at syracusecoe.org

Jake Edwards, Chief of the Onondaga Nation, delivers the Haudenosaunee Thanksgiving Address.

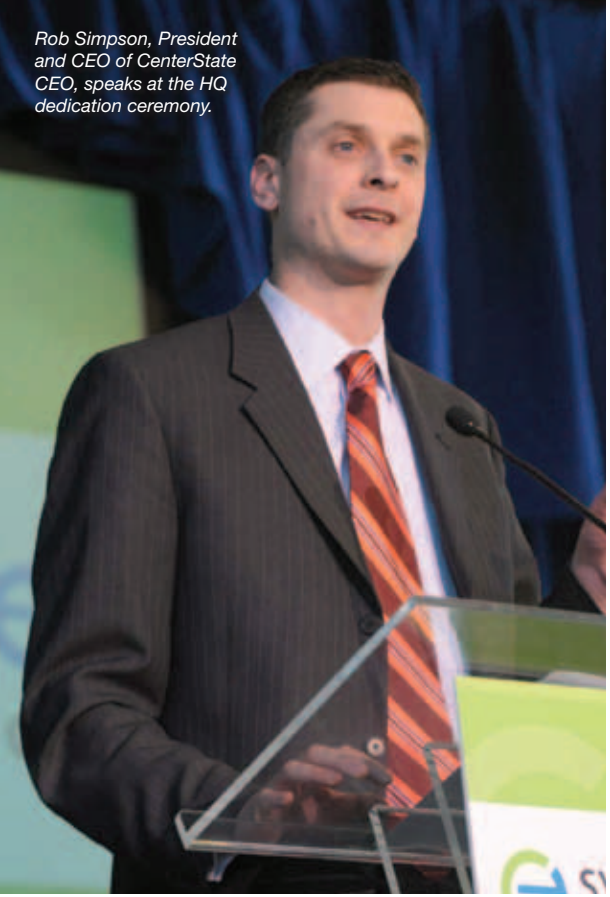
New York State Senator John DeFrancisco speaks at the HQ dedication ceremony.

Pete King, Managing Partner and CEO of King + King Architects and SyracuseCoE Board Chair, tours the Carrier Total Indoor Environmental Quality Lab on the HQ's fifth floor.

More than 1,400 guests visited and toured the HQ over two days.

Nancy Cantor, Chancellor and President, Syracuse University, and Ed Bogucz, Executive Director, SyracuseCoE, lead the ribbon-cutting.

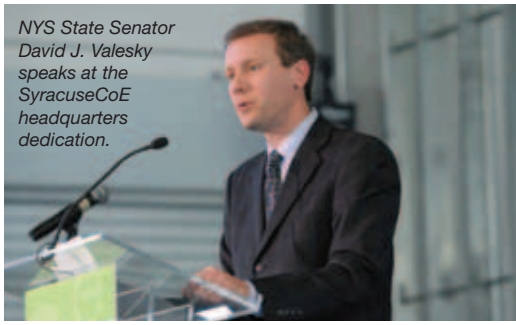
For a tour of the SyracuseCoE headquarters building, visit syracusecoe.org.



Rob Simpson, President and CEO of CenterState CEO, speaks at the HQ dedication ceremony.

Joanne Shenandoah—along with sister Diane and daughter Leah Shenandoah—sang "Your Legacy," especially written for SyracuseCoE and its collaborators.

HQ dedication ceremony guests sing along with the Shenandoahs.

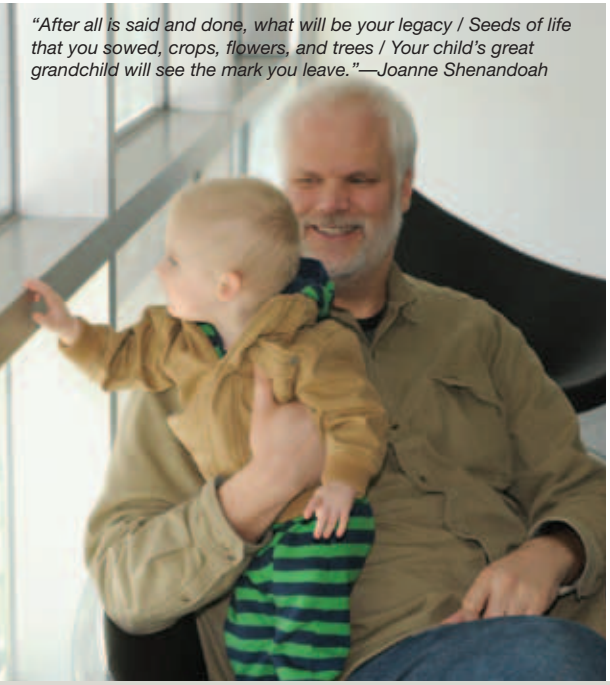


NYS State Senator David J. Valesky speaks at the SyracuseCoE headquarters dedication.

DISCOVER A NEW ANGLE ON SUSTAINABILITY

SYRACUSE CENTER OF EXCELLENCE HEADQUARTERS DEDICATION AND OPEN HOUSE

MARCH 5 & 6, 2010



"After all is said and done, what will be your legacy / Seeds of life that you sowed, crops, flowers, and trees / Your child's great grandchild will see the mark you leave."—Joanne Shenandoah

Oren Lyons, Faithkeeper of the Turtle Clan, Onondaga Nation, addresses guests at the SyracuseCoE HQ Open House.

Lisa Heinzerling, Associate Administrator of the US Environmental Protection Agency's Office of Policy, Economics, and Innovation, met with students and faculty at Syracuse University and spoke at the HQ dedication ceremony.

YEAR IN REVIEW

One of the World's Greenest Data Centers Opens at SU

Syracuse University engineering Professor Ezzat Khalifa, center, explains technologies used at the Green Data Center

In December 2009 SyracuseCoE Platinum Partner Syracuse University, with partners IBM and New York State, opened the Green Data Center (GDC)—a showcase of world-class innovations in advanced energy-efficient information technology and building systems.

The $12.4 million, 12,000-square-foot facility on SU's South Campus uses an innovative on-site power generation system for electricity, heating, and cooling, and incorporates IBM's latest energy-efficient servers, computer-cooling technology, and system management software. It uses about 50% less energy than a typical data center in operation today, making it one of the world's "greenest" data centers.

SyracuseCoE provided funding toward the R&D of many of the GDC's energy-efficient features. In particular, Professor Ezzat Khalifa of the NYSTAR-awarded EQS STAR Center is conducting research about how to efficiently power and heat/cool the facility. Further, Kahlifa's team will fully instrument the GDC, turning it into a research apparatus and test bed that will benefit data center design and operation throughout the world.

Nick Donofrio, IBM Executive Vice President of Innovation (retired), speaks at the opening of Syracuse University's Green Data Center.

(L to R) SyracuseCoE Platinum Partner Siemens Global Head of Research and Innovation for Building Technologies Division Dr. Osman Ahmed; SyracuseCoE Executive Director Ed Bogucz; Syracuse University Chancellor and President Nancy Cantor; Siemens Vice President and Head of the Building Technologies Division's Control Products and Systems Business Unit Christoph Vogel; US Rep. Dan Maffei; NY Assemblyman William B. Magnarelli; SU Vice Chancellor and Provost Eric Spina; and SyracuseCoE Board Chair Peter King.

Siemens Announces $1.55M Strategic Partnership with SyracuseCoE

SIEMENS

The Building Technologies Division of SyracuseCoE Platinum Partner Siemens announced on December 7, 2009, a pledge of $1.55 million to SyracuseCoE as part of a multi-year strategic and collaborative partnership to support research and other initiatives, driving sustainability and energy efficiency in buildings.

This partnership allows SyracuseCoE and its regional stakeholders the opportunity to create a roadmap for sustainable building development, to execute specific research projects, to fund graduate student research in SyracuseCoE Platinum Partner Syracuse University's L.C. Smith College of Engineering and Computer Science, and to engage Siemens' global network of innovation.

Further, Siemens will directly support the maintenance and operation of the SyracuseCoE headquarters building from its branch office in Syracuse, which employs 75 people and is joined regionally by another 235 employees serving Central Upstate New York and Vermont.

EFC WINS SIX-YEAR US EPA COMPETITIVE GRANT

In December 2009, the US Environmental Protection Agency (US EPA) announced a six-year $1 million grant that provides core funding necessary for the Environmental Finance Center at Syracuse University (EFC) to offer multi-year programming and services to a greater number of municipalities in US EPA Region 2—New York, New Jersey, Puerto Rico, the US Virgin Islands and eight tribal nations.

The EFC is part of the Environmental Finance Center Network (EFCN), which was established in 1993 by the US EPA to help local municipal leaders with the "how to pay" question when it comes to environmental infrastructure (particularly water and wastewater) improvements and innovations.

The EFC has been tasked with facilitating the development of sustainable communities. Housed in the SyracuseCoE Center for Sustainable Community Solutions, EFC leverages more than 200 partners, connecting local government officials and private organizations with technical assistance, assessment tools, and funding offered by this large network of collaborators and resources.

EFC Launches NYAgTrader.org

In December 2009, the Environmental Finance Center at Syracuse University (EFC) launched NYAgTrader.org, which allows farmers throughout the state to advertise and trade any material that can be used on a farm, such as hay, manure, equipment, and livestock. Farmers visiting the website can search by item category and location and post their own "wanted" items.

