

Cornell Urban Sustainability Initiative (CUSI)

PI

Marianne Krasny, Professor and Chair, Natural Resources

Co-PIs

Nina Bassuk, Professor, Horticulture

Shorna Broussard, Associate Professor, Natural Resources

Janis Dickinson, Associate Professor, Natural Resources, Cornell Laboratory of Ornithology

Gretchen Ferenz, Sr. Extension Associate, Cornell University Cooperative Extension-NYC

John Nettleton, Sr. Lecturer, City & Regional Planning

Stephan Schmidt, Assistant Professor, City & Regional Planning

Richard Stedman, Assistant Professor, Natural Resources

Keith Tidball, Extension Associate, Natural Resources¹

David Weinstein, Sr. Research Associate, Natural Resources

Nancy Wells, Associate Professor, Design & Environmental Analysis

Thomas Whitlow, Associate Professor, Horticulture

Ke “Max” Zhang, Assistant Professor, Mechanical & Aerospace Engineering

Collaborators

Christine Alfsen, Senior Programme Specialist for Sciences, UNESCO NYC Office

Lindsay Campbell, Research Community Planner, NYC Urban Field Station, US Forest Service

Cristiana Fragola, Director, MillionTreesNYC, PlaNYC

Susan Goberman, Executive Director, Trees New York

Jacqueline Lu, Forestry Analyst, City of New York Parks & Recreation, and
Co-Chair, MillionTreesNYC Research & Evaluation Advisory Board Subcommittee

Mel Pfeffers, Air Quality Project Manager, Environmental Defense Fund

Megan Shane, MillionTrees Director for New York Restoration Project, and
Co-Chair, MillionTreesNYC Research & Evaluation Advisory Board Subcommittee

Erika Svendsen, Research Social Scientist, NYC Urban Field Station, US Forest Service

¹ Approved Form 5 for Tidball to serve as co-PI sent to CCSF by hard copy.

Summary

Introduction. Given that over 50% of the global population lives in cities, addressing urban issues is critical to Cornell's ability to foster regional, national, and global sustainability. New York State, with an urban population of 80%, exemplifies the common paradox wherein cities have extreme environmental footprints extending well beyond their boundaries, yet often are leaders in putting forth large-scale sustainability initiatives. We propose to fill a critical need to evaluate the outcomes of urban sustainability efforts by taking advantage of a natural experiment associated with Mayor Bloomberg's MillionTreesNYC initiative (MTNYC¹). In particular, the goal of this seed project is to develop an initial understanding of ecological and social dimensions affecting outcomes of urban large-scale tree planting efforts; this initial work will lead to broader Cornell partnerships and research programs focused on urban sustainability. In conducting this project, we build on Cornell's considerable strengths in urban research, including the nationally recognized Urban Horticulture Institute in CALS, City & Regional Planning and Cornell Cooperative Extension's long-standing NYC programs, and ongoing projects focusing on air quality, environmental sociology, and environmental psychology, among others.

The Cornell Urban Sustainability Initiative (CUSI) brings together 13 Cornell social, biological, and physical scientists from five departments and four colleges, to partner with three government agencies and four non-profits/NGOs. Our *vision* for CUSI is to create a coupled-systems methodology for understanding the interaction of social with environmental factors in determining the outcomes of urban tree planting, a common sustainability effort worldwide. CUSI is *novel* in the following ways: (1) Whereas research on sustainability initiatives typically involves a single set of outcomes, such as CO₂ sequestration, outcomes are diverse and interact in complex ways. The proposed coupled-systems approach will uncover and integrate into a preliminary conceptual model the effects of human engagement strategies on tree survival and growth, as well as the impacts of trees planted in cities on neighborhood-level variables and on human health and behavior. (2) Whereas much research on urban systems uses a case study approach and lacks controls, through collaboration with a MTNYC project that uses several different approaches to tree planting while controlling for demographic and other factors, CUSI will employ a quasi-experimental research design, allowing us to propose causal relationships. CUSI *objectives* are two-fold: (1) Conduct a controlled "natural" experiment in NYC to determine the impacts of tree planting methods on tree survival and growth, carbon sequestration, air quality, sense of place, social capital, human behavior, and human health. (2) Together with our NYC and international partners, develop plans for longer-term research collaborations focusing on urban sustainability.

Methods. Objective 1. Natural Experiment. We plan to conduct research in neighborhoods that have been identified as having low street tree density and high asthma rates by the Trees for Public Health project (TPH). Starting in fall 2008, TPH will conduct tree planting on 15 of 179 sites in TPH neighborhoods; a subset of these sites also will receive public education and community outreach "treatments." Additional sites will be added in spring 2009 and successive planting seasons. Outcome measures will be taken in equal numbers of sites with: (1) no recent tree planting; (2) tree planting and no education/community outreach; (3) tree planting with education/community outreach. In addition to sites being similar in tree cover and asthma rates, to the extent possible we will select sites that are controlled for income, ethnic diversity, housing

¹ <http://www.nyc.gov/html/planyc2030/html/home/home.shtml>. MillionTreesNYC is one component of Mayor Bloomberg's 2007 PlaNYC, "a comprehensive sustainability plan for the City's future," and focuses on tree planting as a means to enhance water and air quality, mitigate climate change, and increase open space.

density, tree species planted, available soil volume, soil water holding capacity, soil drainage, and other factors that impact tree planting outcomes. Where appropriate, measures will be collected prior to and following the scheduled tree planting, allowing for both pre-/post- and control group comparisons. We will integrate results into a conceptual model explaining the success of tree planting methods. Individual data collection measures are described below.

Tree survival and growth (Bassuk). Trees routinely have up to 90% of their roots removed in the process of being dug from the nursery, and subsequently go into “transplant shock,” a multi-year period of slow growth and reduced vigor as a result of physiological stress. Newly planted trees also are particularly susceptible to water deficits. To determine tree recovery during transplant shock, we will measure the following indicators of tree health and vigor on newly transplanted trees: trunk caliper, shoot extension, leaf area, chlorophyll content, and stomatal conductance. Carbon sequestration (Weinstein). Carbon sequestration associated with tree plantings and subsequent growth will be calculated using the tables in “Method for Calculating Carbon Sequestration by Trees in Urban and Suburban Settings” (USDOE). Air quality (Whitlow, Zhang). We will conduct brief air monitoring campaigns to assess local concentrations of ultrafine, fine, and coarse particulate matter as an indicator of air quality and its potential effect on respiratory health. These observations will be used to parameterize a small-scale dispersion model that elucidates the effects of local and regional sources. As an indicator of asthma risk, particulates collected with cascade impactors will be evaluated for their ability to induce proinflammatory cytokines in alveolar macrophage cultures. Sense of place (Stedman, Schmidt). We will use quantitative instruments developed by Stedman to assess the effect of tree plantings on residents’ sense of place for their neighborhood. Sense of place is comprised of cognitive meanings ascribed to settings, and a series of evaluative domains including place identity, dependence, attachment, and satisfaction. Social capital (Stedman, Broussard, Dickinson, Tidball). We will assess the impact of neighborhood tree plantings on local social capital, defined as networks of trust and reciprocity, using indicators emerging from Putnam’s research and Roper Poll data, including frequency of informal social interaction, levels of mutual trust, and participation in volunteer groups, among others. Stewardship behaviors (Broussard, Dickinson, Ferenz, Krasny, Stedman, Tidball). We will use observations, surveys, and interviews to determine what types of stewardship behaviors result from the tree planting and educational efforts, including participation in tree care and other neighborhood greening efforts (e.g., recording birds on trees, planting flowers around trees). Behavior change, behavior adoption, and motivation theories will frame and inform this component of the research, which will yield correlates and predictors of urban forest stewardship behaviors. Cognitive, psychological, and physical health of children (Wells). We will measure children’s cognitive functioning (measures include the symbol digit modalities test, digit span backwards, alphabet backwards, and the necker cube pattern control); psychological well-being (Rutter Child Behavior Questionnaire); and physical health (physical activity, among others).

We will analyze impacts of individual variables (e.g., how education influences tree survival), as well as integrate the social and ecological variables to develop coupled social-ecological systems conceptual models explaining the relationships among inputs and outcomes of urban tree planting; these results will be shared with urban partners and will lead to testable hypotheses for future proposals.

Objective 2. Long-term Research Collaborations . The Cornell faculty on this project will join with ongoing efforts to plan urban forestry and sustainability research projects in NYC and globally. Broussard, Tidball, and Krasny will serve on the MTNYC Advisory Committee

Subcommittee on Research and Evaluation, whose charge is to develop and seek funding for the MTNYC research agenda. Further, all the Cornell PIs will participate in the 2009 MTNYC Research Symposium, through which we will become further acquainted with sustainability research in NYC. Following this Symposium, we will visit research and tree planting sites, including the TPH neighborhoods, thus allowing us to identify research sampling sites for objective 1 and to gain a broader perspective on MTNYC and urban sustainability research needs. Following the summer research season, the project PIs and partners will again meet in NYC, to share results, develop collaborative proposals for specific funders, and finalize plans for ongoing research collaborations. During these NYC visits, we also will meet with our Stockholm Resilience Center/UNESCO collaborator to plan research for their urban sustainability network NYC site. One outcome of these efforts will be the formation of an ongoing Cornell Urban Sustainability Work Group, with collaborations in NYC and internationally.

