Agenda

9:00 am Light breakfast 524 SPHW
9:15 Greetings, introductions (Theis)
9:30 State of the Institute (Theis/Jameson)
    Updates, new programs and activities
    Discussion
10:30 Break
10:45 UIC's Climate Action Plan (Klein-Banai)
11:30 Research profile: Professor David Wise, Biological Sciences, Ultra-Ex program
1:00 Future plans and activities (Theis/Wise)
    Discussion
2:00 Summary and wrap up
2:15 Adjourn
New External Advisory Board Members

Deborah L. Swackhamer, Professor of Environmental Health Sciences, Co-Director Water Resources Center, School of Public Health, University of Minnesota

Timothy T. Loftus, Ph.D., Project Director NE Illinois Water Supply Planning, Chicago Metropolitan Agency for Planning
IESP
Mission Statement

The mission of IESP is to advance interdisciplinary research and scholarship within the environmental health sciences and engineering, economics, social thought, and policy among UIC’s faculty and students, transmit workable solutions for environmental problem to the public sectors, and to prepare the next generation of environmental decision-makers. IESP’s core theme is to advance the understanding of how urbanization affects environmental and human health.
IESP Mission

This mission is built upon a four-tiered foundation:

• Advance knowledge on environmental science and policy through scholarly research
• Facilitate interdisciplinary collaboration among scholars to develop new paradigms of inquiry that address and define local, regional, and global research priorities
• Gather together multidisciplinary teams of scholars and counterparts in the public and private sectors to devise sustainable solutions for society’s complex environmental challenges
• Prepare the next generation of environmental decision makers through cross-disciplinary education, such that future leaders gain an understanding of the interrelated roles of science, technology, economics, and policy as they apply to environmental sustainability
Interdisciplinary Research...

“...a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice”

NAE/NAS/IOM, 2005
IESP
Key Activities

• Joint faculty appointments and faculty clusters in support of interdisciplinary research
• Ph.D. fellowships
• Seminars
• Conferences and meetings
• Campus activities
IESP Crosscutting Themes

- Human-Natural Interactions
  - Ecological restoration
  - Systems ecology
  - Landscape ecology
  - Environmental chemistry
- Urban Sustainability
  - Urban ecology
  - Transportation systems
  - Urban planning
- Environmental manufacturing
  - Life cycle assessment
  - Industrial ecology
  - Design for the environment
  - Material flow analysis
  - Occupational health and safety
  - Environmental technology
- Environmental Policy Analysis
  - Market-based tools for pollution control
  - Computational modeling
  - Risk assessment
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<thead>
<tr>
<th>Name</th>
<th>Depart/Col</th>
<th>Expertise</th>
<th>Rank</th>
<th>Percent</th>
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<tr>
<td>K. Nagy</td>
<td>Ea &amp; Env Sci</td>
<td>Env.Geochem</td>
<td>Professor</td>
<td>40</td>
<td>2002</td>
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<td>U. Diwekar (left UIC 04)</td>
<td>Ch.E./COE</td>
<td>Systems Optimization</td>
<td>Professor</td>
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<td>N. Esmen</td>
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<td>Risk Assess/ Env.Decision</td>
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<td>Jae Lin</td>
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<td>Trans Sys/ Air Quality</td>
<td>Asst Prof</td>
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<td>M. Zellner</td>
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<td>E. Minor</td>
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<td>2008</td>
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Distribution of Environmental and Policy Faculty by Department
IESP Research Expenditures FY09 ($1.25M)

- Apportioned IESP Research Expenditures ($445K)
- Associated Departmental Research Expenditures ($799K)
IESP Research Expenditures

Fiscal Year

FY02  FY03  FY04  FY05  FY06  FY07  FY08  FY09 (est)
Programs and Activities 2008-2009

• Appointment of new Associate Director, Professor David Wise of Biological Sciences

• Appointment of Assistant Director for Business Affairs, Maggie Jameson

• Awarded IESP doctoral fellowship to Michael Iversen (Urban Planning) “Information Flows in urbanized Ecosystems”

• Funded a new faculty cluster in support of the development of a planning grant from ULTRA (urban long term research area), a new joint program of NSF and the US Forest Service—awarded planning grant from NSF/USFS

• Grant Award: USEPA “Sustainable Development of Brownfields”