"It's like Craigslist for agriculture," explains Melissa Young, EFC Program Manager and creator of the site. "By connecting farmers, we can ensure that farm products wind up with people who can use them, which decreases waste. Also, connecting farmers with each other can bring additional benefits such as social networking, and shared ideas and information." A sister site, NYFoodTrader.org, went online in the summer of 2009 as a place where producers and consumers can post and trade any food items grown in New York. Required membership is free for both sites.

Maffei Announces $500K for SyracuseCoE Projects to Improve Energy Efficiency, Indoor Environments

US Rep. Dan Maffei announced in December 2009 $500K to SyracuseCoE for R&D projects in energy-efficient innovations for healthy buildings. Maffei secured the funds from the US Department of Energy. The funding supports SyracuseCoE projects conducted in multiple facilities, including SyracuseCoE's headquarters building and homes and offices in Syracuse's Near Westside neighborhood. The projects will incorporate emerging energy and IEQ technologies, such as power generation from renewable sources, including sun, wind and biomass; systems that combine heating, cooling, and power generation; active building façades; natural ventilation; and under-floor air distribution.

SyracuseCoE Awards 2010 Graduate Fellowship

In January 2010, SyracuseCoE launched its competitively awarded one-year Graduate Fellowship program. Fellowship projects address research questions associated with air quality or water resource management, in support of the development of technology innovations for improving environmental quality in built and urban environments.

In 2010, 16 applications were received with the following three fellows and projects chosen by SyracuseCoE's Scientific Advisory Committee.

- **Kristen Malone,** Rensselaer Polytechnic Institute (Advisor: Jason Vollen), "Enclosures for Water Reuse: Building-Integrated Solar-Thermal Pasteurization"
- **Skye Elliot Gruen,** Rensselaer Polytechnic Institute (Advisor: Anna Dyson), "Dynamic Solar Façade System: Building Integrated Distributed Power Generation"
- **Kwanghoon Han,** Syracuse University (Advisor: Jensen Zhang), "Development of Emission Source Identification Method by PTR-MS Material Emission Signature"

SyracuseCoE Graduate Fellow Skye Elliot Gruen of Rensselaer Polytechnic Institute is working on the Dynamic Solar Façade System, currently being demonstrated at the SyracuseCoE HQ building

GLSEC BRINGS BI-NATIONAL ENERGY MEETING TO SYRACUSE

Great Lakes Sustainable Energy Consortium

Technology Development Commercialization Economic Growth

Syracuse University and SyracuseCoE hosted a Great Lakes Sustainable Energy Consortium (GLSEC) bi-national meeting in March2010 to discuss growing the clean energy economy in Central Upstate New York and the Province of Ontario, Canada. The consortium, which is focused on research, development, and commercialization of renewable energy technologies and systems, discussed research advancements that can be put to work in an economic development framework.

Leading the discussion on the Canadian side were representatives from the Canadian Consulate in Buffalo and Queen's University at Kingston. The event built on the work of the Thousand Islands Energy Research Forum (TIERF), which was held in fall 2009 to discuss sustainable energy strategies for Canada and the US.

The Clean Tech Center, Collaborators Make List of Top 10 Clean Tech Clusters

In March 2010, the Clean Tech Center—a core asset of New York's Creative Core—was named one of the "Top 10 Cleantech Cluster Organizations 2010" in a report produced by Sustainable World Capital for The Cleantech Group.

The Clean Tech Center was ranked second in the US over CleanTech San Diego and The Environmental Business Cluster in San Jose, CA. In the world it is ranked ahead of Sweden's Stockholm Miljöteknikcenter and Canada's Ontario Clean Water Initiative.

Wrote Shawn Lesser of Sustainable World Capital, "You've heard of the Big Apple. The Green Apple is Central Upstate New York. With 38 colleges and universities, 138,000 college students, $2 billion in annually funded R&D, and a green landscape that supports clean energy production, New York's "green core" is launching and growing clean tech enterprises. The Clean Tech Center at Syracuse-based The Tech Garden, as well as SyracuseCoE, are at the forefront of the green innovation movement."

Haledyne, an Ohio-based company focused on indoor air quality and energy efficiency, recently announced it is relocating its headquarters to the Clean Tech Center, with plans to create 106 new jobs within three to five years. The company's presence strengthens the region's reputation as a leader in R&D and manufacturing of clean technologies for energy-efficient buildings.

Blue arrow=Research Orange arrow=Demonstration
Yellow arrow=Outreach Green arrow=Commercialization

EFC Provides Technical Assistance for US EPA Pilot Program

In February 2010, it was announced that the Environmental Finance Center at Syracuse University (EFC) will provide technical assistance to New York State's Environmental Facilities Corporation for the US Environmental Protection Agency (US EPA) Pilot Technical Assistance Program. The program is part of the recently formed Housing and Urban Development/US Department of Transportation/US EPA Sustainable Communities Partnership. New York is one of three states chosen by US EPA to participate in this pilot project.

New York State's unique relationship with EFC presents an ideal opportunity for cooperation and partnership in achieving common goals. The EFC will work with the NYS Environmental Facilities Corporation (NYSEFC), which is able to provide incentives to encourage funding towards more sustainable water and waste water infrastructure investments. These incentives include adjustments to project priority-setting systems, voluntary state set-asides, and strategic use of subsidies.

The aim of the pilot project is to promote more widespread adoption of practices that encourage reinvestment and efficiency in infrastructure systems. To do this, the New York State partnership will identify opportunities to incorporate best management practices into priority systems and intended use plans and to incentivize smart growth, energy efficiency, asset management, and green infrastructure through the Clean Water State Revolving Fund (SRF).

The pilot program will provide technical assistance to New York, California, and Maryland to modify their existing Clean Water SRF programs to ensure their state water infrastructure investments are used to promote more sustainable investments.

EPA

NATIONAL GRID CEO VISITS SYRACUSECOE HQ

SyracuseCoE Executive Director Ed Bogucz (left) leads SyracuseCoE Platinum Partner National Grid CEO Steve Holliday on a tour of the SyracuseCoE headquarters building, accompanied by Susan Crossett, National Grid Senior Vice President of Economic Development and Community Investment. In April 2010, SyracuseCoE hosted a visit by Holliday and members of his executive team. Holliday received an overview of SyracuseCoE and its headquarters building, as well as updates on regional green and clean tech development, business attraction, innovation and entrepreneurial initiatives, and investment efforts from representatives of CenterState CEO, the Clean Tech Center, and National Grid's Syracuse office.

EFC Wins $180K USDA Solid Waste Technical Assistance Grant

The "Beyond Waste" concept, which is promoted in New York State Department of Environmental Conservation's draft Solid Waste Management Plan, reframes post-consumer materials not simply as trash but as reusable resources. This represents a paradigm shift in the way many think about waste and the cycle of production, consumption, and disposal.

The Environmental Finance Center at Syracuse University (EFC) is developing new programming to assist rural communities as they transition to the Beyond Waste model, including solid waste management training, assistance with drafting local resolutions, and citizen outreach and education. These efforts further the vision of solid waste shared by EFC, its partners, and New York State.

It was announced in April 2010 that EFC is partnering with the New York State Association for Reduction, Reuse, and Recycling (NYSAR3) and Reuse Alliance (RA) to provide no-cost assistance to rural communities through:

- Training sessions for rural government officials on waste challenges, possible waste reduction opportunities, and potential policy mechanisms to address these issues.
- Web-based training for rural solid waste management technicians.
- Virtual materials reuse marketplaces, facilitated by NYSAR3 and RA, where rural officials and residents can buy, sell, and trade reusable construction materials and agricultural biomass.
- Rural community outreach and education on how citizens can lower the impact of their household waste while reaping additional health and economic benefits.

John Wells (at right, with SyracuseCoE Executive Director Ed Bogucz), President and CEO of Interface Americas, visited SyracuseCoE's headquarters building in May 2010. Sustainable InterfaceFLOR carpeting is installed in the HQ. Wells was in Syracuse as a guest speaker at the inaugural meeting of the CenterState Corporation for Economic Opportunity (CenterState CEO), which celebrated the merging of the Syracuse Chamber

Interface Americas John Wells Visit

of Commerce and the Metropolitan Development Agency of Syracuse and Central New York. Rob Simpson—a SyracuseCoE board member—was named the organization's President. "A lot of bets are going to be made in clean technology," said Wells at SyracuseCoE. "This is the place to secure those bets."

In August 2010, SyracuseCoE hosted a return visit by a team of executives from Interface Americas. Included in this day-long series of meetings and events was a SyracuseCoE Research & Technology Forum presentation by John Bradford, Interface Americas Chief Innovations Officer, on "Redesigning Design."

SyracuseCoE Collaborators Selected by US DOE for Energy-Efficient Housing Partnership

In July 2010, the US Department of Energy (US DOE) announced 15 research and deployment partnerships to help dramatically improve the energy efficiency of American homes. These highly qualified, multidisciplinary teams will receive a total of up to $30 million to deliver innovative energy-efficiency strategies to the residential market and address barriers to bringing high-efficiency homes within reach for all Americans.

These partnerships will provide technical assistance to retrofit projects and will leverage industry expertise and funding to support US DOE's energy-efficiency retrofit programs.

One team—Advanced Residential Integrated Energy Solutions (ARIES), led by Levy Partnership, New York, NY—will focus on energy solutions for new and existing affordable housing including factory- and site-built homes. ARIES is a broad-based industry team of more than 50 organizations including implementers, product suppliers, and trainers. The ARIES technical team members include SyracuseCoE Patron CDH Energy and SyracuseCoE.