Risks. Whereas coupled systems research often faces risks related to controlling for multiple variables in natural systems, the MTNYC project offers an opportunity to use an ongoing natural experiment with multiple treatments already planned and with previously collected data that can be included in analyses (*e.g.*, initial street tree density). Further, we will have multiple research sites to choose from, allowing us to select sample sizes based on statistical rather than on logistical considerations. A second risk relates to defining at times vague concepts of sustainability. Whereas we will explore various definitions of sustainability, we have preliminarily identified Hollis' adaptive cycle and social-ecological systems resilience as a sustainability framework that incorporates system change and disturbance, integrates ecological and social factors, and is supported by an extensive literature and international research network (including the Stockholm Resilience Center partner on this project). To address risks associated with managing and integrating research findings from a large, multi-disciplinary team of scientists and practitioners, we will draw on the experience of Whitlow and others who already work on similar projects (*i.e.*, the NSF Baltimore Long-term Ecological Research Site), and will consult with additional colleagues engaged in NSF-funded coupled-systems projects. CUSI PI Krasny has experience leading multi-disciplinary researcher-practitioner teams through her work as chair of Natural Resources and as PI on national, NSF education/applied research projects. We are aware that we have not identified all potential partners or outcomes of urban tree planting; we will seek to expand collaborations where appropriate (*e.g.*, with epidemiologists working on asthma research, with Weill Medical Center).

Impact that Advances Sustainability. (1) CUSI research will make a critical contribution to urban tree planting programs, which increasingly are at the center of sustainability initiatives in cities across the US (*e.g.*, Denver, Philadelphia, Chicago), but often lack sufficient resources to evaluate multiple impacts of their efforts. Whereas Cornell's non-urban location could be considered a negative, the fact that we are not located in any one urban area, coupled with Cornell's broad experience working in upstate NY cities, significant and growing presence in NYC, and commitment to a land grant mission, will facilitate our ability to apply our findings in multiple cities across NYS. Collaboration with UNESCO will enable us to build networks and further expand our impact internationally. (2) Because more sustainable cities reduce the magnitude of the urban footprint (*e.g.*, by reducing urban abandonment and sprawl), application of the results of this research also will foster sustainability along the broader urban-rural continuum. (3) Through forming an ongoing Cornell Urban Sustainability Work Group, CUSI will expand Cornell's capacity to address and to obtain funding for research on critical sustainability issues in cities over the long-term.

Partnerships

Partners. Dr. Marianne Krasny, chair of the Department of Natural Resources and professor of environmental education, will serve as project PI and the following Cornell faculty and academic staff will serve as co-PIs: Nina Bassuk (urban tree planting, Horticulture), Shorna Broussard (human dimensions, Natural Resources), Janis Dickinson (animal behavior and citizen science, Natural Resources, Cornell Laboratory of Ornithology), Gretchen Ferenz (urban environmental programs, Cornell University Cooperative Extension-NYC), John Nettleton (NYC programs, City & Regional Planning), Stephan Schmidt (open space, City & Regional Planning), Richard Stedman (environmental sociology, Natural Resources), Keith Tidball (urban community forestry, Natural Resources), David Weinstein (carbon modeling, Natural Resources), Nancy Wells (health effects of nature, Design & Environmental Analysis), Thomas Whitlow (tree physiologist, Horticulture), and Max Zhang (air quality, Mechanical and Aeronautical Engineering). In concert with City & Regional Planning, both summer (Cornell Urban Scholars Program) and fall (Art, Architecture & Planning Fall Semester) internships will be made available to graduate and undergraduate students during 2009. CUSI faculty and students will work with the project's NYC partners, including: Christine Alfsen (Stockholm Resilience Center/UNESCO Urban Social-Ecological Systems and Globalisation Theme), Lindsay Campbell (US Forest Service), Cristiana Fragola (MTNYC, PlaNYC), Susan Goberman (Trees New York), Jacqueline Lu (NYC Parks & Recreation Department), Megan Shane (NY Restoration Project), Mel Pfeffers (Environmental Defense Fund), and Erika Svendsen (US Forest Service). Whereas 11 of the 13 Cornell PIs have conducted applied research in NYC, we have not worked together previously as a group. Further, whereas we have worked individually with NYC partners, the proposed project represents a new external partnership with MTNYC and the Stockholm Resilience Center/UNESCO.

Building Partnerships, Roles, and Commitments. We have incorporated a number of activities to build new partnerships as follows. First, Bassuk, Broussard, and Krasny will serve on the MTNYC Advisory Committee Research and Evaluation Subcommittee, through which they will contribute to setting a broader research agenda and will forge partnerships with forestry researchers in NYC. One of the activities of this Subcommittee will be planning and conducting the 2009 MTNYC Research Symposium; all Cornell and NYC partners will participate in this Symposium, which will provide additional opportunities to design research and strengthen partnerships. By partnering with environmental non-profits and with Mayor Bloomberg's PlaNYC, and working through Cornell professor Arthur DeGaetano who is a member of the NYC Climate Change Adaptation Task Force, we will be able to extend the impacts of this seed and subsequent projects among the NYC sustainability research, practitioner, and policy communities. By partnering with the Stockholm Resilience Center/UNESCO, we also will be able to share the impacts of this project through their global network of 11 city sustainability research teams. Project partner Alfsen has committed to funding one Cornell PI or co-PI to attend the Resilience Center's urban theme meetings in Bangalore in December 2009, where participants will draft a book on urban sustainability research.

In addition to their roles in planning research and building partnerships described above, the PI and each of the Cornell faculty co-PIs are leaders or participants on the seven mini-research projects that will be conducted as part of objective 1. The MTNYC, Trees New York, and Environmental Defense Fund partners will provide advice regarding specifics of the research activities and sites.

Follow-on Funding Plan

Plans for additional funding once the project is launched include:

Grant Writing. We have identified foundations that fund at the \$100,000 - \$2,000,000 level as targets for proposal writing during fall 2009: National Urban and Community Forestry Advisory Council, NSF's Dynamics of Coupled Natural and Human Systems, and Rockefeller (which has foci on urbanization and on resilience to environmental degradation and climate change, and supports the NYC Climate Change Adaptation Task Force).

Partnerships. Through partnering with the Stockholm Resilience Center/UNESCO Urban Social-Ecological Systems and Globalization Theme project, we will have access to a global network of urban researchers, headquartered at Stockholm University. Currently, 11 cities are part of the urban research theme, the majority of which have received research funding. The NYC site is currently looking for a lead university research partner; should the CUSI project be funded, Cornell will become the lead organization, opening up possibilities for applying for additional funding in collaboration with Stockholm Resilience Center colleagues (*e.g.*, collaborating with the Stockholm urban theme site to seek European Union funds).

University Development. PI M Krasny has met with Mike Riley (Director, CALS Alumni Affairs and Development) and David Dieterich to discuss fundraising options for work in NYC. Suggestions that emerged from this discussion and that we will follow up on include: work with CALS Director of Business Partnerships & Corporate Relations Jennifer Drumluk to identify businesses that will support graduate fellowships (we will target businesses whose office complexes have received trees from MTNYC, and real estate developers who are aware of the value of urban green space); and sponsor an event to share research results with potential private donors and public funders.

Milestones

<i>Date</i>	<i>Activity</i>	<i>Outcome</i>
<u>2008</u>		
Nov – Dec	Cornell faculty participate in meetings of MTNYC Advisory Committee Research and Evaluation Subcommittee	Cornell input into collaborative research agenda for MTNYC.
<u>2009</u>		
Jan - Dec	Continued Cornell faculty participation in meetings of MTNYC Advisory Committee Research and Evaluation Subcommittee	Cornell input into collaborative research agenda for MTNYC. Partnerships expanded with MTNYC collaborators including US Forest Service, NYC Parks & Recreation Department, NY Restoration Project, and Trees New York.
March	Cornell Urban Scholars chosen	Two graduate students to assist multiple research projects full-time during summer. One undergraduate to assist with project during fall.
May	MTNYC Research Symposium	Cornell PIs become more familiar with ongoing urban forestry research in NYC. NYC partners become more familiar with Cornell research in urban and community forestry.
May	Field trip to MTNYC research sites	Sites identified for field work.
May – August	Gather measurements for individual research projects	Data collected.
Sept	Analyze data for individual projects	Data analyzed.
Oct	Integrate results into conceptual model	Preliminary conceptual model for predicting multiple outcomes of three tree planting strategies.
Nov	Workshop with NYC partners and potential funders to share results and develop plans for follow-on research proposals	Results shared with other researchers and practitioners. Proposal plans.
Nov- Dec	Work with Jennifer Drumluk to identify business funders Proposal writing	Proposals drafted.
Dec	Attend Stockholm Resilience Center Urban Theme meetings in Bangalore	Urban resilience research book drafted.

Metrics of Success

The proposed project addresses the following problem: *How can cities more effectively meet multiple environmental and social sustainability objectives through tree planting efforts?* To address this problem, we propose a research project focusing on the question: Under what conditions do large-scale urban tree planting initiatives lead to positive environmental and social sustainability outcomes? (Indicators include healthy tree growth, good air quality, increased carbon sequestration, and residents demonstrating a sense of place, social networks and trust, stewardship behaviors, and psychological, physical and cognitive health.) For the CUSI research project, metrics of success will become evident several years into the future, and include: (1) number of city government and non-profit organizations using the results of this and related future research to guide tree planting efforts; and (2) as a result of using the project research results, positive outcomes of tree planting efforts as measured by the indicators above. As an outgrowth of the proposed seed project, we will work through urban Extension, urban and community forestry, UNESCO, and other urban networks to share the project results and to expand Cornell research in multiple cities, thus enabling us to reach the metrics outlined above.

To further address the problem of how to manage urban forests for sustainability goals, we will establish a work group of Cornell faculty currently engaged in urban research as well as faculty who have not previously worked in cities but who possess a strong suite of tools to bear on urban problems, and of government and non-profit partners engaged in urban community forestry. Metrics of success for the Cornell Urban Sustainability Work Group measurable within the scope of this project include: (1) the establishment of a MTNYC research agenda that reflects coupled systems thinking and current research on sustainability; (2) increase in Cornell faculty understanding of NYC tree planting initiatives, including the organizations involved and ongoing research efforts; (3) number of collaborative proposals written by project partners; and (4) commitment among project partners to work together beyond the scope of the CCSF-funded project to address urban sustainability issues.

