

Institute for Environmental Science and Policy

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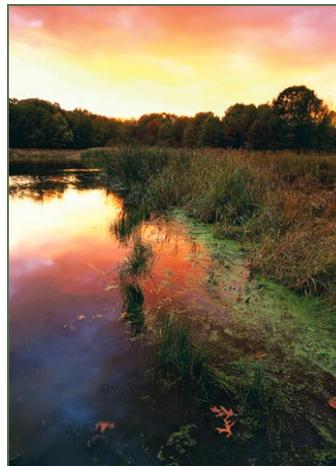
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CHICAGO WILDERNESS CONGRESS 2010

IESP was a major sponsor of the Chicago Wilderness Congress 2010, which was held at the UIC Forum on November 4th. Prof. David Wise, Associate Director of IESP, welcomed Congress participants on behalf of IESP and UIC. The UIC LEAP program was also a Congress sponsor. LEAP, which is associated with IESP, is an NSF-IGERT doctoral training program in the ecology, restoration and management of integrated human-natural landscapes. LEAP doctoral students assisted with Congress activities.

Chicago Wilderness is a regional conservation alliance of over 250 organizations working together to conserve and restore biodiversity and improve the quality of life for people living in the greater Chicago metropolitan area stretching from southern Wisconsin through Illinois and Indiana to southwestern Michigan. Founded fewer than fifteen years

ago with 34 members, Chicago Wilderness is now known internationally as a highly successful model for building effective conservation alliances in metropolitan areas. The 2010 Congress was the seventh biennial meeting of the alliance.



Cameron Davis, Senior Advisor on Great Lakes issues to the Administrator of the U.S. Environmental Protection Agency, delivered the keynote address as part of the opening ceremony. The

rest of the day was devoted to talks presented by leading conservationists in concurrent sessions covering the four major Chicago Wilderness initiatives: climate change and biodiversity, landscape restoration and management, implementation of the Chicago Wilderness Green Infrastructure Vision, and the award-winning educational program "leave no child inside."

The biennial Congress, which was held at UIC in 2008, is a forum in which all Chicago Wilderness members share information, build partnerships, and identify opportunities for future collaborative work. Attendees included community and business leaders, policy makers, planners, scientists, government officials, representatives of partnering organizations, students, volunteers, and interested members of the public.

www.chicagowilderness.org

Mission Statement

The mission of the Institute for Environmental Science and Policy (IESP) at the University of Illinois at Chicago is to advance multidisciplinary research and scholarship within the environmental and health sciences, engineering, economics, urban planning and the social sciences among UIC's faculty and students, to prepare the next generation of environmental scientists and decision makers, and to transmit workable solutions for environmental problems to the public sector.

FROM THE DIRECTOR



Thomas L. Theis, Director, IESP

“[Milestones] are events that are especially significant because of the meaning we impute to them, and when strung together they can provide us with a sense of growth or change.”

A common way of marking time, progress along a pathway, or maturation of an idea is through the placement of “milestones”. These are events that are especially significant because of the meaning we impute to them, and when strung together they can provide us with a sense of growth or change. Milestones aren’t always welcomed (I had a colleague once who referred to them as “millstones” because his superiors were forever asking him for evidence of progress on his research), but they can be an especially effective way of transmitting information.

Institutional milestones also exist—significant events that occur within an institutional context. For IESP there have been many “milestones”—far too many to recall in their entirety here. But a few stick out: our first joint faculty appointment of Professor Kathryn Nagy with Earth and Environmental Science in 2002, our first

joint junior appointment of Professor Jie Lin with Civil and Materials Engineering in 2003, and then our first successful promotion to tenure in 2009 (also Professor Lin). And now IESP will see the first granting of emeritus status to one of its joint faculty: Professor Nurtan Esmen of Environmental and Occupational Health Sciences will be retiring at the end of the year.

Professor Esmen, “Nurt” to his colleagues, came to UIC in 2003 as an accomplished scholar. He is an internationally known expert in environmental and occupational exposure and risk assessment, is well known for his courses in experimental design, and is a superb statistician and mathematician. As importantly, he has been a fine colleague and a model citizen of both EOHS and IESP. “Retirement”, in Nurt’s case, is a relative term; he will still be at UIC and remain active in his research, and a part of IESP for, we



Professor Nurtan Esmen

trust, several years to come. Nurt, we salute you.