EFC ASSISTS PUERTO RICO, USVI WITH SOLID WASTE MANAGEMENT PROGRAM

US Environmental Protection Agency (US EPA) Region 2 Administrator Judith Enck established Puerto Rico and US Virgin Islands Recycling Partnerships to promote waste reduction, recycling, and clean composting. This working partnership includes all levels of government, non-profit organizations, citizens, environmental groups, and the private sector. It was announced in May 2010 that the Environmental Finance Center at Syracuse University (EFC) will play a key role in this partnership.

The intent of the partnership is to design programs, educate the public, and ensure effective implementation. The Puerto Rico Recycling Partnership (PRRP), for instance, uses a collaborative governance/problem-solving process to lead its activities. This "systems thinking" approach to problem-solving takes into consideration diverse and complex relationships and associations, the unpredictability of complex systems, the qualitative and quantitative nature of the PRRP's challenge, and importantly, the emergent and transformative nature of major endeavors, such as those defined by the PRRP's and US Virgin Islands Recycling Partnership's charges.

The collaborative governance model is recognized as an optimum leadership and management tool best suited for facilitating and operating in multi-organizational arrangements. It is particularly useful to solve problems that cannot be solved, or solved easily, by single organizations. Some collaborative governance methods that are employed by the PRRP include working groups, task forces, monitoring committees, process facilitation, advisory groups, and joint fact-finding.

The Environmental Finance Center at Syracuse University will play a key role in the Puerto Rico and US Virgin Islands Recycling Partnerships.

EFC WINS $394K GRANT FROM ONONDAGA COUNTY FOR "SAVE THE RAIN" CAMPAIGN

Onondaga County Executive Joanie Mahoney speaks on behalf of the "Save the Rain" campaign at EFC's Green Infrastructure Conference, co-hosted with SUNY ESF.

In July 2010, the Environmental Finance Center at Syracuse University (EFC) was awarded a $393,896 Green Infrastructure Outreach and Education grant from Onondaga County to revitalize and grow the "Save the Rain" campaign, which aims to teach residents and businesses about the importance of capturing storm water to reduce combined sewer overflows (CSOs). Project partners include SyracuseCoE Platinum Partner SUNY College of Environmental Science and Forestry, Onondaga Environmental Institute, Baltimore Woods, Southside Interfaith, Atlantic States Legal Foundation, and Partnership for Onondaga Creek.

The project team will use a combination of targeted education efforts alongside a broad outreach campaign. With this grant, the team will host rain barrel educational workshops, utilize social media tools, create curricula for Syracuse City School District classrooms, host design charettes, work with the Onondaga Earth Corps to reach neighborhoods, create experiential learning opportunities for community members and green jobs trainees, and more.

Why should residents try to "Save the Rain"? In Onondaga County, many sewers are combined—meaning that the same sewers that transport sanitary waste also capture rainwater. During large storms, the design of this infrastructure often results in CSOs that adversely affect water quality throughout the county.

Environmental educators from the Onondaga Earth Corps explain the demonstration rain garden at 515 Tully St. on Syracuse's Near Westside

While some traditional grey infrastructure (such as storage facilities and pipes) will be utilized to reduce this problem, Onondaga County is dedicated to primarily using green infrastructure—a method of keeping rainwater on-site by capturing it in gardens, rain barrels, green roofs, bioswales, porous pavement, and more. In short, the more water that stays on each individual property, the less water that ends up in the combined sewers.

George Dannecker, President and CEO of VetteCorp and recipient of a $50,000 CAP Award, left, greets NY Assemblyman William Magnarelli, who secured the funds for the award.

Coolcentric water-cooled server at Syracuse University's Green Data Center

Magnarelli Announces Commercialization Awards for Five Upstate Companies

In July 2010, New York Assemblyman William Magnarelli (D-120)—along with SyracuseCoE and CenterState Corporation for Economic Opportunity—announced that five Central Upstate New York companies are the recipients of fifth-round Commercialization Assistance Program (CAP) awards totaling $246,475 to promote the commercialization of innovative green and clean technologies.The announcement was made at the Green Data Center on the campus of SyracuseCoE Platinum Partner Syracuse University, where technology developed by one of the recipients—Vette Corp.—is being used.

Combined, the projects being commercialized by these companies—thanks to funding secured by Magnarelli—have the potential for creating as many as 111 high-value jobs and tens of millions in new revenue for Central Upstate New York and other Upstate regions over the next five years.

The five CAP award-winning companies were:

- ACT Bioenergy of Schenectady, NY—ACT Bioenergy is producing a commercial-scale, high-efficiency wood pellet/wood chip gasification boiler for use in institutional, commercial, and multifamily residential buildings.
- Orthogonal of Ithaca, NY—Orthogonal is commercializing a patent-pending, non-toxic photoresist (light-sensitive material) for producing organic electronics, including photovoltaics and energy-efficient solid state lighting (OLEDs).
- Cameron Manufacturing & Design of Horseheads, NY—Cameron Manufacturing & Design will create a comprehensive commercialization plan for the patented Grid Electrode Precipitator (GEP) that is currently in the final stages of design and manufacturing by Cameron at SyracuseCoE Platinum Partner Clarkson University.
- Vette Corp. of Ontario, NY—Vette Corp.'s Open Sidecar "Coolcentric" is a passive"in-row" data center cooling product based on patent-pending technology. As of Dec.2009, five prototype units have been manufactured and installed at Syracuse University's Green Data Center.
- e2e Materials of Ithaca, NY—This project will focus on the acquisition, installation, testing, and trial of a press and custom tooling to make prototype forms for its petroleum-free, biodegradable composites.

To date, CAP has created or retained more than 152 green and clean technology jobs in New York State. Companies that have benefited from the program can point to new products and services and, in some cases, new companies and expanded operations that are gaining a foothold in this competitive market.

Professor Jensen Zhang of SyracuseCoE Platinum Partner Syracuse University's L.C. Smith College of Engineering and Computer Science addresses an international gathering of delegates at IAQVEC 2010.

Syracuse University Hosts International Indoor Air Quality Conference

In August 2010, Syracuse again welcomed international visitors to discuss indoor air quality, healthy buildings, and energy efficiency. Continuing the success of Healthy Buildings 2009, hosted by SyracuseCoE, Platinum Partner Syracuse University (SU) hosted the 7th International Conference on Indoor Air Quality, Ventilation, and Energy Conservation in Buildings (IAQVEC 2010) from August 15 to 18.

IAQVEC is a premier international conference series, held once every three years. Previously, it had been held in Montreal, Canada (1992, 1995); Lyon, France (1998); Changsha, China (2001); Toronto, Canada (2004); and Sendai, Japan (2007).

In addition to SU's L.C. Smith College of Engineering and Computer Science (LCS), conference co-hosts included SyracuseCoE, the National Research Council of Canada and the US Environmental Protection Agency. IAQVEC 2010's technical program, with a theme of "Innovation an Integration," included eight keynote lectures delivered by prominent scientists, researchers, and architects from Asia, Europe, and North America, and it featured more than 150 oral and poster presentations.

Jessica Bohn and Kevin Stack of Northeast Green Building Consulting

Chris Shrimpton

Nicole O'Loughlin

Clinton Smith

SYRACUSECOE SPONSORS INTERNSHIPS AT CENTRAL UPSTATE NEW YORK FIRMS

The SyracuseCoE Industry Collaboration Internship Program, funded by a grant from the US Environmental Protection Agency, provides support for qualified college students hosted by Central Upstate New York companies working in the environmental quality and indoor air quality fields, including high-performance/green building design.

The goal of the program is to increase post-graduation student retention in Central Upstate by establishing valuable relationships between college students and regional companies doing work in the energy and environmental fields. Starting in June 2010, the SyracuseCoE funded the following internships:

- Jessica Bohn (SUNY ESF) with SyracuseCoE Charter Member Northeast Green Building Consulting (Ecological Performance of Buildings)
- Daniel Corbin (Rensselaer Polytechnic Institute) with Huhtamaki (Air Quality and Sustainability Improvements)
- Diana Dunn (SUNY ESF) with Antek (Estrogen Filtration)
- Tyler Howe (Wilkes University, PA) with SyracuseCoE StartUp Partner Natural Systems Engineering (Environmental Engineering)
- Nick Karker (SUNY Buffalo) with SyracuseCoE Patron CDH Energy (Field Monitoring)
- Tyler Mokay (Clarkson University) with SyracuseCoE Gold Partner C&S Companies (Rainwater Reuse at the Syracuse Airport Expansion)
- Nicole O'Loughlin (Syracuse University) with SyracuseCoE StartUp Partner The Open Atelier ("The Living Wall" Project)
- George Perry (Rensselaer Polytechnic Institute) with SyracuseCoE Silver Partner Air Innovations (Prototyping and Testing)
- Jeffrey Rapp (Ithaca College) with SyracuseCoE StartUp Partner Bluepoint Environmental (Environmental Testing)
- Stephen Rook (SUNY ESF) with Atlantic State Legal Foundation (Brownfield Remediation)
- Chris Shrimpton (SUNY ESF) with SyracuseCoE StartUp Partner Natural Systems Engineering (Environmental Engineering)
- Clinton Smith (University of Massachusetts–Lowell) with Colden Corp. (Environmental Sampling)
- Eric Wagner (Clarkson University) with SyracuseCoE Gold Partner O'Brien & Gere (Water Conservation and Treatment)

Blue arrow=Research Orange arrow=Demonstration
Yellow arrow=Outreach Green arrow=Commercialization

SU, SyracuseCoE Receive Toyota Prius PHVs for Local Demonstration Program

In August 2010, SyracuseCoE Platinum Partner Syracuse University and SyracuseCoE received four PHVs as part of Toyota Motor Sales' US plug-in demonstration program. CuseCar, a local not-for-profit community car share provider utilizing alternatively fueled vehicles, also received two cars through the program. Clean Communities of Central New York, the local chapter of the US Department of Energy's (DOE) Clean Cities Program, is managing a long-term evaluation of the vehicles.