Cornell Center for a Sustainable Future
Academic Venture Fund
Initiative Title: Cornell Urban Sustainability Initiative (CUSI)
Award Start/End Date: 1/1/09-12/31/09

PI: M Krasny
Dept: Natural Resources
Business Contact: Sarah Gould, Joan Bartlett-Peck

CO-PIs: Bassuk, Broussard, Dickinson, Ferenz, Nettleton, Schmidt, Stedman, Tidball, Weinstein, Wells, Whitlow, Zhang
Collaborators: Alfsen, Campbell, Fragola, Goberman, Lu, Pfeffers, Shane, Svendsen

	FTE	Year 1	
		1/1/09-12/31/09	
<u>Budget</u>			
Salary			
Research assistants	40%	25,000	
Undergraduates and Interns	15%	14,000	
Total Salaries		39,000	
Graduate Student Support			
Stipend (2 CUSP summer interns)		3,000	
Total Graduate Student Support		3,000	
Miscellaneous Expenses:			
Benefits		12,683	
Registration for NYC Research Symposium		5,000	
Travel to NYC for PIs/co-PIs/research assistants		32,000	
Supplies & Materials		8,000	
Total Miscellaneous Expenses		57,683	
Total Funds Requested		99,683	

Budget Justification

Research Projects. We have allocated \$16,000 to Bassuk project, \$5000 each to Whitlow and Weinstein projects, and \$10,000 each to the 4 other research projects.

Budget for individual research projects includes salary for research and undergraduate assistants, travel to NYC for research assistant and faculty member (2 trips @ \$800 ea), and supplies.

Co-PIs will combine funds in hiring research assistants and students who collect data on more than one measure, as appropriate.

Integration. We have allocated \$10,000 for salary of research assistant to help with integration of results from multiple projects.

Other. We have budgeted for 2 trips to NYC each for the 10 PIs who live in Ithaca to attend the spring Research Symposium and fall meeting to share results and plan future projects, and for 3 co-PIs to attend MTNYC Research and Evaluation Subcommittee meetings.

Additional expenses include partial funding for two Cornell Urban Scholars Program (CUSP) interns (matching funding provided by CUSP in CRP) and registration for the Cornell participants to participate in the NYC Research Symposium.

Resume

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EDUCATION:

- **BS** 1974 Department of Floriculture and Ornamental Horticulture, Cornell University.
- **Ph.D.** 1980 Horticulture, University of London.

WORK EXPERIENCES:

- July 1, 1993 to present - Professor of Horticultural Physiology/Program Leader, Urban Horticulture Institute, Cornell University.
- July 1, 1986 to June 30, 1993 - Associate Professor of Horticultural Physiology/Program Leader, Urban Horticulture Institute, Cornell University
- April 1980 to June 30, 1986 - Assistant Professor of Horticultural Physiology/Program Leader, Urban Horticulture Institute, Cornell University

SELECTED PUBLICATIONS:

- Bassuk, N.L. and Whitlow, T.H. 1988. Environmental stress in street trees. *Arboricultural Journal* 12(2) 195-201
- Lindsey, P. and Bassuk, N. 1992. Redesigning the Urban Forest from the Ground Below: A New Approach to Specifying Adequate Soil Volumes for Street Trees. *Arboricultural Journal*. 16(1) 25-39.
- Harris, J.R., and Bassuk, N.L., 1994. Seasonal Effects on Transplantability of Scarlet Oak, Green Ash, Turkish Hazelnut and Tree Lilac. *Journal of Arboriculture*, 20(6) 310-317.
- Day, S.D., Bassuk N.L. and Van Es H, 1995. Effects of Four Compaction Remediation Methods for Landscape Trees on Soil Aeration, Mechanical Impedance and Tree Establishment. *J. Environmental Horticulture*. 13(2): 64-71.
- Grabosky, J., Bassuk, N.L. and Van Es, H, 1996. Testing of Structural Urban Tree Soil Materials for Use Under Pavement to Increase Street Tree Rooting Volumes. *Journal of Arboriculture* Vol. 22 No. 6, 255-263.

OTHER SELECTED PUBLICATIONS:(over 100 in total)

Grabosky, J and Bassuk N.L 2008 Sixth- and Tenth-Year Growth Measurements for Three Tree Species in a Load-Bearing Stone–Soil Blend Under Pavement and a Tree Lawn in Brooklyn, New York, U.S. *J. of Arboriculture and Urban Forestry*. In press.
macrocarpa Michx. Cuttings. *Hort Science* 42:909
Abstract: Harris, J.R., Day, S., Bassuk, N., Xiao, Q., Bartens, J., Hafner, T., Dove, J. and T. Wynn. 2007. Integrating the Urban Forest into Stormwater Management: A First Step in Restoring Hydrologic Function to Urbanized Environments. *Hort Science* 42:824.

- Grabosky, J., Bassuk, N. and Marranca, M. 2002 “Preliminary Findings from Measuring Street Tree Shoot growth in two Skeletal Soil Installations Compared to Tree Lawn Plantings” *Journal of Arboriculture* 28(2) 106-108.
- Grabosky, J., Bassuk, N., Irwin, L. and Van Es, H. 2001 “Shoot and Root Growth of Three Tree Species in Sidewalks.” *Environmental Hort.* 19(4):206-211
- Buckstrup, M. and Bassuk, N. 2000 “Transplanting Success of Balled and Burlapped Versus Bare –Root Trees in the Urban Landscape. *Journal of Arboriculture*. Vol.26 (6) 298-308.
- Day, S.D., Bassuk N.L. and Van Es H, 1995. Effects of Four Compaction Remediation Methods for Landscape Trees on Soil Aeration, Mechanical Impedance and Tree Establishment. *J. Environmental. Horticulture*. 13(2): 64-71.
- Grabosky J. and Bassuk N.L. 1995 a New Urban Tree Soil to Safely Increase Rooting Volumes Under Sidewalks, *Journal of Arboriculture* 21(4) 187-201.
- Harris, J.R., Bassuk N.L., Zobel, R.W. and Whitlow, T.H. 1995. Root and Shoot Growth Periodicity of Green Ash, Scarlet Oak, Turkish Hazelnut and Tree Lilac. *JASHS*, 120(3) 211-216.
- Harris and Bassuk. 1993. Effect of Cold Storage on Bud Break Root Regeneration and Shoot Extension of Douglas Fir, Paper Birch and Green Ash. *JEH*, Vol 11 (3) 19-23.
- Harris and Bassuk. 1993. Adaptation of Trees to Low Light Environments and Effects on Branching Pattern of *Fraxinus Americana*. *J. of Arboriculture*. 19(6) 339-343.
- Day and Bassuk. N.L. 1994. “Soil Compaction: A Review of the effects of soil compaction and amelioration treatments on landscape trees. *J of Arboriculture*. 20(1) 9-17.
- J.R. Harris and N. Bassuk. 1993. “Tree Planting Fundamentals” *Journal of Arboriculture*. 19(2)64-70.
- Lindsey, P. and Bassuk, N. 1991. Specifying Soil Volumes to Meet the Water Needs of Mature Urban Street Trees and Trees in Containers. *Journal of Arboriculture*. 17(6)141-149.
- Whitlow, T.H., Bassuk, N.L. and Reichert, D.L. 1992. A three year study of water relations of urban street trees. *J. of Applied Ecology* 29, 436-450.
- Ranney, T.G., Bassuk, N.L. 1988. Managing plant growth and water relations during transplanting. *Proc. 6th Metria Conference*, June 1988, pp 108-118.
- Whitlow, T.H. and Bassuk, N.L. 1987. Trees in difficult sites. *J of Arboriculture* 13(1): 10-17.

BOOK:

Nina Bassuk and Peter Trowbridge 2004 “**Trees in the Urban Landscape: Site Assessment, Design and Installation**” 207 pp. Wiley and Sons, Inc. Hoboken, NJ

Synergistic Activities:

Cornell’s Urban Horticulture Institute was founded in 1980 with the explicit mission of improving the quality of urban life by enhancing the functions of plants within the urban ecosystem. The Institute program integrates plant stress physiology, horticultural science, plant ecology and soil science and applies them to three broad areas of inquiry. They are:

- 1) The **selection, evaluation and propagation of superior plants** with improved tolerance of biotic and abiotic stresses, and enhanced functional uses in the disturbed landscape.
- 2) Developing improved technologies for **assessing and ameliorating site limitations** to improve plant growth and development.
- 3) Developing **improved transplant technologies** to insure the successful establishment of plants in the urban environment.
- 4) Working with municipalities to **assess and manage their urban tree resources while applying appropriate technologies.**

Funding sources:

Hatch, Macintire Stennis. Horticultural Research Institute, International; Society of Arboriculture, New York Farm Viability Institute, NYState DEC, USDA Forest Service National Urban and Community Forestry Advisory Committee Grant

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EDUCATION

Ph.D.	2001	Oregon State University	Forest Resources
M.S.	1997	Pennsylvania State University	Forest Resources
B.S.	1994	Pennsylvania State University	Environmental Resource Mnmt.

CURRENT POSITION

Cornell University (7/1/2007-Present)

Dept. of Natural Resources

- Associate Professor, Human Dimensions of Natural Resources
 - Appointment: 50% Research, 50% Extension

RELEVANT PUBLICATIONS

Broussard, S.R., Ottombre-Washington, C., and B.K Miller. 2008. Opinions toward Land-Use Planning and Protection of Natural Resources: A Comparative Study of Government Officials and the General Public. *Landscape and Urban Planning* 86(1): 14-24.