Programs and Activities 2008-2009

• Co-sponsorship of the Chicago Wilderness Congress (11/08)

• Co-sponsorship of DECON '09 conference, the annual meeting of the Building Materials Reuse Association (4/09)

• Town Hall Meetings on Sustainability Research and Pedagogy (9/08 and 11/08)

• Seminar: “Natural Land Management: A Property Management Strategy to Enhance Ecological Value” Gregory R. Biddinger, Ph.D., ExxonMobil Biomedical Sciences (4/09)


• Survey of courses and research on sustainability at UIC—results pending
# Summary of UIC's Greenhouse Gas Emissions FY04 through FY08

<table>
<thead>
<tr>
<th>Scope</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
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<tr>
<td><strong>Scope 1</strong></td>
<td></td>
<td></td>
<td></td>
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<td>Co-gen Electricity</td>
<td>129,031</td>
<td>113,805</td>
<td>81,847</td>
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<td>Co-gen Steam</td>
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<td>Other On-Campus Stationary</td>
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<td>3,740</td>
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<td>Purchased Electricity</td>
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<td>12,895</td>
<td>13,443</td>
<td>23,719</td>
<td>48,139</td>
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<td><strong>Scope 3</strong></td>
<td></td>
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<tr>
<td>Faculty / Staff Commuting</td>
<td>19,454</td>
<td>18,904</td>
<td>19,119</td>
<td>20,684</td>
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<td>Student Commuting</td>
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<td>18,704</td>
<td>19,090</td>
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<td>Solid Waste</td>
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<td>1,717</td>
<td>1,711</td>
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<td>1,275</td>
<td>1,330</td>
<td>2,346</td>
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<td><strong>Totals</strong></td>
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<td>Scope 1</td>
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<td>Scope 2</td>
<td>18,496</td>
<td>12,895</td>
<td>13,443</td>
<td>23,719</td>
<td>48,139</td>
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<tr>
<td>Scope 3</td>
<td>45,692</td>
<td>41,999</td>
<td>40,863</td>
<td>43,955</td>
<td>49,760</td>
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<td>All Scopes</td>
<td>272,758</td>
<td>245,892</td>
<td>215,901</td>
<td>245,081</td>
<td>275,443</td>
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</table>
UIC GHG Emissions by Scope and % Non-Nuclear Purchased Electricity Mix
Sources of UIC’s GHG Emissions

- Buildings and Other Energy Uses: 83%
- Commuting: 16%
- Solid Waste: 1%
UIC Commitments

• American College and Presidents’ Climate Commitment
• Illinois Sustainable University Compact
• Chancellor’s Committee on Sustainability and Energy
• Talloires Declaration
UIC Climate Action Plan

- Energy Efficiency & Conservation
- Clean & Renewable Energy Sources
- Improved Transportation Options
- Improved Grounds Operations
- Recycling & Reduced Waste Streams
- Employment Strategies
- Education, Research & Public Engagement
UIC’s Projected GHG Emissions Reductions

UIC Office of Sustainability
UIC – “UNPLUG!”

- Personal commitment pledge
- Monthly messages
- 2% per year
- Slay the Vampire
Reduce, Reuse, Recycle

- Recycling expansion/grant
- ALL Buildings – Paper and Cardboard
- Most Buildings – Paper, Cardboard, Bottles and Cans
- Electronics recycling event
- Cell phones and batteries
Transportation

- Walk, Pedal, Ride!
- Active Transportation Program
- U-Pass
Research

- Biodiesel Laboratory
IESP Mission

• Advance knowledge on environmental science and policy through scholarly research

• Facilitate interdisciplinary collaboration among scholars to develop new paradigms of inquiry that address and define local, regional, and global research priorities

• Gather together multidisciplinary teams of scholars and counterparts in the public and private sectors to devise sustainable solutions for society’s complex environmental challenges

• Prepare the next generation of environmental decision makers through cross-disciplinary education, such that future leaders gain an understanding of the interrelated roles of science, technology, economics, and policy as they apply to environmental sustainability
Seed Grant from IESP to develop an ULTRA-Ex Proposal
(Minor, Wise, Zellner)

- *Urban Socio-Ecological Atlas* with Stockholm Resilience Centre
  - Emily Minor (Chicago Wilderness Science Team)