SyracuseCoE Project Scientist Aimee Clinkhammer test-drives a Toyota Prius Plug-In Hybrid Vehicle (PHV).

The Prius PHV is capable of running on electricity for about 13 miles at speeds up to 62 mph, at which point it operates as a conventional Prius hybrid.

SyracuseCoE Platinum Partner Syracuse University and SyracuseCoE are taking part in a demonstration of Toyota Prius Plug-In Hybrid Vehicles.

A total of 150 PHVs are being delivered to demonstration program partners across the US—600 throughout the world—as part of a global program to demonstrate plug-in hybrid technology, educate and inform the public about the cars and capture real-world driving data. Clean Communities of CNY will be gathering Prius PHV driving data for 12 to 24 months. Each participant group will have two vehicles that will be rotated for use every two months.

As it becomes available, data from the US demonstration programs will be posted on www.toyota.com/esq.

In Syracuse, this program will be able to take advantage of electric vehicle charging stations that are being installed by CuseCar as a part of a DOE/ARRA Economic Stimulus Award, managed by the local Clean Cities Coalition. CuseCar is deploying 75 charging stations throughout Onondaga County.

SPREADING THE SUSTAINABLE WORD

The following are just some of the green and clean technology and sustainability-themed events SyracuseCoE hosted, sponsored, exhibited at, or presented from October 2009 to September 2010:

- Roots of Peacemaking, Syracuse, NY, October 2009
- Tech Garden Fall Expo, Syracuse, NY, October 2009
- SUNY ESF Climate Change Panel, Syracuse, NY, October 2009
- Imagining America, Syracuse, NY, October 2009
- Governor's Task Force on Recycling, Des Moines, IA, October 2009
- USGBC Caribbean Chapter Conference, Puerto Rico, November 2009
- Greenbuild 2009, Phoenix, AZ, November 2009
- Advanced Energy 2009, Stony Brook, NY, November 2009
- SyracuseCoE Research and Technology Forum (with Professor John Spengler of Harvard Univ ersity), February 2010
- SyracuseCoE Research and Technology Forum (with John Bradford of Interface Americas), February 2010
- SUNY ESF Green Building Conference, Syracuse, NY, March 2010
- Syracuse Chamber of Commerce Show, Syracuse, NY, March 2010
- Symposium on Energy in the 21st Century, Cazenovia, NY, April 2010
- AccelerateCNY, Liverpool, NY, May 2010
- Blue Rain ECOfest, Syracuse, NY, July 2010
- New York High Tech Innovation Showcase, Washington, DC, August 2010
- New York State Fair (with the Creative Core Green Team), Syracuse, NY, August 2010
- Park(ing) Day 2010, Syracuse, NY, September 2010
- SyracuseCoE Symposium 2010, Syracuse, NY, September 2010

SYRACUSECOE PARTICIPATES IN US DOE'S BUILDERS CHALLENGE

113 Woodland Ave., Syracuse, is a Builders Challenge home completed in spring 2010 by Home HeadQuarters. The project team included SyracuseCoE Patron CDH Energy and Charter Member Northeast Green Building Consulting. Cost-effective energy-efficient measures included superior insulation, a 95% efficiency gas heater, and a 0.65EF water heater. The home's thermal load is approximately one-third that of a similarly designed "base" house.

US homebuilders of all sizes, from all areas of the country, report growing buyer interest in energy-efficient houses. Yet they also find that many homebuyers want help in making informed decisions. How can homebuyers tell exceptional energy performers from average energy performers or up-to-code homes? How do they figure out just what that difference will mean in their energy bills?

Spearheaded by the US Department of Energy (US DOE), the Builders Challenge is a voluntary effort to provide answers. Through the Builders Challenge, participating homebuilders will have an easy way to differentiate their best energy performing homes from other products in the marketplace, and to make the benefits clear to buyers.

US DOE's ultimate vision is that, by 2030, a consumer will have the opportunity to buy an energy-efficient home anywhere in the US—ultimately, a grid-connected home that, over the course of a year, produces as much energy as it uses. More information can be found at syracusecoe.org.

Building AMERICA
U.S. Department of Energy

SYRACUSECOE HOSTS ROUNDTABLE WITH MAJORA CARTER

In September 2010, environmentalist and green jobs guru Majora Carter (at left, with Ed Bogucz, SyracuseCoE Executive Director) gave a lecture entitled "Green the Ghetto and How it Won't Cost Us" at Hendricks Chapel on the campus of SyracuseCoE Platinum Partner Syracuse University. Carter spoke about the growing green economic sector and green-collar jobs and their potential positive effect on poverty in the US. Earlier in the day, Carter toured the SyracuseCoE HQ and met for a working lunch with representatives of community groups and initiatives working on the green revitalization of the city, such as the Near Westside Initiative.

EFC LAUNCHES GREENPROJECTEXCHANGE.ORG

Environmental Finance Center Syracuse University

In September 2010, the Environmental Finance Center at Syracuse University (EFC) launched GreenProjectExchange.org (GPE), a place where communities can share innovative, environmentally focused projects that support healthy communities in New York State. GPE's purpose is to provide an outlet for sharing ideas and resources to facilitate a collective effort toward sustainability.

GreenProjectExchange.org features case studies on a variety of environmental topics, such as water quality, waste management, and energy efficiency that offer useful information such as project funding, challenges, and community engagement processes. Users also have access to reports, budget summaries, photos, and other supporting files.

One of the first GreenProjectExchange.org projects: the Lindenhurst Memorial Library's green infrastructure parking lot in Lindenhurst, NY.

SYRACUSECOE SYMPOSIUM 2010

More than 300 attended the 10th Annual SyracuseCoE Symposium 2010 in September, where industry, university, and community experts addressed topics relating to the symposium's theme of "Restoring Sustainable, Healthy Communities."

Tracks explored energy-efficient buildings research, water resources and energy-efficiency initiatives happening in communities, municipal energy-efficiency incentives and implementation, the US DOE Builders Challenge, the Creative Core Green Business Certification Program, ecological performance standards for buildings, and more.

One highlight of the event was a plenary talk by urban critic Roberta Brandes Gratz, who addressed Syracuse's many sustainability initiatives. Said Gratz, "Here in Syracuse, you are demonstrating that you don't have to leave this city to live in a better one."

Kate Gordon, Vice President for Energy Policy at the Center for American Progress, discuss how the US can create jobs through investments in a clean energy economy.

Students from regional colleges and universities at the SyracuseCoE Symposium.

Jared Snyder, Assistant Commissioner for Air Resources, Climate Change, and Energy, NYS Department of Environmental Conservation, delivers a plenary talk on New York State's Climate Action Plan, an initiative to dramatically reduce greenhouse gas pollution while building New York's clean-energy economy.

Hugh Henderson, President of SyracuseCoE Patron CDH Energy Corporation, presents on energy-efficient buildings.

SyracuseCoE Platinum Partner SUNY ESF President, Neil Murphy, discusses a proposed Center for the Advancement of Sustainable Membrane Technologies.

CHARACTERIZING NON-POINT SALT CONTAMINATION TO STREAMS AND GROUNDWATER

While not particularly thought of as a health hazard, high levels of salt are being found in streams and groundwater—affecting our watershed and therefore our overall water quality. Through SyracuseCoE-funded research conducted in Fishkill Creek in Dutchess County, NY, Stuart Findlay of the Cary Institute of Ecosystem studies, along with Don Siegel and Li Jin of Syracuse University, found that the major culprits are road salt (contributing to more than 80% of the issue), water softeners (5-10%) and wastewater treatment plants (about 1%).

While it's easy to assume that streams and groundwater are more contaminated with salt in the winter months when there is a large amount of road salt application, the opposite can be equally true. High concentrations of salt have been found in the summer months—painting a clear picture that something is holding onto the chloride, making it last through the summer and perhaps affecting animals in the streams during their breeding season and their young in early growth stages. In Dutchess County, NY, about 20% of the private wells show salt contamination at levels that would advise caution for people on severely salt-limited diets. Since large areas of New York rely on individual water wells, it presents a problem once the groundwater is contaminated. It may take a long time to see rising salt levels in groundwater and it will also take a long time for levels to decline, even if salt applications are reduced.

Through a new model, researchers found that by reducing salt application in half, the concentration decreased by only 20.7%, while doubling it increased concentration by 34.2%. The model suggests a lag in delivery of the salt, so the road salt applied now will more than likely show up in the future. These results provide an educational model that help us manage expectations of what is down the line for our watershed if we don't act to mitigate salt levels in the water. Next, there is a need to find modifications to road salt, different ways to apply salt so it remains only on the road and/or begin to reduce the application rate.

In October 2009 the Cary Institute of Ecosystem Studies and Cornell Cooperative Extension of Dutchess County held a management-based forum about the impact that road salt has on natural areas, drinking water supplies, and health conditions.