Broussard, S.R. and J.C. Bliss. 2007. Institutional Commitment to Sustainability: An Evaluation of Natural Resource Extension Programs in Universities in Alabama and Oregon. *International Journal Sustainability Higher Education* 8(3): 272-284.

Parmar, P. and S.R. Broussard. 2006. *Exploring Urban Landscapes: A Post-Modern Approach to Learning*. In J. L. Kincheloe, K. Hayes, K. Rose, and P.M. Anderson [Editors] Praeger Handbook of Urban Education. Westport, CT: Greenwood Press.

Broussard, S.R., S.B. Jones, L.A. Nielsen, and C.A. Flanagan. 2001. "Forest Stewardship Education with Urban Youth." *Journal of Forestry* 99(1): 37-42.

Broussard, S.R. and S.B. Jones. 2001. Extension, Communities, and Schools: Results of a Collaborative Forestry Education Project in Philadelphia. *Journal of Extension* 39(3).

OTHER PUBLICATIONS

Janota, J.J. and S.R. Broussard. 2008. Are all Family Forest Owners Created Equal? Examining Private Forest Policy Preferences. *Forest Policy and Economics* 10(3)89-97.

Ross-Davis A.L., and S.R. Broussard. 2007. A Typology of Family Forest Owners in North-Central Indiana. *Northern Journal of Applied Forestry* 24(4): 282-289.

Broussard, S.R., LaLopa, M., and A. Ross-Davis. 2007. Synergistic Knowledge Development in Interdisciplinary Teams. *Journal of Natural Resources and Life Sciences Education* 36: 129-133.

Schaaf, K.A., A. L. Ross-Davis and S. R. Broussard. 2006. Exploring the Dimensionality and Social Bases of the Public's Attitudes toward Forest Management. *Landscape and Urban Planning* 78(1/2): 135-146.

Broussard S., K.P. Bell, and W.L. Hoover. 2004. *Modeling Land-Use Change: Social and Economic Data Considerations*. In: R.K. Swihart and J.E. Moore [Editors]. Conserving biodiversity in agricultural landscapes: model-based planning tools for systems with sharp edges. Purdue University Press. Pp 153-164.

SELECTED SYNERGISTIC ACTIVITIES

Society of American Foresters, National Committee on Forest Policy (2008-2010).

American Forest Foundation, National Research Group Policy Committee (2008-2010)

Editorial Board, Communications and Education, *Journal of Forestry* (2002-2005)

URBAN RESEARCH SUMMARY

Dr. Broussard's work in urban areas has included development of a comprehensive educational program aimed at helping minority youth learn about forestry and forest management. This project involved fostering collaborations with Penn State University Cooperative Extension staff and Forest Resource faculty, Philadelphia community leaders, school district administrators, and area teachers. Dr. Broussard and colleagues developed three distinct educational programs aimed at urban audiences: 1) Teaching Forest Stewardship to Urban Youth, 2) the Police Athletic League-Penn State University Summer Natural Resources Program, and 3) the Natural Resources Institute training program for Philadelphia teachers. Dr. Broussard led the research component of this project and conducted program evaluations and assessments of environmental attitudes and knowledge using a quasi-experimental social science research design. This research was funded by grants from the Pennsylvania Dept. of Education, the U.S. Forest Service, and CSREES (Cooperative States Research, Extension, and Education Service). Results from this work have been published in peer-reviewed journals and in the Encyclopedia of Urban Education.

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(a) PROFESSIONAL PREPARATION

Binghamton University	Biological Sciences	B.S 1981
Cornell University	Entomology/Animal Behavior	Ph.D. 1987
Arizona State University	Postdoctoral Fellow	Maytag 1987-88
University of Cambridge	Postdoctoral Scientist	1988-1989
UC Berkeley	Postdoctoral Fellow	1990-1994 (NSF-2/NIH-2)

(b) Appointments

2005 – present Arthur A. Allen Director of Citizen Science, Cornell Laboratory of Ornithology

2005 - present Associate Professor, Department of Natural Resources, Cornell University, Ithaca, New York 14853
Associate Professor, Graduate field of Neurobiology and Behavior

2003 – 2005 Associate Research Zoologist, Museum of Vertebrate Zoology and Hastings Reservation, University of California, Berkeley

1995 - 2003 Assistant Research Zoologist, Museum of Vertebrate Zoology and Hastings Reservation, University of California, Berkeley

(c) Scientific Publications

(i)

Dickinson, J.L. 2007. Decoding dumping ducks. *Molecular Ecology*, 16: 2610-2612.

Kleiber, D., Kyle, K., Rockwell, S., and J.L. Dickinson. 2007. Sexual competition explains patterns of individual investment in territorial aggression in western bluebird winter groups. *Animal Behaviour*, 73: 763-770.

Cooper, C.B., J. Dickinson, T. Phillips, R. Bonney. 2007. Citizen science as a tool for conservation in residential ecosystems. *Ecology and Society*, 12 (2): 11.

Koenig, W.D., Marcus, L., Scott, T.W., and J.L. Dickinson. 2007. West Nile Virus and breeding bird declines. *Ecohealth*, 4:18-24.

Koenig, W.D., Marcus, L., Scott, T.W., and J.L. Dickinson. 2007. West Nile Virus and breeding bird declines. *Ecohealth*, 4:18-24.

Dickinson, J.L., McGowan, A. 2005. Winter resource wealth drives delayed dispersal and family-group living in western bluebirds. *Proc. Roy. Soc. Lond. Ser. B*, 272: 1471-2954.

Saether, B.-E., Engen, S., Møller, A.P., Visser, M.E., Matthysen, E., Fiedler, W., Lambrechts, M.M., Becker, P.H., Brommer, J.E., Dickinson, J., du Feu, C., Gehlbach, F.R., Merila, J., Rendell, W., Robertson, R., Thomson, D.L., Torok, J. 2005. Time to extinction in bird populations. *Ecology* 86: 693-700.

(ii)

- Dickinson, J.L. 2004. A test of the importance of direct and indirect fitness benefits for helping decisions in western bluebirds, *Behavioral Ecology* **15**: 233-238.
- Ekman, J., J.L. Dickinson, B.J. Hatchwell, and M. Griesser. 2004. Delayed dispersal. Pp 35-47 in: W.D. Koenig and J.L. Dickinson (eds) *Ecology and Evolution of Cooperative Breeding in Birds*. Cambridge University Press, Cambridge.
- Dickinson, J.L. and B.J. Hatchwell. 2004. Fitness consequences of helping behavior. Pp 48-66 in: W.D. Koenig and J.L. Dickinson (eds) *Ecology and Evolution of Cooperative Breeding in Birds*. Cambridge University Press, Cambridge.
- Saether, B.-E., Engen, S., Møller, A.P, Weimerskirch, H., Visser, M., Fiedler, W., Matthysen, E., Lambrechts, M.M., Freckleton, R., Badyaev, A., Becker, P.H. Brommer, J.E., Bukacinski, D., Bukacinska, M., Christensen, H., Dickinson, J., du Feu, C., Gehlbach, F.R., Heg, D., Hotker, H., Merila, J., Nielsen, J.T., Rendell, W., Robertson, R.J., Thomson, D.L., Torok, J., and P. Van Hecke. 2004. Life history variation predicts the effects of demographic stochasticity on avian population dynamics. *American Naturalist* **164**: 793-802.
- Dickinson, J.L. and Akre, J.J. 1998. Extrapair paternity, inclusive fitness, and within-group benefits of helping in the western bluebird. *Molecular Ecology*, **7**: 95-105.

(d) Selected synergistic activities including Citizen Science Projects under my direction

- 2008 John Udell's Interviews with Innovators, "Gathering bird observations throughout the western hemisphere," IT Conversations, The Conversations Network
- 2007 Funded and launched new bilingual citizen science project for urban audiences: "Celebrate Urban Birds!" with 500 partner organizations and a special celebration at Dana Discovery Center – Central Park, Harlem Meer. Funding: Cornell Coop. Extension
- 2007 Research coordinating Network member - USA National Phenology Network, USGS
- 2006 Research interviews for BBC "The Rules of Life" and *Nature* Podcast

Research: I am interested in examining the power of the internet and citizen science to create adaptive management communities in residential landscapes, particularly the urban environment. In addition to urban citizen science and landscape ecology (Celebrate Urban Birds citizen science project www.celebrateurbanbirds.org) my group has a planning grant to conduct research on community science and greening with urban Latino communities that vary in country of origin and the structure of the city in which they are embedded. Both the urban birds project and the planning research focus on urban greening and connection with nature, science, and community through monitoring birds. More recently, I have begun to explore the use of the internet to create adaptive management communities using a combination of social networking and incentives. This work is embedded in theories of competitive altruism, public goods games, social networking, and collective action.

GRETCHEN FERENZ

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<http://nyc.cce.cornell.edu/environment/>

EDUCATION

<u>Year</u>	<u>Degree</u>	<u>Institution</u>
1984	M.S., Environmental Horticulture;	University of California, Davis
1981	B.A./B.S., Plant Science/Horticulture, Magna Cum Laude	Rutgers University/Cook College

CURRENT POSITION

Senior Extension Associate, Cornell University Cooperative Extension-NYC; 1991-present

As Program Leader, Urban Environment, provide leadership to the development, evaluation, and implementation of education and applied research programs that address critical environmental needs and related public policy issues of diverse urban audiences, including youth and adults, and of communities and the environment. Develop and manage new programs and conduct fund development, including grant and contract proposal development, budgets and negotiations. Hire, train and supervise academic and professional staff; conduct performance appraisals and facilitate professional development. Serve on Program Leadership Team for NYC Office, providing strategic direction to organizational planning and management. Provide leadership to local, state and national professional development and education programs through Extension and external organizations. Collaborate with faculty, staff and administration, national Cooperative Extension system, legislators, government, community and organization leaders to conduct initiatives and maximize impact.