And there is one more milestone of note. Maggie Jameson, IESP’s Assistant Director for Business Affairs, has left us to pursue other interests. Maggie came to the institute in 2003 as an assistant to the director, and immediately set about organizing our programs and activities so thoroughly and completely that, over the course of time, the position had to be redefined. There is hardly a part of IESP on which she has not had an influence: research proposals, human resources, office management, arrangements for advisory boards, oversight of meetings and workshops, and of course a variety of budgets.

But perhaps her most important and lasting contribution has been her work coordinating with other departments, centers, offices and individuals on campus. IESP counts among its affiliates over twenty departments and centers, and in excess of 200 faculty, professionals, external groups and people with whom we work in a collaborative way on activities related to environmental inquiry. Without her skills in building and maintaining relationships across and beyond the campus, the work of the institute would have been significantly curtailed. Au revoir Maggie!

Note: Dr. Theis was invited to deliver a lecture on “Life Cycle Assessment and Nanomaterials” before the National Research Council in Washington DC May 4, 2010. In addition, he was invited to speak at the week-long workshop on “Sustainable Electronic Materials” sponsored by the International Heraeus Foundation in Bad Honnef Germany, August 1-5, 2010. Theis also was part of an NSF visitation review team for the EPA-NSF Center on the Environmental Implications of Nanotechnology at Duke University, June 21-22, 2010.

George W. Crabtree, PhD

Distinguished Professor

Department of Physics, University of Illinois at Chicago

Senior Scientist, Distinguished Fellow and Associate Division Director

Materials Science Division, Argonne National Laboratory



This is a bit of a homecoming for you since you received your doctorate at UIC. Would you comment on the most interesting changes you've witnessed in UIC's development since you were a student here?

I think the biggest change is structural - the replacement of concrete with trees and grass. The campus is a much more appealing place to spend time when green open spaces are in view. A second big change is the development of University Village south of Roosevelt. The shops, restaurants and history give the feel of a neighborhood, with University people providing a vibrant and colorful presence. It is wonderfully refreshing to have places to get coffee and enjoy the street life. Now, of course, many students live on campus, providing a sense of human place that was missing in earlier days. I have walked across the campus at 11 PM and passed students jogging, a sure sign of a deep and rich campus life. UIC is much more engaging, exciting and full of promise than it has ever been.

As a scientist at Argonne National Laboratory, what is your current research focus? And, as a new member of the UIC faculty, what is your vision for your research program at UIC?

My research at Argonne is in materials science, and especially the remarkable behavior of superconductors that lose all trace of resistance to electrical current at low temperatures. 2011 is the centennial year of the discovery of superconductivity, and it expresses the frontier excitement it has generated continuously over the past century. The challenges

are intellectually rigorous, having defeated some of the biggest names in physics including Einstein, Bohr, Pauli, Heisenberg and Feynman. The horizons of high temperature superconductivity now include a great deal of the rest of materials science, as the highly correlated electrons that produce the superconducting state also produce unexpected and exotic competing magnetic and insulating states as well. The insights that solve superconductivity are likely to also solve the mysteries of these competing states in a single broad stroke.

In the last five years I have developed a strong interest in energy and the historic transition it is undergoing. Our reliance on fossil fuels is now diversifying to include more sustainable energy technologies, such as solar, wind, bio-fuels and electric cars. These new energy technologies are in their infancy - we don't really understand where they are going yet. It is a bit like the emergence of the automobile in 1900; would it be steam, electric, gasoline or diesel and what functions would it provide? We need to meet the historic energy transition on three fronts: education of the next generation of energy specialists who will implement the transition, research and development on the new alternative energy technologies to understand how they work and where they might go, and urban planning and policy development at the city, state and federal levels to steer the implementation of more sustainable energy alternatives. UIC is the perfect place to pursue these goals, with its diverse student body, its central urban location, and its strong interest in public service. I hope to raise the consciousness of sustainable energy on campus and help launch initiatives in the three areas above.

With a few colleagues, I will be teaching a general education course, Energy for Future Decision-Makers, in spring 2011 that will introduce students to the broad issues of energy, environment and climate change. It will compare the capacity and outlook of alternative energy technologies within a common framework, consider policy and urban planning issues in deciding which alternatives to pursue, and provide future decision makers the foundation for making informed decisions. A primary goal is to attract students from many disciplines who are interested but not experts in energy. The only prerequisite is the ability to do arithmetic - no background in physics, chemistry or engineering is assumed. I look forward to teaching this course, with lots of help from colleagues and feedback from students!

You will be hosting the 2011 UIC Summer Institute on Sustainability and Energy. Can you tell us more?