"Salt pollution of our environment is an increasingly important issue," Findlay tells us "but the bright side to the problem is that it can engage citizens and local officials to be more aware of apparently benign materials we spread into the environment that can come back to trouble us."

The Urban Observatory Tower at the SyracuseCoE HQ, seen from the HQ building's green roof.

Characterization of the Ambient Air Quality in Syracuse, NY, and Identification of Its Origins

How is the outdoor air quality in Syracuse, New York? That depends on a number of factors. Is it a hot humid day in July or a cold clear one in January? Maybe it is early Sunday morning, or afternoon rush hour with major construction on the interstate highway.

Pollution in the atmosphere can induce a wide variety of adverse effects including: increased mortality and morbidity in the public, deterioration of buildings and monuments, acidification of lakes and rivers, and forest and crop damage. Although the US has substantially improved air quality over the past 30 years, there are still a number of problems that are attributed to air pollution.

By modeling the evolution of traffic emissions in a similar fashion to that done for freeways in Los Angeles, Max Zhang, Assistant Professor of Mechanical and Aerospace Engineering at Cornell University, developed models that relate automated traffic data and weather-related measurements to predict pollutant concentrations.

A team of researchers led by Philip Hopke, Bayard D. Clarkson Distinguished Professor and Director of the Center for Air Resources Engineering and Science (CARES) at Clarkson University, collected data at two towers—one at Upper Onondaga Lake Park and the other near the SyracuseCoE headquarters in downtown Syracuse. Myron Mitchell, Professor and Director of the Council on Hydrologic Systems Science, Department of Environmental and Forest Biology at SUNY College of Environmental Science and Forestry, also contributed his expertise, maintaining the collection towers and providing modeling data.

Studies from around the country have established that vehicles play a major role in a community's air quality. The Clarkson researchers suspect that the two major highways that cross Syracuse—I-81 and I-690—have a definite impact on the city's surrounding air. These two highways, adjacent to the SyracuseCoE headquarters site, are being monitored with two Autoscope traffic cameras mounted on the top of the Urban Ecosystem Observatory tower, providing real-time traffic volume, speed and size classes. A graphical user interface is also being used to process the traffic data. Now that the SyracuseCoE headquarters construction has been completed, most of the data has been collected and the team is finalizing the analysis of the information.

"We are analyzing the wealth of collected data to determine the impacts of the interstate highways on local air quality. These results should help inform local officials as they make choices regarding the future for I-81," says Hopke.

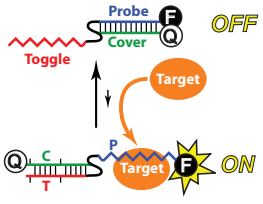
Using their model based on actual information about Syracuse, the researchers intend to develop other models that can predict future pollutant concentrations using easily collected traffic data. With this kind of information, controlling and improving the quality of the air we breathe every day becomes a possibility.

BIOSENSORS WITH LOW CROSS-REACTIVITY FOR WATERBORNE CONTAMINANTS

Dr. Philip Borer, CEO of AptaMatrix, Inc. and chemistry professor at Syracuse University (SU), has conducted research to develop a new method to identify nucleic acid sequences—short strands of DNA or RNA—attracted to microorganisms. Borer calls this Direct Sequence Analysis, or the DSA Method. Using this new method, Borer's team can quickly find the DNA/RNA strands, called "aptamers," that recognize and bind to chlorine-resistant waterborne microorganisms—such as Cryptosporidium and Giardia—which cause debilitating illnesses that can be fatal for infants, senior citizens, or immune-compromised individuals.

The short nucleic acid strands are identified using next-generation technologies that are coming into wide use for determining subtle differences between the DNA genomes of different people. "We are delighted to have two of these next-gen instruments—the first in Syracuse—at AptaMatrix," says Borer. "The company can sequence nearly a billion DNA fragments per week, which is important because finding aptamers is like searching for a needle in a haystack." he said. In addition to aptamer discovery, AptaMatrix does sequencing for academic and industrial researchers.

An AlloSwitch™ turns ON when the target binds the aptamer probe.



AptMatrix and SU scientists engineered the aptamers that bind directly with a target organism into a "molecular switch." Thus the outcome of this research—a DNA/RNA molecule that changes its shape on binding with the target—has been dubbed the AlloSwitch™. The shape change is coupled to a change in light output from the switch to provide a biosensor that can detect the target. Because of its selectivity and sensitivity, other non-harmful or beneficial microorganisms in the water will not react to the AlloSwitch™.

Building off his success in capturing aptamers using the DSA method, Borer's new project aims to discover dozens of high-affinity sequences for each target. Those having the lowest off-target effects will be chosen for commercial biosensors that are specific for Cryptosporidium or Giardia and that do not react with other common components of public water supplies.

"We are especially grateful to SyracuseCoE, NYSTAR, and the SU CASE Center for critical early support for our work," says Borer. "The techniques developed in this SyracuseCoE-funded research project have laid the groundwork for what should become the primary method by which thousands of biosensor targets—proteins, microorganisms, toxins, etc.—are detected." Borer and his team submitted patent applications in March of 2009 and 2010 for aptamer discovery, and have been awarded three patents on the AlloSwitch™ technology, owned by SU and licensed to AptaMatrix.

Real-time water contaminant analysis equipment by collaborator OrthoSystems.

ULTRAFINE PARTICLES AND CARDIAC RESPONSES: EVALUATION IN A CARDIAC REHABILITATION CENTER

Epidemiologists study the factors that affect the health and illness of populations. These doctors and scientists know from years of research that particulate matter air pollution causes people to suffer from some forms of heart disease which, for some, can have fatal consequences.

But what is causing this? The term "particulate matter" (PM) describes a wide range of particles, and what isn't clear is the direct effect of specific particulate matter components. Determining exactly what role each different component found in PM pollution—organics, metals, ultrafines, etc.—plays in our everyday cardiovascular health is what Mark J. Utell, with the help of the University of Rochester, is measuring. Researchers suspect ultrafine particles, the very smallest of these particles at less than 100 nanometers in diameter, play a significant role in causing ill health.

A team of varied experts was put together to participate in this project, including: epidemiologists, who study factors of health and illness in populations; environmental health scientists, who study relationships between health and the environment; cardiologists, who deal with heart and blood vessel illness and health; analytical chemists, who study chemical composition of natural and artificial materials, primarily at the molecular level; and biostatisticians, who use math to analyze, understand, and interpret data to establish relationships between factors.

The research team's observational study incorporates several research elements. The data collection of the current project tests patients at a cardiac rehabilitation center who are recovering from serious heart attacks. The team records sensitive heart electrophysiological measurements—the electrical signals emitted by biological cells and tissues—during rehab exercise and collects blood samples. Similar cardiovascular endpoints have been examined in other subgroup populations in Rochester, NY, allowing the researchers to compare data..

Information from this study offers a better assessment of adverse health effects from inhalation of common pollutants. Considering this direct relationship along with environmental conditions and populations becomes a basis for understanding more general health risks. This data can and hopefully will be helpful in creating public policy that addresses ultrafine particles, large particulate matter, and air quality in general.

Integrated Energy Recovery Ventilation and Air Purification System (HEPAiRx)

Air Innovations' HEPAiRx® energy recovery and air purification system fits into standard windows for home applications.

For adults and children suffering from asthma and other upper respiratory illnesses, clean air can mean relief and feeling better. However, in recent years, energy efficiency requirements have resulted in tighter building construction and renovation. While this has helped conserve energy, a resulting decline in indoor air quality may be a cause for the increase in asthma and upper respiratory illnesses. North Syracuse, NY, company Air Innovations, a SyracuseCoE Silver Partner, believes this situation can be corrected.

Previous funding from the New York State Energy Research and Development Authority (NYSERDA) allowed Air Innovations to design and develop an air purification system that brings more fresh air into a room without high energy consequences.

The result is an integrated, packaged, portable air conditioner that heats and cools the room, brings in fresh air, filters out pollutants, and creates a positive pressure in the space to keep airborne pollutants from other spaces, such as microorganisms and allergens, from entering the room. The system is designed to take over complete environmental control of a room, such as a bedroom, and reduce airborne particles and gaseous contaminants. By doing so, the bedroom can be isolated from the rest of the house.

With funding from SyracuseCoE, Air Innovations was able to test the Integrated Energy Recovery Ventilator, also called a Ventilating Room Air Purifier and trademarked HEPAiRx®. Working with Clarkson University, two separate studies to evaluate the air quality and health of asthmatic children were designed and implemented. In the first, 45 units were placed in participants' bedrooms for an 18-week period. In the second, 20 units were installed and evaluated over a 14-week period.

The studies monitored air quality along with the health of the rooms' occupants under different situations.

The researchers collected information to compare using the unit against not using the unit. Forced Expiratory Volume and exhaled breath samples were collected from the individuals with standard breath sampling equipment. The results indicated reduction in lung inflammation in the subjects using the HEPAiRx®. Air samples were measured showing substantial reductions in the particulate and gaseous contaminant levels. Questionnaires were used to evaluate changes in quality of life such as the use of medication, sleeplessness and sick days. Subjects generally reported better sleep and a reduction in medication.

These two separate studies determined that the unit significantly improved the IAQ and reduced asthma symptoms. Participants were given the option of keeping their units or receiving a cash payment for participation. Most reported improved quality of life for their children, with 95% opting to keep the latest model of HEPAiRx® in the second study. Further studies will be conducted in winter 2010 to determine the medical intervention cost savings of the HEPAiRx®.