SELECT PUBLICATIONS

- Simon-Brown, V., project coordinator. Adamski, M., Elliott, C., Simon-Brown, V., lead authors. Adamski, M., Brown, A., Crosby, G., Elliott, C., Ferenz, G., Friend, D., McDonell, L., Monroe, M., Muscio, C., Meyers, N., Peterson, N., Rosauer, U., Worthley, T., Yates, J., project team. Welch, T., editor. *Living Sustainably: It's your choice*. OSU Extension publication. #EC 1614. February 2008. 24pp.
- Kudryavtsev, A., Krasny, M., Ferenz, G., Babcock, L. Use of Computer Technologies by Educators in Urban Community Science Education Programs. *Journal of Extension* [on-line], 45(5), Article 5FEA2. October 2007. Available at: <http://www.joe.org/joe/2007october/a2.shtml>
- Krasny, M., Doyle, R., Ferenz, G., et al. *Garden Mosaics Educator's Manual*. <http://www.gardenmosaics.cornell.edu>. April 2004.
- Ferenz, G. "Garden Mosaics: Participatory Research and Learning Communities." *2003 Urban Extension Conference Proceedings: Meeting the Challenge of a Changing America*. Chicago, IL. May 7-9, 2003.
- Brown, S., G Ferenz, M. Krasny, and C. Tse. Implementing a 4-H Aquatic Resources Education Program in New York City Through Collaborations. *Journal of Extension* 41(2): <http://www.joe.org/joe/2003april/iw2.shtml>. April 2003.
- Kuhns, M., G. Ferenz, D. Blahna. "Effective Community Involvement in Urban Forestry Programs." *Seventh National Urban Forest Conference Proceedings: Inside Urban Ecosystems, New York City*. September 12-16, 1995. *Urban Community Ecosystems: A National Action Plan*. U.S. Dept. of Agriculture, Cooperative State Research, Education, and Extension Service, and Cooperative Extension Service, Univ. of Maryland, College Park and Eastern Shore. May 1995.

SYNERGISTIC ACTIVITIES

Garden Mosaics / Garden Mosaics and Urban Agriculture

Garden Mosaics is a national science education program, developed with funding by the National Science Foundation, under leadership of M. Krasny, Cornell's Dept. of Natural Resources, and co-leadership of G. Ferenz, Cornell University Cooperative Extension-NYC (CUCE-NYC). Since 1999, G. Ferenz and staff have contributed toward its development, implementation and evaluation. The Garden Mosaics program model, including curricular resources and national online databases, can be accessed at www.gardenmosaics.org. Since Sept. 2003, CUCE-NYC developed and continues to implement a science-based program targeted to the South Bronx and now citywide.

Training workshops have reached more than 450 formal/non-formal educators, adult residents and youth in use of the Garden Mosaics youth science education program model.

Urban Horticulture & Ecology Training Program

Through collaboration with Central Park Conservancy, CUCE-NYC coordinates development, planning, implementation and evaluation of "Urban Horticulture & Ecology Training Program," an intensive 5-month instructional course for 36 professional employees and volunteers working in Central Park and other parks citywide in New York City. Course includes 18 full-day weekly sessions, that involve class, lab and field instruction and regular assessments. Program is funded by Central Park Conservancy and sponsored by Chase.

Celebrate Urban Birds

Provides co-leadership, along with J. Dickinson, director for citizen science at Cornell's Lab of Ornithology (CLO), on "Celebrate Urban Birds!" through a 3-year national/international collaboration. "Celebrate Urban Birds-NYC!" is CUCE-NYC's local effort to reach thousands of NYC residents and community-based organizations, enabling them to participate in activities focused on birds and neighborhood habitat improvement, through hands-on citizen science data collection and other experiential learning, and to document and report their efforts on the project's website and to CLO. During May 10-13, 2007, 1,400 NYC residents took active part in 10 "Celebrate Urban Birds-NYC!" events citywide.

Sustainable Living Education

G. Ferenz has contributed toward initiatives to support future development of 'sustainable living' education programs in New York City. These include: participatory research involving leaders nationwide to determine the 'content areas of greatest need and interest' that would support professional development and other education programs, conducted in collaboration with Cornell researchers W. Trochim and D. Cabrerra; and the development of "Sustainable Living Guide" Extension publication, under the leadership of V. Simon-Brown, Oregon State University, for broad distribution and use in outreach to Extension audiences.

Harbor 360°

For 3 years, G. Ferenz provided leadership to Harbor 360°, an initiative representing a unique public education and visitors' attraction planned for Governors Island as part of its redevelopment, for which CUCE-NYC serves as core partner. It will be a destination for visitors from the metropolitan region, the nation and abroad, providing learning opportunities and experiences focused on the harbor and the urban environment at the core of the New York Harbor. Project is proposed to cost \$65 million and \$3.3 million to operate annually. The proposed 73,000 sq. ft. facility will be designed and constructed using sustainable green technology and be LEED certified. Partners include City University of New York, Regional Plan Association, Hudson River Foundation, Liberty Science Center, Metropolitan Waterfront Alliance, NY Harbor School and The River Project.

RESEARCH ACTIVITIES IN URBAN AREAS with emphasis on Urban Forestry Work

G. Ferenz has been involved in numerous research and integrated Extension activities in New York City for more than 15 years, ranging from environmental and science education, social sciences, urban forestry, horticulture and natural resources research and application. Since 2001, she serves as PI on the USDA CSREES funded "Urban Silviculture" project along with PI T. Whitlow, Dept. of Horticulture, an integrated research and Extension education program targeted to the South Bronx, NYC, involving researchers from Cornell's Depts. of Horticulture and Earth & Atmospheric Sciences, and the US Forest Service. Building on this project, Gretchen served as co-PI on a 2005-07 NUCFAC-funded research and education initiative, "Determining the Fate of PM2.5 Particles Following Capture by Leaves." Based on Federal Hatch funding received for Urban Silviculture-related work, in June 2008 she and co-PI T. Whitlow convened an "Urban Forestry & Respiratory Health" Symposium at the Weill Cornell Medical College in NYC, bringing together more than 50 researchers, practitioners, policymakers and educators to begin a discussion on these emerging interdisciplinary areas. Gretchen has also served as a research supervisor to "Cornell Urban Scholars Program" graduate students, overseeing and collaborating on research activities related to urban forestry and environmental education. Currently she is working with S. Broussard, Cornell Dept. of Natural Resources, with involvement of the NYC Dept. of Parks and MillionTreesNYC on a proposed social science research and education initiative to assess the public's knowledge, attitudes, and values related to trees and the urban forest towards development of a community engagement model. Preliminary research was initiated in July 2008 involving Bronx residents and community partner organizations.

MARIANNE ELIZABETH KRASNY<http://krasny.dnr.cornell.edu/>**PREPARATION**

Cornell University, College of Arts and Sciences	Independent Major (Human and Community Development)	BA, 1974
University of Washington, College of Arts and Sciences	Botany	BS, 1978
University of Washington, College of Forest Resources	Forest Biology	MS, 1982
University of Washington, College of Forest Resources	Forest Biology	PhD, 1986

APPOINTMENTS

PROFESSOR and CHAIR, Department of Natural Resources, Cornell University, 2007-present
 PROFESSOR, Department of Natural Resources; DIRECTOR OF GRADUATE STUDIES, Field of Natural Resources, Cornell University, 2003-2007
 ASSOCIATE PROFESSOR, Department of Natural Resources, Cornell University, 1993-2003
 ASSISTANT PROFESSOR, Department of Natural Resources, Cornell University, 1986-1993

PUBLICATIONS (selected)

- Krasny, ME and KG Tidball. (in revision) Civic Ecology Education: a systems approach to resilience and learning in cities. *Environmental Education Research*.
- Schusler, TM and ME Krasny. 2008. Youth participation in local environmental action: Developing political and scientific literacy. Reid, A., Jensen, B.B., Nikel, J. & Simovska, V. (eds), *Participation and Learning: Perspectives on Education and the Environment, Health and Sustainability*. Springer-Verlaug.
- Liddicoat, KR, JW Simon, ME Krasny, and KG Tidball. 2007. Sharing programs across cultures: Lessons learned from Garden Mosaics in South Africa. *Children, Youth and Environments* 17(4): http://www.colorado.edu/journals/cye/17_4/index.htm
- Tidball, KG and ME Krasny. 2007. From risk to resilience: What role for community greening and civic ecology in cities? In: Wals, A. (ed). *Social Learning Towards a more Sustainable World*. Wageningen Academic Press. pp 149-164.
- Krasny, ME and R Bonney. 2005. Environmental education through Citizen Science and Participatory Action Research: the Cornell Laboratory of Ornithology and Garden Mosaics examples. In: Mappin, M and EA Johnson, eds. *Environmental Education or Advocacy: Perspectives of Ecology and Education in Environmental Education*. Cambridge University Press. pp 292-319.
- Krasny, ME. 2005. University K-12 science outreach programs: How can we reach a broad audience? *BioScience* 55(4):350-359.
- Krasny, ME. 2005. An Exploration of Participatory Methods in a Youth Outreach Program Linked to University Research. In: Peters, S, N Jordan, M Adamek, and TR Alter, eds. *Engaging Campus and Community: The Practice of Public Scholarship in the American Land-Grant University System*. Kettering Foundation, Dayton, OH. pp 309-362.
- Saldivar-Tanaka, L and ME Krasny. 2004. The role of NYC Latino community gardens in community development, open space, and civic agriculture. *Agriculture and Human Values* 21:399-412.
- Doyle, R and ME Krasny. 2003. Participatory Rural Appraisal as an approach to environmental education in urban community gardens. *Environmental Education Research* 9(1):91-115.
- Krasny, ME and R Doyle. 2002. Participatory approaches to extension in a multi-generational, urban community gardening program. *Journal of Extension* 40(5): <http://www.joe.org/joe/2002october/a3.shtml>.