- PLANNING WORKSHOP
  - Organized by Emily Minor & Lynne Westphal (USFS)
  - Participants from UIC, USFS, DePaul, Purdue, Loyola, Chicago Dept. Environment, Field Museum (Chicago Wilderness Science Team)
ULTRA-Ex

- **Urban Long-Term Research Areas**
- **Exploratory projects**
- Funds from NSF and US Forest Service
- NSF: 50/50 split between Directorates of Biological Sciences; and Social, Behavioral and Economic Sciences
- Seed Grant: $300,000 for 2 years
- Chicago ULTRA-Ex: Projected start Dec ‘09
Full ULTRA

- Anticipate RFP within a year
- 2-4 projects to be funded for 6 yrs, ~900K/yr
- Renewable
- Outgrowth of NSF Long Term Ecological Research (LTER) Program
- ULTRA: Dynamics of socio-ecological systems in complex urban landscapes
“ULTRA-Ex teams . . . should involve researchers from the social and behavioral sciences, ecological sciences, and technical sciences . . . . . . should include considerable local participation, including city or metropolitan planning offices and organizations related to management of natural resources.”
CHICAGO WILDERNESS Science Team

Co-Chairs:
Liam Heneghan (DePaul)
Lynne Westphal (USFS)
David Wise (UIC)

IESP
Emily Minor
David Wise
Moira Zellner
• Alliance formed in 1990’s to “coordinate regional efforts to protect and restore threatened native landscapes in the Chicago metropolitan region”

• The name “Chicago Wilderness” refers to:
  -- The **alliance** of ~ 250 organizations
  -- The **land**: 360,000 acres that are conserved and managed for biodiversity
Chicago Wilderness Initiatives
CW Science Team

- Provide sound scientific advice to policy makers
- Establish a CW Research Agenda
- Foster region-wide communication and cooperation within the scientific community
Chicago ULTRA-Ex

“Connecting the social and ecological sciences with planners, managers, and the public: Building a broad foundation for the Chicago Region ULTRA"
ULTRA-Ex Research Team

- **Chicago Dept. of the Environment**: Aaron Durnbaugh
- **DePaul University**: Liam Heneghan
- **Field Museum**: Jennifer Hirsch
- **Lincoln Park Zoo**: Eric Lonsdorf
- **Loyola University**: Nancy Tuchman
- **Purdue University**: Bryan Pijanowksi
- **UIC**: Emily Minor, David Wise, Moira Zellner
- **US Forest Service**: Paul Gobster, Susan Stewart, Lynne Westphal
Central Question:

In a complex urban/metropolitan socio-ecological system, what are the synergies and tradeoffs between conserving biodiversity and providing ecosystem services to people?
Green Infrastructure Vision

1) Develop a **tangible vision** reflecting goals and recommendations of the CW Biodiversity Recovery Plan

2) Develop a **map** identifying on-the-ground, regional scale opportunities for biodiversity protection
3) Identify specific protection techniques for identified “recommended resource protection areas.”

- acquisition
- conservation easements
- restoration
- greenway connection
- conservation development
Green infrastructure is defined as the interconnected network of land and water that supports biodiversity and provides habitat for diverse communities of native flora and fauna at the regional scale. It includes large complexes of remnant woodlands, savannas, prairies, wetlands, lakes, stream corridors and the related natural communities that have been identified in the Biodiversity Recovery Plan. Green infrastructure may also include areas adjacent to and connecting these remnant natural communities that provide both buffers and opportunities for ecosystem restoration.

Chicago Wilderness member organizations are undertaking an effort to identify and prioritize sites for biodiversity protection and recovery along the Lake Michigan nearshore. This work will be proposed as an addendum to the Biodiversity Recovery Plan and is scheduled to be considered for adoption in 2004. Results should be integrated with future versions of the Green Infrastructure Vision.

The City of Chicago and invited Chicago Wilderness member organizations undertook an effort to identify sites for biodiversity protection and recovery in the City. This work was completed in 2004. Appropriate regionally-significant biodiversity conservation sites identified by the City have been integrated into the Green Infrastructure Vision.