"We are fortunate to have won multiple, competitively awarded matching grants from SyracuseCoE, NYSERDA, CenterState CEO and NYSTAR to pursue our dream of helping people, especially children, get some relief from their asthma by using clean and green technologies of fresh air for ventilation and high-efficiency particulate air filtration," says Larry Wetzel, PE, Chairman of the Board, Air Innovations, Inc.

In December 2009, Air Innovations was named the 9th fastest growing small business in Central Upstate New York. In August 2010, the company was named to *Inc.* magazine's list of America's 5,000 Fastest Growing Privately Held Companies. HEPAiR® has recently received a U.S. patent and is now available for sale via its website www.hepairx.com.

AN INTELLIGENT URBAN ENVIRONMENTAL SYSTEM (I-UES) FOR CENTRAL NEW YORK WATER RESOURCE MANAGEMENT

A robotic water monitoring unit being deployed on Otisco Lake, Otisco, NY.

A unique three-year longitudinal and vertical study of Central New York's Three Rivers system—involving the Oswego, Oneida and Seneca rivers—has revealed that oxygen resources have become degraded by several stressors, including the impact of wastewater treatment plants, nonpoint runoff, an increase in invasive zebra mussels and channelization of the flow. As oxygen is necessary to support life in aquatic ecosystems, its measurement is essential for gauging the overall state of water bodies; in one of the study's surveys, more than one-third of the 90-kilometer length of the river system failed to meet the New York water quality standard.

This research has shown the importance of utilizing innovative technology to manage and monitor complex aquatic ecosystems in urban settings. Oftentimes, programs for treating water systems are implemented without robust data to identify the true source of the problem. The value of this case study comes from the large number of cause-and-effect relationships that were clearly identified through the monitoring system.

Steven Effler, Director of Research at the Upstate Freshwater Institute, and Charles Driscoll, University Professor of Environmental Systems Engineering in the L.C. Smith College of Engineering and Computer Science at Syracuse University, recently presented the results of this Syracuse Center of Excellence Collaborative Activities in Research and Technology Innovation (CARTI) water research project—"An Intelligent Urban Environmental System (i-UES) for Central New York Water Resource Management"—to SyracuseCoE's Scientific Advisory Committee. SyracuseCoE awards CARTI projects using funds from the U.S. Environmental Protection Agency. Co-authors of the study are Anthony R. Prestigiacomo and Adam J.P. Effler of the Upstate Freshwater Institute.

While much attention has been given to the impact of rivers on lake water quality, there had previously been little done to track the effects of lake outflows on receiving rivers. The water quality of these rivers is of great concern in order to protect their multiple uses—recreation, navigation, power generation and waste discharge—and to support regional development. Currently, the ability of the water systems to absorb the waste sent into them is significantly reduced.

"This study illustrates some of the complexities and challenges in managing urban water systems," says Driscoll. "There are multiple factors associated with the low oxygen concentrations in the Three Rivers

system. As a result, multiple approaches will be needed to improve the oxygen status of the river."

To assess the water quality of such large river systems, the study conducted eight longitudinal surveys—four in summer 2007 and four in summer 2009—collecting data from more than 50 sites, utilizing special instrumentation that measures temperature, conductance (the capacity to conduct electricity), turbidity (muddiness of water due to stirred up sediment), chlorophyll levels and dissolved oxygen. The "boundary conditions" that show the baseline measurements were collected by solar-powered robotic monitoring platforms at the outflows of each lake.

With much conclusive evidence pointing to the oxygen depletion in the Three Rivers system, the research team recommends long-term, routine monitoring of the system, utilizing robotic systems. The researchers suggest that simply improving processes at individual wastewater treatment plants will not be enough to impact the system, and the team must continue to define dynamics and provide insights for rehabilitation. A water quality model can then guide management decisions for a recovery process.

These findings have had extensive media coverage, including *The Syracuse Post-Standard, Science Newsline, Science Daily, Red Orbit,* and *Terra Daily.*

COMMERCIALIZING "Q" AIR TERMINALS: ADDRESSING CHALLENGES OF INDOOR AIR QUALITY, ENERGY COSTS, AND HEALTH RISKS

A "Q" Air Terminal induction/chilled beam heating and cooling unit in classroom use.

Keeping the air in an office, dormitory, laboratory or school at a comfortable temperature and free of germs and odors requires lots of energy. NuClimate Air Quality Systems has designed equipment to address both indoor air quality and energy concerns. The product, consisting of induction units/chilled beams, is called the "Q" Air Terminal. "Q" stands for "Quality."

Air terminals are the units that take air in and put it back out into a room. The NuClimate system, located in the ceiling, works by taking a source of primary, or fresh air, and mixing it with the inside air. Fresh air comes through nozzles at a high rate of speed into a mixing chamber. The resulting induced room air flows over a coil that is set to maintain a comfortable temperature by the room thermostat. The heated or cooled air then streams down into the room by a design that uses the coanda effect, the same principle of air flow that makes an airplane lift off the ground or a sailboat move forward on the water.

A "Q" Air Terminal moves air at a slower pace than more common forced-air systems, reducing the distribution of dirt and germs. And because the system operates on air flow principles, there are no electric motors or fans using energy, making noise, or needing repair and maintenance. NuClimate's system requires duct work that is one-third the size of traditional air heating and cooling systems. This smaller size also reduces the architectural impact in building construction.

With access to research and lab facilities for testing and development at SyracuseCoE, as well as valuable networking benefits for publicity, NuClimate has been able to grow at exponential speeds. They continue to develop spin-offs of their original invention into different models, which possess the same induction technology.

John DiMillo, Vice President of Sales and Marketing at NuClimate, credits much of the product's success to SyracuseCoE. "The Syracuse Center of Excellence kind of took us under its wing," DiMillo says. "They've done tons of work for us. In 2010, SyracuseCoE successfully assisted NuClimate in its pursuit of the New York City School renovations, which begin in 2011."

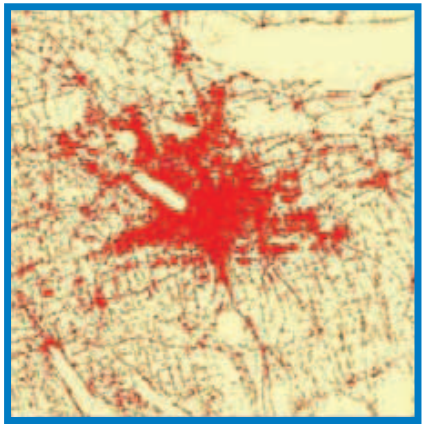
Recently, NuClimate developed a more advanced model for individual residences, cementing a relationship with Titus Corporation (a $5 billion corporation specializing in HVAC products) and the US Military. By June of 2010, NuClimate had shipped more than 2,500 units. The company is also in the process of developing a unit specifically for the hospital market.

Bridging the Temporal Mismatch between Remotely Sensed Land Use Changes and Field-Based Water Quality/Quantity Observations

As urban development continues to expand outward, cities and suburbs are losing permeable surfaces to sidewalks, roads, and parking lots. By taking natural hydrology out of the equation, we are faced with negative impacts on water quality from stormwater runoff.

Runoff moves swiftly over impervious surfaces, picking up dirt and contaminants as it flows to the nearest water body. Runoff also puts pressure on sewer lines, which can breach capacity during storms, releasing a mixture of raw sewage and runoff directly into a nearby waterway before reaching a plant for treatment—known as combined sewer overflows.

Recently, researchers have been incorporating remotely sensed satellite imagery to detect impervious surface cover in a given area. The resulting maps help hydrologists link water quality to trends in development and nonpoint source water pollution (runoff). However, traditional hydrologic modeling methods are limiting because they capture total impervious surface cover but ignore its spatial distribution. Also, hydrologists are not aware of possible limitations in the image analysis algorithms that provide the impervious maps.



A satellite image of the Onondaga Lake watershed mapping impervious surfaces, such as blacktop.

With funding support from SyracuseCoE, a team of researchers at the SUNY College of Environmental Science and Forestry has developed enhanced image processing technology capable of accurately detecting impervious surfaces, while simultaneously providing an accuracy metric for every detected pixel. The technology is revolutionary, as it bridges a significant scientific gap between image analysts and hydrologic modelers. Dr. Giorgos Mountrakis, an Assistant Professor in the Environmental Resources Engineering Department of SUNY ESF and the Principal Investigator in this grant, notes: "The funding from SyracuseCoE was critical in allowing researchers with diverse backgrounds to come together and tackle the elimination of typical disciplinary barriers through a collaborative and highly integrated approach. It was a group effort, that none of us could have undertaken in isolation, with some impressive results."

This enhanced processing technology is coupled with an integrated modeling framework that incorporates socio-economic, land use and environmental monitoring data. These inputs can be plugged into the model and used to project future trends on a more frequent basis.

Moving forward, the model will be translated into software and distributed to communities to help them make smarter land-use decisions in the future.

INTEGRATED COMPUTER SIMULATION ENVIRONMENT FOR PERFORMANCE-BASED DESIGN OF VERY-LOW ENERGY AND HIGH-IEQ BUILDINGS

The US Department of Energy (US DOE) has announced a $560,296 grant to a Syracuse University (SU)-led project to develop a virtual design studio to help building designers evaluate architectural and mechanical options in order to maximize the energy savings of residential and commercial buildings while ensuring healthy, comfortable and productive indoor environments.