GRANTS (selected)

- 2006-09 Urban Community-Designed Green Spaces: Applying Common Values to Resolving Land Use Conflict. (PI with K Tidball, co-PI). *Smith-Lever and Hatch*. (\$63,000)
- 2006-07 Design Principles for Interactive Digital Learning Tools- Agricultural Education and Business Applications in Central Upstate NY. (co-PI with D Hoard, PI). *Metropolitan Development Association of Syracuse and Central NYS and PhotoSynthesis Productions, LLC*. (\$55,000)
- 2006-07 Integrating Agroforestry Indigenous Knowledge and Scientific Research into Science Education in Southern Africa and US. (PI with Nicolette Kohly, fellow; Festus Akinnifesi, co-PI). *USAID Borlaug Leadership Enhancement in Agriculture Program (LEAP), Norman E. Borlaug International Agricultural Science and Technology Fellows Program* (\$20,000)
- 2005 Garden Mosaics International Supplement (PI with K Tidball, co-PI). *NSF International Programs and Informal Science Education* (\$99,227)
- 2003-06 Garden Mosaics and Urban Agriculture (co-PI with G Ferenz PI) *Special budget item sponsored by Congressman Serrano and Congresswoman Velazquez* (\$450,000)
- 2003-06 Cornell Science Inquiry Partnerships (PI with N Trautmann co-PI) *NSF Graduate Teaching Fellows in K-12 Education* (\$1,500,000)
- 2002-05 Garden Mosaics (PI with A Berkowitz and G Ferenz, co-PIs) *NSF Informal Science Education* (\$1,434,488)
- 2000-04, 2006-08 Cornell Duke Conservation Fellowships (PI) *Doris Duke Charitable Foundation* (\$365,000)
- 2000-04 Cornell Environmental Sciences Research Partnerships (PI with C Cunningham and N Trautmann, co-PIs) *NSF Graduate Teaching Fellows in K-12 Education* (\$1,346,000)

URBAN EXPERIENCE

Dr. Krasny has conducted outreach and research focusing on environmental and sustainability education in cities in the US and internationally for over 20 years. She has developed and evaluated novel approaches to environmental education, including programs that incorporate traditional knowledge of urban community gardeners, participatory action research, social learning, and social-ecological system resilience. Dr Krasny provides leadership for a diverse group of graduate students, all of whom integrate research and practice to address the following question: How can we create experiences for urban youth and adults that lead to science learning, environmental and cultural understanding, more vital communities, and more resilient social-ecological systems? Together with Extension Associate Keith Tidball, Dr. Krasny recently formed the Cornell Initiative for Civic Ecology, which focuses on individual, neighborhood, and system-level impacts of civic ecology practices including community gardening, community forestry, wetland restoration, and similar stewardship activities in cities.

LEADERSHIP OF INTERDISCIPLINARY TEAMS

With funding from NSF and elsewhere, Dr. Krasny has created and provided leadership for national teams of scientists, evaluation researchers, graduate students, and educators from non-profits, universities, and Cooperative Extension, focusing on university science outreach program development and evaluation. She has served as Department Extension Leader (5 yrs), Director of Graduate Studies for the Field of Natural Resources (10 yrs), and PI on an NSF Graduate Teaching Fellowships in K-12 Education project (6 yrs). More recently, as Chair of the Department of Natural Resources, she has led a strategic planning effort to integrate social, biological, and physical scientists for the purposes of addressing natural resources management and sustainability issues. Dr. Krasny is chair elect of the Research Commission of the North American Association for Environmental Education.

John Nettleton

- Title: Senior Lecturer
Executive Director, Cornell Urban Scholars Program
- Department: City and Regional Planning
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- Phone: 347-835-0089
- Fax: 212-497-7594
- Email: jsn10@cornell.edu

Personal statement: John Nettleton's work has centered on sustainable development issues and concerns and the role of energy efficiency plans, practices, strategies in response to climate change. He is Executive Director for Cornell's Urban Scholars Program and the Urban Mentorship Initiative with the Urban Assembly's School for the Urban Environment in Bedford Stuyvesant, Brooklyn. Prior to joining CRP John directed Community Economic Development and Program Incubation efforts with Cornell Cooperative Extension/New York City where he developed and initiated the New York website for MarketMaker, a national network of web-based platforms linking agriculture producers and consumers. He worked in a private advocacy planning practice on neighborhood development and residential displacement issues, and served on the planning team that developed and implemented New Jersey's Pinelands Plan.

- Education: B.A. (Architecture), Rice University, 1971

MCP, University of Pennsylvania, 1976

Work and Community Service

Board Member, Association of Energy Engineers/NY, 2002- Board President 2005-07

Member, Village Energy Policy & Strategy Committee, South Orange (NJ), 2004-, Committee Chair 2004-6;

Steering Committee, Community & Rural Development Institute (CaRDI), Cornell (2002-05)

Courses

- Equity and Sustainability in the Global City (NYC, Fall)
- Social Justice in the City- Preparation for Fieldwork (campus, Spring)

- Climate Change: Urban and Public Policy Impacts (Spring, 1990- first college course on climate change in New York)

Research

- Responses to climate change at the district and community scale.
- Sustainability criteria and standards for biofuels
- Novel applications of biodiesel, incl. multi-family space heating in Northeast U.S. and on-location film production in urban settings.
- Regional strategies linking sustainable biofuel production and local use

Conference Presentations

July, 2008. “Sustainable Development: Energy Initiatives in the Urban Setting”, 2008 Northeast Summer Joint Session of Northeast Cooperative Extension and Agricultural Experiment Station Directors, Bethesda, Maryland

May, 2007: Biofuel Development in the Mid-Hudson Region, 15th European Biomass Conference & Exhibition, Biomass for Energy, Industry and Climate Protection: From Research to Market Deployment, Berlin, Germany.

Publications

May 7, 2007. “On Energy: Consider the Alternatives” Gotham Gazette: NYC News and Policy, Citizens Union Foundation, publ. (www.gothamgazette.com),

“Heating Up Isn’t Hard to Do: Global Warming from a Planner’s Window”, Progressive Planning: The Magazine of the Planners Network, No. 169, Fall 2006.

STEPHAN SCHMIDT

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Employment

Fall 2006 – present: Assistant Professor, Department of City and Regional Planning. Cornell University.

Spring 2006: Adjunct Professor, Milano The New School for Management and Urban Policy

2004 – 2005: Instructor, E.J. Bloustein School for Urban Planning and Policy Development, Rutgers University

Education

2006: PhD, Urban Planning and Policy Development, Rutgers University, New Brunswick, NJ.
Dissertation: “Nature in the suburbs: open space preservation, fiscal planning, and exclusion”
Chair: Donald Krueckeberg. Funded in part by the Lincoln Institute of Land Policy.
Awarded Bloustein School best dissertation award, 2006

2000 – 2001: Independent study, Department of Architecture and Urban Planning, Technical University Munich, Brownfield reclamation project in the Porto Marghera industrial-harbor complex, Venice, Italy, with Prof. Peter Latz

2000 Master of Landscape Architecture, University of Washington, Seattle, Washington
Thesis: “The modification of Public Space in Kumasi, Ghana” Chair: Sally Schauman. Awarded College of Architecture and Urban Planning best masters thesis, 2000

1999: Independent study, Department of Planning, University of Science and Technology, Kumasi, Ghana, Independent research on colonial and indigenous urban design influences

1995: Bachelor of Arts, Earth and Planetary Science, Washington University St. Louis, Missouri
Concentration in Environmental Geology

5 Relevant publications

Schmidt, S. and Paulsen, K. “Is Open Space Preservation a Form of Exclusionary Zoning? The Evolution of Municipal Open-Space Policies in New Jersey” currently under review at *Urban Affairs Review*

Schmidt, S. (2008) ”The evolving relationship between open space preservation and local

planning practice” *Journal of Planning History*, vol. 7(2)

Nemeth, J. and **Schmidt, S.** (2007) “Security, Liberty and the Accessibility of Public Space: An Empirical Study” *Journal of the American Planning Association*, vol 73(3): 283-297

Critique: Ewing, R. (2007) “Security of public spaces: New measures are reliable, but are they valid?” *Planning*, July 2007

Schmidt, Stephan (2004) “World Wide Plaza: The Corporatization of Urban Public Space”, *IEEE Technology and Society*, vol.23(3) Also published as “World Wide Plaza: A Corporatizacao do Espaco Publico Urbano”(2005), *Urbanismo Revista da Associacao dos Urbanistas Portugueses*, no 8

Schmidt, S. (2005) “Cultural Influences and the Built Environment: An Examination of Kumasi, Ghana”, *Journal of Urban Design*, vol.10(3): 353-370

5 Additional Publications

Schmidt, S. “Has planning in Germany changed? Recent developments in local and regional planning in Germany” currently under review at *European Planning Studies*

Schmidt, S. “Post- Socialist sprawl: Explaining land consumption patterns in East and West Germany” currently under review at *Land Use Policy*

Schmidt, S. (2008) “From pro-growth to slow-growth in suburban New Jersey”, *Journal of Planning Education and Research*, vol. 28(3): 306-318

Schmidt, S. and Buehler, R. (2007) “The Planning Process in the US and Germany: A Comparative Analysis,” *International Planning Studies*, vol. 12(1): 55-75

Lichtenstein, A., Nemeth, J. and **Schmidt, S.** (2006) “Suburban Bypass roads and interjurisdictional politics: A case study” *World Transportation Policy and Practice* vol.12(1)

de Oliveira, V., Printz, A., Bezerra, C., and **Schmidt, S.** (2003) “Sustainable use of natural resources in the municipality of Taua-Ceara” in *Global Change and Regional Impacts*, edited by Gaiser, T. et al, Springer Verlag

Ahern, J., France, R., Hough, M., Burley, J., Turner, W., **Schmidt, S.**, Hulse, D, Badenhope, J., and Jones, G. (2002) “Integrating Ecology ‘across’ the Curriculum of Landscape Architecture” in *Ecology and Design: Frameworks for Learning*, edited by Johnson, B. and Hill, K., Island Press

Synergistic Activity

1. Applied and received funding (\$20,000) to undertake economic and environmental assessment of the Erie Canalway National Heritage Corridor from the National Park Service, in conjunction with David Lewis and Corianne Scally, SUNY Albany, Department of Geography and Planning.