The Summer Institute will take place August 7-19, 2011 on the UIC campus, a two-week school for about 60 advanced undergraduates, graduates graduates and postdocs to learn about energy and its implications. The Institute will cover energy, environment, sustainability and society from the "big picture" perspective: what are the key issues going forward and how can society channel its response in the most productive way? We will cover topics

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Faculty Spotlight: Dr. Samuel Dorevitch, Assistant Professor from the School of Public Health, Investigates Stormwater

Some of the most extensive beach monitoring in the US is performed by the Chicago Park District at 23 designated bathing beaches along 26 miles of Lake Michigan shoreline. Despite intensive monitoring and sophisticated targeted analyses over the past decade, beach notifications (advisories and swim bans) due to elevated levels of fecal indicator bacteria (FIB) continue to occur. In fact, over 9 Chicago beaches are closed more than 10% of the summer due elevated levels of FIB.

Recently, a team consisting of Dr. Dorevitch from UIC's School of Public Health, local government officials, local beach managers, the United States Geological Survey (USGS), and a community-based group that advocates for improving the Great Lakes, was awarded funding from EPA's Great Lakes Restoration Initiative to perform a multi-tier project to investigate storm water as a source of pollution leading to beach notifications in Chicago. This investigation will involve conducting sanitary surveys at beaches, as well as in the catchment areas of storm drains that discharge into Lake Michigan. The sampling will include testing storm water and beach water for fecal indicator bacteria, along with the use of source identification analyses. Results of this investigation will be utilized to identify remediation targets.

The project is part of a comprehensive beach initiative that also includes other efforts to reduce known sources of pollution such as gull waste, and a communication program to improve the public's understanding of beach water quality and factors that can impair it. The team will communicate the findings to Great Lakes beach managers and researchers so that the results of this project can inform the implementation of storm water investigations at other Great Lakes beaches.



Note: On Tuesday, October 19th, 2010, Dr. Dorevitch testified before the Illinois Pollution Control Board regarding the Chicago Health, Environmental Exposure, and Recreation Study (CHEERS). The study evaluated the health risks of limited contact water recreation activities on the Chicago Area Waterways System.

(Continued from page 3)

such as fossil, solar, nuclear, wind, biofuels, the electricity grid, carbon emissions, environment, policy, and start-up companies, always asking how these activities interact with each other to create the future energy landscape. Guest lecturers from UIC, our neighboring universities and Argonne will provide the instruction. This will be a new experience for UIC and for the students - we want stimulate their intellectual juices and establish a new awareness of emerging challenges, opportunities and careers in sustainability and energy.

As UIC's special advisor on energy, could you discuss what that role entails, what are your goals and how do you plan to achieve them?

Energy is a wonderfully interdisciplinary and inclusive area, embracing natural science, engineering, behavioral science, policy and urban planning. Its challenges and solutions unite rather than divide the traditional disciplines and interests of the university. Like all emerging endeavors, it forms itself by integrating pieces from other areas. Energy is superb opportunity not only to address an historic societal and technological transition, but also to bring people and ideas together to create new ways of thinking.

One of the first goals will be to bring the challenges and opportunities of energy to the attention of the University community. The course my colleagues and I will teach next spring on Energy for Future Decision-Makers and the Summer Institute in August 2011 will help to achieve this goal. There are many opportunities within the University for broad new endeavors - curriculum development, interdisciplinary centers for research, and policy studies, for example. UIC is a founding member of the Clean Energy Trust, a new organization spanning universities, business and government in Chicago that will promote education, research and development and starting up alternative energy companies. Serving as a clearinghouse for these activities, making contacts among University people and organizations to promote them, and reaching out to the governmental bodies, industries, and other universities across Chicago will be among my primary pursuits. Energy is an enormous opportunity to serve the University and its community intellectually, socially, technologically and strategically. My goal is to promote and nurture all of these opportunities.



NEW & CURRENT RESEARCH

Rapidly Measured Indicators of Waterborne Pathogens

Sponsor: U.S. Environmental Protection Agency

Investigators: Samuel Dorevitch (EOHS/IESP), Li Liu (Epidemiology and Biostatistics), Peter A. Scheff (EOHS), Salvatore Cali (Great Lakes Center for Environmental and Occupational Safety and Health), Rebecca N. Bushon (U.S. Geological Survey), King-Teh Lin (MycoMetrics, Inc.)