The Virtual Design Studio project is led by Jensen Zhang, L.C. Smith College of Engineering and Computer Science, and Michael Pelken, SU School of Architecture. The project is being developed in collaboration with Syracuse-based firm and SyracuseCoE building Patron and tenant CDH Energy, the Florida Solar Energy Center and SyracuseCoE, which provided matching funds. This project adds a new capability to SyracuseCoE's extensive portfolio of research and demonstration assets and projects that are advancing energy-efficient building products and services.

"The Virtual Design Studio will integrate a suite of performance simulation models, a virtual building database and a knowledge base of architectural design principles to achieve fully coordinated, integrated and optimized building design," says Zhang, Professor of Mechanical and Aerospace Engineering. "Buildings designed and constructed using a performance-based energy and IEQ design process that optimizes the interaction between the building envelope and a building's HVAC systems can save between 30 percent and 75 percent of energy costs while providing better indoor environmental quality."

According to the US DOE, the nation's 114 million households and more than 74 million square feet of commercial floor space account for about 40 percent of the country's primary energy consumption, as well as 39 percent of carbon dioxide, 18 percent of nitrogen oxides and 55 percent of sulfur dioxide emissions.

In addition to helping the nation achieve energy independence by reducing its reliance on fossil fuels to heat and cool aging and inefficient buildings, the Virtual Design Studio project is expected to help create high-value jobs in both the supply and demand sides of the energy-efficient building market. Therefore, the project will directly support of the country's economic recovery and development effort.

In total, the US DOE has awarded more than $76 million for 58 advanced energy-efficient building technologies and commercial building training programs throughout the United States. The Virtual Design Studio project was one of five projects awarded a grant under the rubric of "Analysis, Design and Technical Tools," which focuses on improving the simulation of complex interactions between building elements, including climate, building envelope heat and moisture transfer, internal heat gains, lighting power, HVAC equipment, controls, thermal and visual comfort, and energy costs.

"These projects will help the US lead the world in advancing energy-efficient technologies," says US Energy Secretary Steven Chu. "Energy-efficient commercial buildings will help our country cut its carbon emissions and energy costs while the training programs will upgrade the skills of the current workforce and attract the next generation to careers in the emerging clean energy economy."

Syracuse University Professor Jensen Zhang in the Building Energy and Environmental Systems Laboratory (BEES Lab), which he directs.

The virtual design studio will continue to explore innovations in building envelopes and energy-efficient building design as currently studied in the BEES lab.

LIFE DOWN UNDER: THE FORGOTTEN HYPORHEIC ZONE IN STREAM RESTORATION AND DEVELOPMENT OF A BIOINDICATOR OF SUBSURFACE RECOVERY

Two SUNY ESF students with a Bou-Rouch pump, used to detect invertebrates beneath a streambed.

Billions of dollars are spent every year on stream restoration projects aimed at restoring the hydraulic and ecological diversity of natural stream systems. Usually restoration goals are focused on bank erosion and improving fish habitat. But, what effects are there on the subsurface environment? Streams are not simply surface flow over a stream bed, but include complex interactions with and within the stream bed. What effects do these man-made rock structures have on biological communities within the bed itself? Do they restore the habitat and biological diversity like we hope they do?

These engineered stream restoration structures may induce hyporheic exchange—the mixing of surface and groundwater flows—within the stream bed. No one has ever studied the effects of these structures on the living world within the stream bed (an entire and complex fauna of invertebrates lives down there). Kathleen McGrath and her team at SUNY College of Environmental Science and Forestry partnered with Laura Lautz at Syracuse University to study Ninemile Creek in Marcellus, NY, an ideal field "laboratory" to examine the effects of restoration structures on subsurface invertebrates.

The team of researchers at Ninemile Creek found that cross vane structures, or carefully placed V-shaped rock structures built across the channel to funnel flow toward the center and away from eroding stream banks, do appear to affect the nature of the environment in a positive way. By mimicking natural riffle pool flow patterns with carefully placed rock structures, flow patterns in and out of the bed, and associated hyporheic habitats do appear to be more diverse. Invertebrate communities may be more diverse and healthy as well.

A better understanding of stream restoration effects on the hyporheic zone allows us to guide future stream restoration efforts to restore not just the surface environment of a healthy stream, but also the subsurface environment as well.

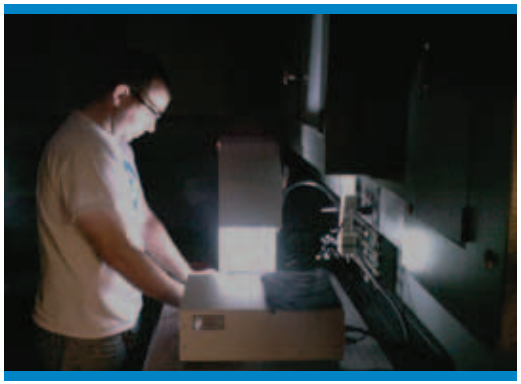
Development of a Photovoltaic Cell Utilizing a Proprietary Manufacturing Process

For more than 30 years, solar photovoltaics (PV) technology has tried to feasibly compete with coal-fired power generation as a source of grid tied electricity—with limited success. However, with continued advancements in technology and the rising price of fossil fuel-powered energy, a path to grid parity for solar PV exists. Some analysts argue that 100% of our current energy demands could be met with a mere 1% of our land area blanketed with solar cells. For these reasons, grid-connected solar PV represented the fastest growing energy technology on the world market through 2009. The question is—how do we reduce the cost of producing solar PV while increasing production throughput? Syracuse University partner Antek is working to solve this dilemma.

In January of 2008, Anthony Terrinoni of Antek was connected by the Syracuse Center of Excellence with SU Professor Eric Schiff concerning an opportunity to collaborate on research into a novel method of solar cell fabrication. In the standard process, thin wafers of silicon and phosphorous are heated in large ovens and exposed to boron gas. Through extensive research, the team has discovered a process that involves "spritzing" the wafers with a proprietary mixture of chemicals—which could reduce production costs by 10 to 20%. Antek's proprietary manufacturing process not only reduces overall cost of production, but also minimizes carbon emissions associated with the process and results in an increase in open-circuit voltage compared to current solar PV cells on the market.

With funding from SyracuseCoE, Antek has produced a prototype solar cell that demonstrates the reduced production costs, and has also proven the thin film layer to be durable and resistant to environmental impact. The company is currently exploring a path to market and was recently accepted into Syracuse's Clean Tech Center. Antek also recognized the importance of "think global, buy local." By partnering not only with local distributors, but also with local module manufacturers, Antek envisions that they will be able to create a packaged solar PV product comprised entirely of technologies developed in New York State—creating high-value technical jobs in the region. "The Center of Excellence was the spark at the inception of the solar cell project, having supported the research and development stage, and now assisting with its commercialization," says Terrinoni. "In all aspects of the product life cycle, the CoE has been a model partner and has showed its commitment to fostering positive economic change in the local area."

In February 2010, work began on increasing solar cell performance and the development of a business plan/investor presentation. An intern from the Johnson School, Benjamin Barrington, brought in-depth knowledge of the solar industry, allowing for the rapid completion of both. As of September 2010, Antek is attempting to raise capital for a demonstration solar panel.



Testing Antek's proprietary photovoltaic cells.

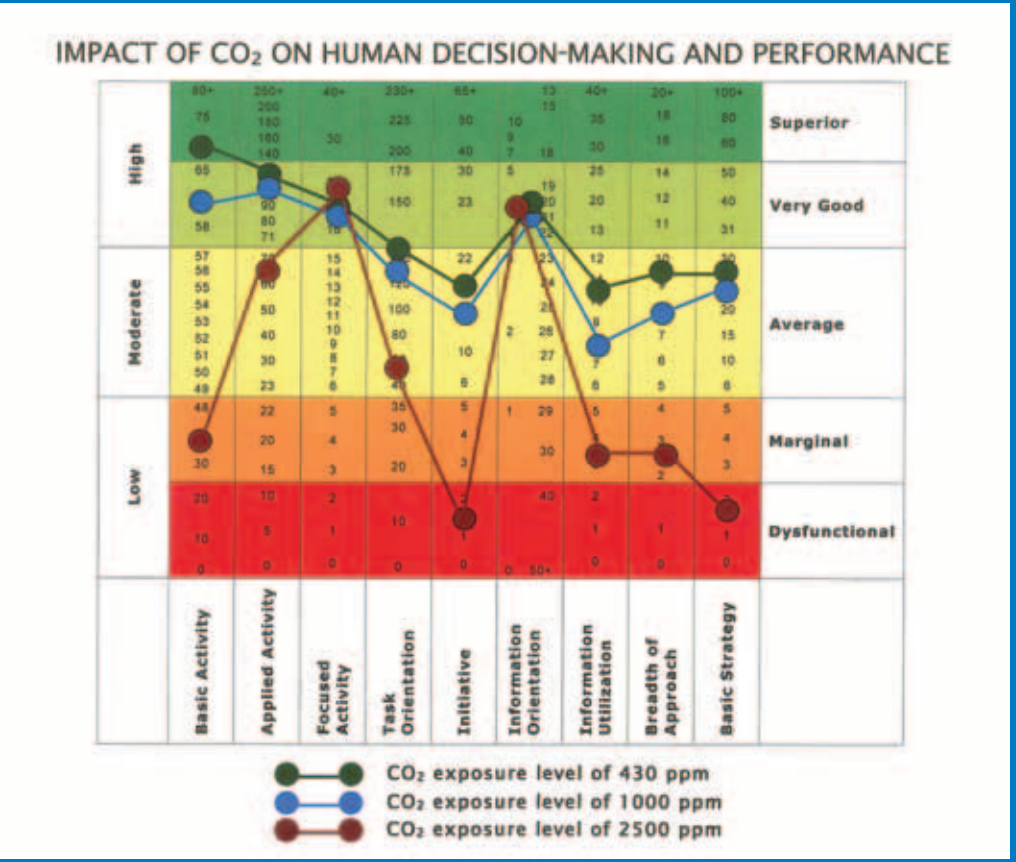
IMPACT OF CARBON DIOXIDE ON HUMAN DECISION-MAKING AND PRODUCTIVITY

Is it possible that decision-making and productivity can be influenced by outside chemical imbalances? In order to understand the possible effect indoor air quality (IAQ) has on human performance and productivity, Dr. Usha Satish from SUNY Upstate Medical University is conducting an in-depth analysis on what links exist between CO_2 levels, people's health symptoms and perceived IAQ. More specifically, her investigation focuses on how CO_2 levels impact the decision-making process of workers and their overall productivity rate as well as how it changes based on their perceptions of IAQ.