2. NSF funded Biodiversity study of property owners along Lake Ontario embayments (North Sandy Pond, South Sandy Pond, Little Sodus Bay, and Blind Sodus Bay) with Rolf Pendall, Cornell University, Department of City and Regional Planning. The purpose of survey is to understand more fully the relationship between perceptions of water quality and support for actions to solve/mitigate the problem.
3. Ongoing research into the changing institutional landscape of planning practice in Germany, in particular the effect of privatization and regional level planning initiatives on the methods and tools available to local, regional, and state level planners to affect land use patterns.
4. Ongoing research into the interaction between privately owned public spaces, accessibility, and social exclusion in New York City, with Jeremy Nemeth, U Colorado-Denver
5. Current Co-chair of the Cornell University Campus Planning Committee (with Barbara Knuth). I also serve on the Cornell University Campus Master Plan working committee.
6. Faculty Adviser, Dual degree in City and Regional Planning and Landscape Architecture, with Dan Krall, Department of Landscape Architecture.

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EMPLOYMENT

July 2007 – Present

Assistant Professor, Department of Natural Resources, Cornell University.

June 2007 – July 2007

Associate Professor of Rural Sociology, Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University.

Sept 2001 – June 2007

Assistant Professor of Rural Sociology, Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University.

July 1999 - Sept 2002

Natural Resource Sociologist and Unit Leader, Canadian Forest Service, Socio-Economic Research Network

EDUCATION

Ph.D. University of Wisconsin-Madison. Sociology and Rural Sociology. Dec. 2000

M.S. Cornell University. Natural Resources. May 1993.

B.A. University of Wisconsin-Madison. Sociology, Concentration in Analysis & Research, May 1989.

FIVE RELEVANT PUBLICATIONS

Stedman, R.C., R.C. Lathrop, B. Clark, J. Ejsmont-Karabin, P. Kasprzak, K. Nielsen, D. Osgood, M. Powell A.M. Ventela, K.E. Webster, and A. Zhukova. 2007. Place attachment and perceived environmental quality in North American and European temperate lake districts. *Lake and Reservoir Management* 23:330-344.

Stedman, R.C. 2004. Sense of place as an integrated framework for understanding human impacts of land use change. Pp. 120-131 In Goetz, S.J., Shortle, J.S., and J.C. Bengstrom (Eds.) *Land Use Problems and Conflicts: Causes, Consequences, and Solutions*. NY: Routledge.

Stedman, R.C. 2003. Is it *really* just a social construction: the contribution of the physical environment to sense of place. *Society and Natural Resources* 16(8):671-685.

Stedman, R.C. 2002. Toward a social psychology of place: predicting behavior from place-based cognitions, attitude, and identity. *Environment and Behavior* 34(5):405-425.

Stedman, R.C. 1999. Sense of place as an indicator of community sustainability. *The Forestry Chronicle* 75(5):765-770

FIVE ADDITIONAL PUBLICATIONS

Stedman, R.C., B. Lee, K. Brasier, and F. Higdon. Cleaning up water? Or building rural community? Community watershed organizations in Pennsylvania. Manuscript forthcoming at *Rural Sociology*.

Beckley, T.M., R.C. Stedman, S. Wallace, and M. Ambard. 2007. Snapshots of what matters most: Using resident employed photography to articulate sense of place. *Society and Natural Resources* 20:913-929.

- Stedman, R.C., W. White, M. Patriquin, D. Watson. 2007. Measuring community forest sector dependence: Does method matter? *Society and Natural Resources* 20:629-646.
- Stedman, R.C., and R.B. Hammer. 2006. Environmental perception in a rapidly growing, amenity-rich region: the effects of lakeshore development on perceived water quality in Vilas County, Wisconsin. *Society and Natural Resources* 19(2): 137-151.
- Parkins, J., R.C. Stedman, and J. Varghese. 2001. Moving towards locally defined indicators of sustainability in forest-based communities: A mixed-method approach. *Social Indicators Research*. 56(1): 43-72.

SYNERGISTIC ACTIVITIES

I am a team member/leader on several interdisciplinary projects—funded and proposed—that explore the interface between human and ecological systems, across multiple scales. Specifically (and as detailed below): the well-being of urban centers such as NYC cannot be separated from the well-being of the regions in which they are located. As such, I have three research projects (two funded, another proposed) that examine the sustainability of the rural-urban connection:

1. I am a co- principal investigator (J. Findeis, Penn State University, PI) on an USDA-NRI project that examines change and stability what we are referring to as the “transition zone”: connected gradients ranging from very rural to very urban. The project explores the drivers of land use change along a gradient that focuses on the Susquehanna watershed. My work on this focuses on human response (cognitive, affective, behavioral) to social and ecological changes occurring therein.
2. I am the principal investigator on a Federal-Formula-Funded (Hatch) project situated within a similar rural-urban gradient (the Hudson River watershed of New York State, including metropolitan NYC). This project examines the challenges and opportunities for social-ecological resilience in the system, and discrete nodes within. The research will analyze the collaboration between citizens’ groups that focus on traditional ‘community development’ and those that address ecological well-being. Because these points are connected through upstream-downstream linkages, the partnerships between groups at different locations throughout the watershed are also explored.
3. I am a co- principal investigator on a proposal submitted to the Norwegian Research Council that addresses drivers of social-ecological change (and responses to change) in circumpolar tundra ecosystems. My role in the project is to examine the capacity of resource-dependent communities to adapt to changing social-ecological conditions. This work will take place in all polar countries: Norway, Canada, Russia, and the United States, and will include a comparative governance domain.
4. At Cornell University, I have co-created (with E. Mills) and led a graduate level seminar on Coupled Human-Ecological Systems. This course has brought together students from the ecological and social sciences to develop a ‘report card’ addressing the ecological, economic, and social health of the Cayuga Lake Watershed. The class has: exposed graduate students to the rapidly emerging literature in the area of coupled human-ecological systems; taught data collection methods reflecting these principles; and engaged local stakeholders.
5. The above class is proceeding in exciting new directions: T Walter (Biological and Environmental Engineering, Cornell University), and I were co-recipients of a 2008 Innovation in Teaching award. This award will provide additional opportunities for synthesis across ecological and social sciences: the award is for interactive watershed mapping, using a Wiki-type overlay on the Google Earth/Google Maps applications. The graduate students in my class and in Dr. Walters’ will engage a broad range of indicators of watershed health, ranging from hydrological to socio-economic. We will participate in each others’ classes to ensure strong synthesis.

RESEARCH IN URBAN SITES

My work has thus far not been centered in urban sites, nor on urban problems. Rather, much of my research has addressed the well-being of rural communities. However, my work over the past two years is increasingly focusing on urban systems, or at least, as described above, is *including* urban locales as part of complex systems. This work has been funded by the USDA-NRI, Federal Formula Funds (Hatch), the Canadian Rural Secretariat, and the Canadian Forest Service. As I have long been saying to the discipline of rural sociology, it is short-sighted to examine rural communities in isolation. The same principle holds for urban locations: it is the interdependence and exchange—of raw materials, of ideas, of human and social capital—that is the focus of my study. Further, the core concepts of my work—sense of place, community capacity, community well-being, dependence, and others—are equally, if not more, relevant in urban systems as in the rural locales where I have thusfar conducted my work. In short, the substantive areas in which I have developed expertise should translate very well to understanding the sustainability of urban places.

KEITH G. TIDBALL

Department of Natural Resources, Cornell University

PROFESSIONAL PREPARATION

University of Kentucky	Anthropology	BA	1998
George Washington University	International Affairs	MA	2000
Cornell University	Natural Resources	PhD	In progress

APPOINTMENTS

EXTENSION ASSOCIATE, Cornell University, Department of Natural Resources;
PROGRAM DIRECTOR, Garden Mosaics Projects. October 2003 to 2006
ASSOCIATE DIRECTOR, Civic Ecology Initiative
INSTRUCTOR, Urban Environments, Green Cities and Science Education for Civic Participation courses

AGRICULTURE PROGRAM LEADER **and** AGRICULTURE ECONOMIC DEVELOPMENT
EDUCATOR. Cornell University, Cooperative Extension,
Ontario County, New York; October 2002 - October 2003.

INTERNATIONAL AFFAIRS SPECIALIST, US Department of Agriculture, Foreign
Agriculture Service, International Cooperation and Development, Research and Scientific
Exchanges Division, Washington, D.C. November 1999 - September 2002.

RESEARCH ASSISTANT, Federation of American Scientists, Washington, D.C.
Aug 1998 - May 1999

RESEARCH INTERN, Library of Congress, Congressional Research Service, Foreign Affairs/National
Defense Division, Washington, D.C. May 1998 - Aug 1998.

PUBLICATIONS -Related to Proposed Project

Tidball, KG [“Trees and Rebirth: Urban Community Forestry in Post-Katrina Resilience.”](#) *Community Forestry and Environmental Research Fellows Program Predissertation Fellowship Final Report, 2008*

Tidball, KG [“Urban Environments: Service Learning Towards Urban Sustainability.”](#) *Extending our Reach: Voices of Service Learning at Cornell*, Faculty Fellows in Service, Cornell University, Fall 2007

Tidball, KG “Birds in Community Gardens,” *BirdScope*, Winter, Vol. 21, No. 1, pg 11, 2007. Cornell Laboratory of Ornithology.