Background: Current tests for indicators of waterborne pathogens require 24 hours to produce results. Public health responses to the results of such tests, such as beach closures, are often inaccurate because of changes in water quality during the 24-hour delay. The quantitative polymerase chain reaction (qPCR) method may soon become part of water monitoring programs in order to produce same-day results. The primary objectives of this study are 1) to analyze 500 archived water samples for new indicators by qPCR 2) to compare four rapidly measured microbes as indicators of pathogen presence, 3) to identify thresholds for the rapid indicators that maximize the accurate prediction of pathogen presence, and 4) to implement a beach monitoring program using rapidly measuring indicators, and to compare beach management decisions that result for the use conventional and the rapidly measured pathogen indicators. This research addresses the link between indicators and hazards, and between indicators and public health action. We will compare the ability of rapidly and conventionally measured indicator bacteria to predict the presence of pathogens in recreational waters. We will describe the changes in public health actions that result from the new, rapid, pathogen indicators.

NSF-EPA Workshop on Life Cycle Aspects of Nanoproducts, Nanostructured Materials, and Nanomanufacturing: Problem Definitions, Data Gaps, and Research Needs

Sponsor: National Science Foundation/U.S. Environmental Protection Agency

Investigators: Thomas Theis (IESP/UIUC), Bhavik Bakshi (Ohio State University), Delcie Durham (University of South Florida), Vasilis Fthenakis (Columbia University), Timothy Gutowski (Massachusetts Institute of Technology), Thomas Seager (Arizona State University)

This proposal resulted in the convening of a workshop on life cycle research needs and opportunities of nanotechnological materials, manufacturing methods, and products. It has resulted in a focused research strategy for managing and improving the environmental profile of nanotechnologies.

FBI 2010: Regional Socioeconomic and Environmental Impacts of Alternative Biofuel Pathways

Sponsor: University of California

Investigators: John Braden (UIUC), Madhu Khanna (UIUC), Thomas Theis (IESP/UIUC)

The goal in this project is to identify the mix of pathways that best balances economic and environmental considerations. A model will be applied that separates the world into four regions, each different in terms of biofuels, feedstocks, water quality, policies, and costs. From this analysis, decisions on the most efficient mix of biofuels and feedstocks, with sensitivity to policy measures and technological change, can be made.

Partnership to Develop an Integrated, Advanced Travel Demand Model and Fine-Grained, Time-Sensitive Network

Sponsor: Transportation Research Board of the National Academies

Investigators: Jane Lin (Civil and Materials Engineering/IESP)

Dr. Lin is leading the effort in designing functional interfaces between the EPA's MOVES2010 (MOTor Vehicle Emission Simulator), travel activity models, and dynamic traffic assignment (DTA) models, which will allow both air quality modelers and transportation planners to better assess GHG and air quality implications of transportation policies and alternatives.

Environmental and Energy Benefits of Freight Delivery Consolidation in Urban Areas

Sponsor: National Center for Freight and Infrastructure Research and Education through US DOT

Investigators: Jane Lin (Civil and Materials Engineering/IESP), Kazuya Kawamura (Urban Planning)

This research investigates the business cost and environmental impacts of a promising truck demand management strategy that has been used in European and Asian countries, delivery consolidation. We will simulate freight delivery activities in an urban area based on the truck route network of Chicago. Simulation will be conducted for up to eight scenarios consisting of various combinations of: the size of delivery vehicles, penetration of biodiesel fuel, fleet turnover rate, fuel price and other government policies. This research will provide valuable insights toward the development of a comprehensive strategy for sustainable goods movement in urban areas.

Post-Implementation Evaluation of Emissions Benefits of CMAQ Projects

Sponsor Agency: Chicago Metropolitan Agency for Planning

Investigator: Jane Lin (Civil and Materials Engineering/IESP)

This study develops and implements a methodology to evaluate the actual impact on travel behavior and emissions of US DOT's Congestion Mitigation and Air Quality (CMAQ) projects in northeastern Illinois as implemented since early 1990s. Specifically, these projects are examined: bicycle and pedestrian path projects, traffic improvement projects, and intersection improvement projects.

Leaf Litter Food Webs Across Rainfall Gradients

Sponsor: Spanish Ministry of Science and Innovation

Investigators: David Wise (Biological Sciences/IESP), Anadón Alvarez, Amy Austin, Stefen Scheu

Unlike aquatic food webs, we currently lack accurate quantitative data describing complex terrestrial food webs (i.e. > 10 species). For instance, connectance –the number of links per species- and interaction strengths –the degree to which a population affects another- have not been convincingly solved for any terrestrial food web. Since these parameters are central to understand the robustness and the stability of these ecological networks, and since the above dynamic properties are very important for conservation biology, solving terrestrial food webs is an urgent and necessary task. Here, we propose to solve an important food web module within the beech forest leaf-litter food web: that of the meso- and macroarthropods.