The research team, funded by SyracuseCoE, successfully compiled pivotal raw data based on strategic simulations and manipulations within the model work environment. Participants were evaluated through strategic management simulations (SMS) studies of various complexity and different client populations, across three CO_2 conditions. By retaining a constant within the simulation environment, researchers scored the participant data solely on how the individual performed tasks and processed the provided information. Studying the IAQ in conjunction with perceived air quality (PAQ), and in relation to health and human performance, sheds light on the effects of indoor environmental qualities.

Most people spend 40 hours a week, if not more, in the workplace. For many, that is a large amount of time spent in a work setting without fresh air. Reducing building ventilation requirements in order to save energy can have lasting effects on our bodies. "The study results are important to indoor air sciences and very relevant to human functionality. We found the performance of participants was marginal to dysfunctional with higher exposures of CO_2, at concentration levels typically found in some buildings," Satish describes. This research will lead to a better understanding of how varying levels of CO_2 affect worker productivity, which in turn has the potential to make a significant impact on the development of future indoor ventilation requirements and design.

Everyone benefits when brains function with the right amount of oxygen—people feel healthy, perform well, and can be productive at work.



Dr. Usha Satish's research studied the implications of direct impacts of levels of CO_2 on people's decision-making capabilities. Certain areas of decision-making were impacted under high CO_2 concentrations: planning, stretegy, breadth of approach, and emergency responsiveness.

Distributed Demand-Controlled Ventilation for Improving Indoor Air Quality

The interest in controlling Indoor Air Quality (IAQ) stems from the desire to create and maintain healthy and safe work environments for the many people around the world who work in office buildings. This means being able to immediately detect the presence of pollutants and contaminants, alert those in charge, and mitigate the problem or reduce the impact on the indoor environment.

The Syracuse Center of Excellence headquarters includes a Total Indoor Environmental Quality (TIEQ) laboratory for research in this area. But the new building also serves as an example of the latest technology in IAQ and "intelligent built environmental systems." An intelligent system is designed and built to monitor the environment, perceive changes in conditions, and make automatic adjustments to the indoor environment to achieve optimal performance.

Current HVAC (heating, ventilating, and air conditioning) technology exists for demand-controlled ventilation (DCV). This regulates the amount of fresh air brought into a building based on the carbon dioxide (CO_2) generated by the occupants' activities. DCV provides good IAQ and is more energy efficient than older systems.

However, a recent study by the National Institute of Standards and Technology, a federal government technology agency, shows that DCV may result in higher levels of unhealthy air pollutants such as the volatile organic compounds (VOC) that are emitted in an office environment from plastics and other synthetic materials, cleaning chemicals, and copying and other office equipment. These "passive emissions" can accumulate in the building during unoccupied periods, when the CO_2 levels are expected to be low, prompting the DCV to shut off or drastically reduce the supply of fresh air. Some of them cannot be eliminated from the office environment, so controlling them becomes important.

Researchers at Syracuse University are taking DCV one step further by investigating distributed demand-controlled ventilation (DDCV). In this project, investigators are testing methods that rely on a network of distributed sensors and environmental control systems to adjust the supply of fresh air for each occupant based on local conditions. This approach ensures that each occupant will receive the correct amount of fresh air indicated by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) at reduced energy consumption. The DDCV approach will also address such important considerations as occupancy, activity, floor area, passive emissions and ventilation efficiency in individual occupied spaces. To this end, a mathematical model and experimental methods have been developed to evaluate practical design and control methods, and optimize the mechanical equipment for improved IAQ and lower energy consumption.

The new system, operating at a higher level of intelligence, monitors individual offices and cubicles as well as the interaction of the air throughout larger office spaces. Regulation of fresh air control and contaminant detection is then based on the conditions or needs in the individual areas. This distributed approach to IAQ will achieve maximum comfort, health, and safety for workers throughout a building.

Open Web Services-Based Indoor Climate Control System

The CollabWorx/SenSyr Open Web Services-Based Indoor Climate Control System has been installed at the SyracuseCoE headquarters.

How often have you sat at your desk—at work, in school, at a computer lab—and felt uncomfortable with your indoor environment? Is air too warm and stuffy, or too cold to concentrate? Even worse, the reason we often feel too hot in the winter and too cold in the summer is because of HVAC systems that are wasting energy by over-conditioning the building. While building automation systems (BAS) that deal with these problems have existed for a long time, they currently do not take advantage of the Internet technologies that transformed many other computing domains—and that are user-friendly for office workers, students, and general public alike.

To deal with this dilemma, CollabWorx—known for its signature Web-based real-time collaborative workspaces—has developed a smart building control product that reduces energy costs and increases energy efficiency, improves indoor air quality, increases worker productivity, and creates personalized climate-control environments—all based on the premise that one can build a functional prototype of a BAS assembled exclusively from open-source Internet-based elements.

Says Project Investigator Dr. Marek Podgorny, "I am very grateful to the Syracuse Center of Excellence for financial and intellectual support for the project. Technically, we wanted to demonstrate that open-source software technologies can be used to implement all elements of a control system, including internal system communications. This approach allowed us to lower costs of the system so that the product becomes affordable to small businesses and suitable for residential buildings. It creates a new market niche that we expect to fill while creating green jobs in Upstate New York, with significant energy savings as an important bonus."

Personal Environment system implemented using the CollabWorx green building control technology.

Findings of the project have been conclusive; the Web-based BAS offers a nontrivial technological advantage over current proprietary industrial solutions and a sustainable foundation for future collaborative development of Smart Building software by academic and industrial consortia and alliances. In addition, the modular design of the system permits replacement of any of its components by a proprietary or simply different implementation. Presently CollabWorx is working on demonstrating the technology at the SyracuseCoE headquarters building, and continuing to make it a commercially-viable technology.

The energy-efficient Live/Work/Home at 317 Marcellus St., Syracuse, designed by Cook + Fox Architects. The home's owners moved in October 2010, with owners moving into the other two innovative green homes (at 619 and 621 Otisco St., below) within a few months.

CDH ENERGY TO MONITOR GREEN HOMES

SyracuseCoE Patron CDH Energy has partnered with SyracuseCoE to install monitors in all three of the innovative green homes built as part of the Near Westside Initiative. These homes are the result of the "From the Ground Up: Innovative Green Homes" competition, built in collaboration with the Near Westside Initiative, Syracuse University School of Architecture, Home HeadQuarters and SyracuseCoE, which fosters advanced thinking about design, sustainability, and cost-effective building practices for the single-family home.

These innovative homes provide a new vision for one of the city's oldest neighborhoods and demonstrate the value of design within a disinvested and demographically diverse community. These small domestic projects wed high standards of living with advanced technology and design to encourage revitalization of the Near Westside and similar neighborhoods across the country.

At the Live/Work/Home (317 Marcellus St., Syracuse), for instance, CDH Energy attached temperature and air flow sensors to the heat recovery ventilator. In the basement, they installed a dedicated gas meter, as well as sensors on the mini-boiler, the hot-water heater, and the under-floor radiant heating circuits. Data will be collected every 15 minutes and fed into an Internet database for analysis.

The monitors will collect data for a total of three years to document energy consumption. SyracuseCoE will fund the monitoring project with part of a federal appropriation it received in December 2009 through US Rep. Dan Maffei (NY-25).

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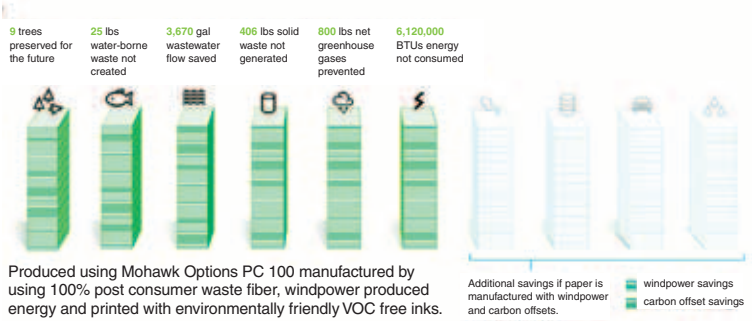

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