**DATA SOURCES:**
- Existing Public Open Space in Illinois: Cook County Forest Preserves from Forest Preserve District of Cook County's Forest Preserve District Boundaries, April 2001; DuPage County Forest Preserves from Forest Preserve District of DuPage County's 2003 Forest Preserve District Boundaries, February 2003; Lake County Forest Preserves from Lake County Forest Preserve District, 2003; McHenry County Forest Preserves from McHenry County Conservation District, digitized by NIPC staff from McHenry County Highway Map, September 2002; Kane County Forest Preserves from Kane County Forest Preserve District Boundaries, May 2002; Will County Forest Preserves from Forest Preserve District of Will County's 2003 PINS_20031120, November 2003; Midewin National Tallgrass Prairie from Midewin Prairie Explorer 1999 CD-ROM with additional edits reflecting changes between CD release date and April 2001; Illinois State Parks and Illinois State Conservation Areas from Illinois Department of Natural Resources, Illinois Geographic Information System CD-ROM, Volume II, May 1996
- Existing Public Open Space in Indiana: Nature Preserves from Indiana Department of Natural Resources' Nature Preserves digitized from 1:24,000 quad maps; Managed Areas from Indiana Department of Natural Resources' Draft GAP Analysis and from U.S. Environmental Protection Agency, Region 5, Great Lakes Commission's 1998-2001 Northern Indiana Inland Sensitivity Atlas, Managed Areas Coverage, Northern Indiana Mapping Area, Final, Version 1, August 2001
- Existing Public Open Space in Wisconsin: Conservation Easements from U.S. Fish and Wildlife Service's 1995 Wetland Management District Conservation Easements - Region 3 Map, April 2001; Kettle Moraine State Forest - Southern Unit from Wisconsin Department of Natural Resources; Managed Areas from U.S. Environmental Protection Agency, Region 5's 2001-2002 Rock River Managed Areas, Inland Sensitivity Atlas, Version 1, September 2002; Public Lands for Walworth County from Southeastern Wisconsin Regional Planning Commission's 1990 Public Lands, Walworth County
- Streams and Rivers: U.S. Geological Survey's National Hydrography Dataset
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<table>
<thead>
<tr>
<th>Recommended Resource Protection Areas</th>
<th>Streams and Rivers</th>
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</thead>
<tbody>
<tr>
<td>Existing Public Open Space</td>
<td>Lake Michigan</td>
</tr>
<tr>
<td>County Boundaries</td>
<td>Open Water</td>
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<tr>
<td>State Boundaries</td>
<td></td>
</tr>
</tbody>
</table>
GIV

• Over 140 recommended resource protection areas totaling > 1.8 million acres

• Compares to:
  – 360,000+ acres of protected public natural open space in Chicago Wilderness
  – over 6 million total acres within the entire region of Chicago Wilderness

• GIV already utilized in regional planning efforts
ULTRA-Ex

OBJECTIVE 1

• Critically investigate connections between the biodiversity-recovery goals of the Green Infrastructure Vision and the delivery of ecosystem services to human communities throughout the Chicago region

• Carbon sequestration/storage
• Water quality
• Stewardship scenarios
ULTRA-Ex

OBJECTIVE 2

• Develop a multi-faceted, interactive, web-based Chicago ULTRA-Hub
  – Interactive web-based platform
  – Managing data from ULTRA research
  – Communicating findings of ULTRA and other research to planners and the public
  – Facilitate collaborations and interactions between scientists and practitioners
  – Umbrella and focal point for urban ecosystem research and policy
  – Partner with regional education and outreach programs.
ULTRA-Ex

OBJECTIVE 3

• Develop the integrated theoretical and empirical framework for the full ULTRA proposal

  – Metropolitan-wide graduate course to be organized by faculty in the NSF IGERT LEAP training program at UIC and faculty from other area universities

  – Quarterly meetings of working groups (researchers, practitioners and the public) from wide spectrum of institutions and organizations throughout the region
Two Postdoctoral Researchers

• **Biodiversity and ecosystem services** (Obj. 1)
• **Ecological Informatics** (Obj. 2)
• Both will devote energies to Obj. 3.
• Will work closely with two other postdocs to be hired under a related NSF research grant (CNH)
“Coupled Natural Human Systems in the Chicago Wilderness: Evaluating the Biodiversity and Social Outcomes of Different Models of Restoration Planning”

- **Partners:**
  - DePaul Univ.
  - Univ. of Illinois at Chicago
  - Field Museum
  - US Forest Service
  - Univ. of Illinois at Urbana-Champaign