NEW & CURRENT RESEARCH

Transportation Conformity Particulate Matter Hot-Spot Air Quality Modeling (2010-2011)

Sponsor: Illinois Center for Transportation, Illinois Department of Transportation

Investigator: Jane Lin (Civil and Materials Engineering/IESP)

This research project will (1) quantify motor vehicle-generated PM_{2.5} and PM₁₀ in Illinois' nonattainment and maintenance areas, (2) develop "Illinois" specific thresholds for these areas, and (3) secure USDOT and USEPA approval for IDOT to use these thresholds to determine if a project is a project of air quality concern.

Integrated Study of Natural Resources, Human Impact, and Environmental Policy: Making Complex Systems Accessible for Secondary Learners

Sponsor: National Science Foundation

Investigators: Leilah Lyons (Computer Science), Emily Minor (Biological Sciences/IESP), Moira Zellner (Urban Planning/IESP)

This proposal explores the potential of "Agent-Based Models" to assist learners to acquire environmental science concepts targeted in forthcoming Advanced Placement test standards. It will also help learners acquire a better understanding of complex systems and to shift their attitudes towards the use of scientific models. The investigators frame the research in a simulated scenario where "green" infrastructure is integrated into urban environments, and they propose

how to use a new user interface strategy ("Paper-to-Parameters") that promises unique approaches for understanding the spatial and scalar relationships between simulation elements.

Social Network Analysis of Environmental Groups in the Calumet Region

Sponsor: National Science Foundation

Investigators: Emily Minor (Biological Sciences/IESP)

The goal of this study is to understand the structure of the social network of those groups and individuals with an interest in the environment of the Calumet region. We plan to distribute online surveys to all registered Summit attendees to gather information about a variety of interactions (e.g., collaboration on projects, exchange of ideas or advice, personal friendships) between participating groups. Then we plan to use Pajek (a social network analysis/visualization software application) to provide a visual representation of the patterns of interactions of the Summit attendees and calculate characteristic measures of the network structure. This analysis will allow us to understand patterns in the flow of information and ideas among Summit attendees and identify potential communication gaps that could be strengthened to promote conservation goals in the Calumet region.

Collaborative Research: Effects of Fire and Subsequent Sediment Burial on Sulfur and Mercury in Organic Matter of Forest Soils

Sponsor: National Science Foundation

Investigators: Kathryn Nagy (Earth and Environmental Sciences/IESP)

In this project, research is outlined to examine the effect of fire on the ability of soil organic matter to strongly bind mercury and prevent methylation and bioaccumulation. The research is driven by three hypotheses addressing the transformations caused by fire in the oxidation state of sulfur in soil organic matter and the effect of these changes on mercury binding. The hypotheses are (1) that forest fire increases the oxidation state of sulfur in soil organic matter, (2) that forest fire decreases the strong mercury binding capacity of soil organic matter because of the increase in the oxidation state of the sulfur, and (3) that sediment burial restores, or increases, the strong mercury binding capacity of soil organic matter because of incorporation of hydrogen sulfide in the lake and reservoir sediments.

Exploratory Advanced Research Program

Sponsor: U.S. Department of Transportation

Investigators: Moira Zellner (Urban Planning/IESP), Jonathan Levine (University of Michigan)

Urban and transportation planners often find it difficult to predict the demand for proposed new initiatives on upgraded transportation services and infrastructure. Examples of such initiatives include new roads, expanded highway lanes, a rapid transit system, congestion pricing, etc. We advance herein an advanced modeling and analysis method that permits the assessment of transportation policy and project initiatives on meeting specific objectives.

Climate Literacy Zoo Education Network

Sponsor: Chicago Zoological Society/National Science Foundation

Investigators: Susan Goldman (Psychology/Learning Science Research Institute), Steven Forman (Earth and Environmental Sciences), Thomas Moher (Computer Science), Leilah Lyons (Computer Science), James Pellegrino (Psychology/LSRI), Thomas Theis (IESP), Michael Mann (Pennsylvania State University)

Goals are to 1) characterize the values, interests, and preconceptions of zoo visitors with regard to climate change; 2) distill partner experiences and strengths to select transformative approaches and effective, high quality educational programs that serve a wide diversity of audiences; 3) explore how audiences respond to innovative informal education methods (e.g. self-directed inquiries on live animals, mobile media, self-reinforcing electronic social networks), and how psychological factors influence individual engagement in climate change across the continua of experts and novices, advocates and deniers; and 4) develop a strategic plan and research strategy for future integration of zoo experiences, informal education programs, mobile electronic devices, and social networks with contemporary learning science methods.