- **NSF support:** 1.5 million, 2009-2013
Buckthorn Controversy

--- European Buckthorn  (*Rhamnus cathartica*)
**Objective 1:**

To generate Agent-Based Models based upon the behaviors of constituency groups in order to explore how their interactions may lead to different biodiversity outcomes
Objective 2:

To investigate the human components of the woodland management action arena, including both the participants and the planning process itself.
Objective 3:

To document the range of biodiversity outcomes in woodlands and savannas undergoing restoration in Chicago Wilderness
Objective 4:

To test hypotheses about the relationship between distinct models of the restoration planning process and biodiversity outcomes
Restoration-Management Models

- **Traditional**: Developed for projects of large area with no formal input from the scientific community or the community at large.

- **Co-Management**: Developed with input from managers, scientists, volunteers, and others.

- **Grass Roots**: Volunteer stewards and workers use past experience; small land parcels; minimal input of managers and scientists.
Hypotheses

- **Traditional** → Short-term gains in plant diversity, particularly the rarer, legally recognized threatened species

- **Co-Management** → Gains in broader metrics of biodiversity (related to ecosystem functioning)

- **Grass Roots** → Focus on removal of invasives and establishment of high-quality flora; less resistant to re-invasion by undesirable spp.; less resilient restoration
Objective 5:

To investigate the potential impact of differences in biodiversity outcomes on the broader human communities; in particular, altered support for, and involvement in, restoration and conservation of biodiversity by constituents not directly involved with restoration.
POSTDOCTORAL TEAM

(1) Research Social Scientist (CNH)
(2) Plant Ecology / Soil Ecology (CNH)
(3) Biodiversity and Ecosystem Services (ULTRA-Ex)
(4) Ecological Informatics (ULTRA-Ex)

--- Offices and labs with researchers and planners throughout CW region

--- Share an office suite on UIC East Campus (Science and Engineering South)
“Town Hall” meetings

• Purpose: to survey opportunities for developing and strengthening interdisciplinary environmental research, scholarship, and outreach at UIC.

• Goal: to explore opportunities for interdisciplinary research and scholarship, particularly in the context of the sustainability paradigm.

• Three “Town Halls”
  4-22-08 Interdisciplinary Environmental Scholarship at UIC
  9-25-08 Enhancing Environmental Scholarship at UIC
  11-6-08 Sustainability Scholarship at UIC
Interdisciplinary Research and Scholarship (IDRS)

“...a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice”

NAE/NAS/IOM, 2005
Outputs from Town Halls

• Need for “sustainability studies” courses/major?
• Very difficult to raise $ for IDRS unless its has a broad following in society. Better opportunities with “policy”-type initiatives (e.g. foundations).
• UIC has many “pillars of excellence” that could participate in IDRS, but there is insularity—”silo effect”
• Great basis for IDRS that focuses on problems of the urban environment (which UIC does, but mostly in isolation)
• Important role for centers in IDRS in general, but little experience at UIC.
• General agreement on the need for IDRS, but lack of understanding of other disciplines leads to an undercurrent of “disciplinary mistrust”
Town Halls: Barriers to IDRS

- Interdisciplinary research and scholarship is difficult; many barriers exist
  - Time, lack of an “entrepreneurial” culture
  - Disciplinary methods, practices, and languages
  - Lack of incentives, presence of disincentives (e.g. fewer $/faculty in a typical ID research proposal; credit for teaching team-based courses is difficult)
  - University/college organization (e.g. no “Interdisciplinary Dean”)
  - Budgetary practices (Deans control virtually all funds; no identifiable pool of resources to foster IDRS)
  - Mentoring of junior faculty on IDRS is virtually non-existent
  - Joint hires may be at a disadvantage (evaluation, direction, promotion)
  - Inadequate IDERS training for graduate students (IGERTS excepted)
Town Halls: What might be done?

- Greater support for graduate students to engage in IDRS including open encouragement to explore other disciplines that have relevancy for their research areas (catalytic effect?)
- Seed money for IDRS (e.g. IESP, Chancellor’s Fund)
- Promotion of networks among faculty and external partners
- More flexible budgetary policies
- Different reward system for faculty engaged in IDRS (including new IDRS-based courses)
- Role for professional societies
- *Role for external advisory boards*
- Need for funding agencies to provide more $$ for IDRS