Tidball, K. G. and ME Krasny, “From Risk to Resilience: What Role for Community Greening and Civic Ecology in Cities?” in Wals, Arjen (editor) (2007), *Social Learning Towards a more Sustainable World*, Wageningen Academic Publishers, Wageningen, The Netherlands.

Tidball, KG, and ME Krasny. Creating Garden Mosaics, One by One. *Cornell Plantations Magazine*. Summer/Fall 2006.

Tidball, KG, C Kramer-LeBlanc, and S Wolfe. TEACH US-Teaching Educators Agriculture and Conservation Holistically for Urban Society. *World Summit on Sustainable Development USDA Background Paper*, USDA/FAS/ICD/RSED, Johannesburg, South Africa, August 26, 2002.

Other Publications

Tidball, KG “Rethinking Peace Parks as Social-Ecological Systems: “Environmental Peacemaking” and Resilience.” *Paper presentation at the 93rd Meeting of the Ecological Society of America, Milwaukee, WI, Aug 3-8, 2008.*

Stedman, R & KG Tidball “Addiction or Trust, Vulnerability or Confidence? Expanding the Concept of “Dependence” in the Studies of Resource Dependent Communities.” *Paper presentation at meetings of the Rural Sociological Society, Manchester, NH July 2008.*

Tidball, KG & ME Krasny, [“Raising Urban Resilience: Community Forestry and Greening in Urban Post-Disaster and Post-Conflict Contexts.”](#) *Paper presentation at meetings of the Resilience Alliance, “Resilience 2008,” Stockholm, Sweden: April 2008.*

Tidball, KG, ED Weinstein, S Kaisler, R Grossman-Vermaas, and S Tousley. [“Stake-Holder Asset-Based Planning Environment”](#) *DOD/OSD 2007 STTR TOPIC 003 Final Technical Report, May 2008.*

Weinstein, E. and KG Tidball, *Environment Shaping: an Alternative Approach to Development and Aid. Journal of Intervention and Statebuilding*, Routledge. March 2007, Vol. 1, Issue 1.

SYNERGISTIC ACTIVITIES

Innovative Program Development and Partnership Models. As Program Director for the Garden Mosaics Projects, I provide leadership for implementation of NSF funded innovative national and international urban program partnerships of not-for-profit, youth-serving, environmental and community garden based education organizations. In collaboration with the Garden Mosaics PIs, I am responsible for building a network of and training partner organizations, staff and volunteers, and providing resource materials and support of efforts to reach thousands of youth from underrepresented populations in intergenerational community gardening and horticultural education activities.

Broadening Participation of Groups Underrepresented in Science, Mathematics, Engineering and Technology. As an International Affairs Specialist at USDA focused on education and research and scientific exchanges, I developed, organized, and implemented the USDA TEACH US (now TEACH) program (Teaching Educators Agriculture and Conservation Holistically). This project involved coordination of seven country teams and their collaborators, as well as multiple partners in each of seven US cities. The program enabled underrepresented teachers in urban elementary, middle, and high schools to travel internationally and expand knowledge of and experience with sustainable agricultural practices. These efforts were focused on recognition of the important roles teachers play in forming positive attitudes about agriculture and the environment among minority students. In recognition of this work, I received the USDA National Unsung Hero Award in 2002.

Innovations in Teaching and Training. Under agreements between the United States and Ireland, and with support from USDA’s Foreign Agriculture Service, my colleagues and I were able to contribute to the Ireland/ Northern Ireland Peace Process through implementation of international scientific exchanges focused on hands-on, inquiry based citizen science. Participants included Northern Ireland, Republic of Ireland, and United States educators. I was responsible for interagency coordination on the US side, as well as coordination of Irish agencies and community organization personnel. Through holistic teaching and training approaches focused on understanding and documenting feeding behaviors of migratory waterfowl, we were able to transcend border issues and contribute to the body of scientific information on this subject.

URBAN FOCUS

Cities experiencing social chaos may be viewed as socio-ecological systems that, as a result of a disturbance such as disaster or conflict coupled with lack of resilience, have shifted into a qualitatively different, undesirable state. I have argued that urban community greening and other "civic ecology" approaches that integrate natural, human, social, financial, and physical capital in cities, and that encompass diversity, self-organization, and adaptive learning and management leading to positive feedback loops, have the potential to play a key role in developing urban community resilience before a disaster or conflict strikes. My current research applies resilience theory to urban social -ecological systems, attempts to expand comparative analysis of resilience narratives in cities to encompass more community-based and environmental approaches, and proposes an asset- and community-based tool, i.e., urban community greening, which can serve as the focus of social learning about resilience in cities.

BIOGRAPHICAL SKETCH

DAVID A. WEINSTEIN

Senior Research Associate

Dep. of Natural Resources, 8 Fernow Hall, Cornell University, Ithaca, NY,
(607) 351-4214 phone; (607) 273-1227 aux phone; Email: DAW5@cornell.edu

EDUCATION

Dartmouth College	Environmental Science	B.A. 1973
University of New Hampshire	Botany	M.S. 1976
University of Tennessee	Ecology	Ph.D. 1981
Cornell University	Ecology	Postdoctoral 1981-'83

CURRENT POSITION

Senior Research Associate, Dep. of Natural Resources, Cornell University

RELEVANT PUBLICATIONS

- Weinstein, D.A. 2007. Project Budbreak: Monitoring how climate change affects native plants. *Cornell Plantations Magazine*. 62(2): 12-19.
- Weinstein, D.A., and P. B. Woodbury. In press. Review of Methods for Developing Probabilistic Risk Assessments. Part 1: Modeling Fire. Chapter for Book: *Advances in Threat Assessment and their Application to Forest and Rangeland Management*.
- Woodbury, P. B., and D.A. Weinstein. In press. Review of Methods for Developing Probabilistic Risk Assessments. Part 2: Modeling Invasive Plants, Pests, and Pathogens. Chapter for Book: *Advances in Threat Assessment and their Application to Forest and Rangeland Management*.
- Hong, B., D. A. Weinstein, D. P. Swaney. 2006. Assessment of ozone effects on nitrate export from Hubbard Brook Watershed 6. *Environmental Pollution* 141: 8-21,
- Weinstein, D. A., J. A. Laurence, W. A. Retzlaff, J. S. Kern, E. H. Lee, W. E. Hogsett, and J. Weber. 2005. Predicting the effects of tropospheric ozone on regional productivity of ponderosa pine and white fir. *Forest Ecology and Management* 205:73-89.

OTHER PUBLICATIONS

- Hong, B., D. P. Swaney, D. A. Weinstein. 2006. Simulating spatiotemporal nitrogen dynamics in a forested reference watershed, Hubbard Brook Watershed 6. *Landscape Ecology* 21: 195-211.
- Hong, B., R. L. Strawderman, D. P. Swaney, D. A. Weinstein. 2005. Bayesian estimation of input parameters of a nitrogen cycle model applied to a forested reference watershed, Hubbard Brook Watershed Six. *Water Resource Research* 41(3): 3007-3023.

Karnosky, D.F., K.S. Pregitzer, D.R. Zak, M.E. Kubiske, G.R. Hendrey, D.A. Weinstein, M. Nosal, and K.E. Percy. 2005. Scaling Ozone Responses of Forest Trees to the Ecosystem Level in a Changing Climate. *Plant, Cell, and Environment*. 28 (8): 965-981.

Hong, B., D. P. Swaney, P. Woodbury, D. A. Weinstein. 2005. Long-term nitrate export pattern from Hubbard Brook Watershed 6 driven by climatic variation. *Water, Air, and Soil Pollution* 160 (1-4): 293-326.

Woodbury, P. B., R. M. Beloin, D P. Swaney, B E. Gollands, and D A. Weinstein. 2002. Using the ECLPSS Software Environment to Build a Spatially Explicit Component-Based Model of Ozone Effects on Forest Ecosystems. *Ecological Modeling* 150: 211-238

RELEVANT SYNERGISTIC ACTIVITIES

Member, President's Climate Commitment Implementation Committee, Cornell Univ,
International Union of Forest Research Organizations Deputy Coordinator for Risk
assessment and modeling (2007 - present)

Chairperson, Cornell Plantations Advisory Board (2000-2007)

RELEVANT RESEARCH

My research involves analyzing the carbon sequestration potential of trees, forests, and agriculture, I have evaluated plant response to environment, constructing computer simulation models of the ecosystem dynamics in many different types of forests and landscapes. My major current projects include (1) coordination of the Cornell University effort to design a plan to achieve climate neutrality (zero net greenhouse gas emissions) on the Cornell campus, (2) development of a predictive model of nitrate export from forest and agricultural watersheds, and (3) creation of a citizen science network of plant phenology observations to monitor effects of global climate change.

RELEVANT RECENT SUPPORT

Coordination of the Climate Neutrality Working Group to organize faculty contributions to a plan for Cornell to achieve climate neutrality (zero net greenhouse gas emissions). Award from the Cornell Biogeochemistry and Biocomplexity program. June 07 - June 09. \$55,000.

Enhancing a Network for Citizen Science Observation of the Response of Plant Phenology to Global Climate Change. USDA Research and Extension Hatch and Smith-Lever Award. Oct 07 - Sept 10. \$105,000.

A Process-Based Predictor of Export from Forest and Agricultural Watersheds. Award from the Agricultural Ecosystems Program, Cornell University. Jan 06-Sept 08.\$21,000.

Citizen science network for observing changes in plant phenology from climate change. New York State Biodiversity Research Initiative. Oct 06-Sept 07. \$25,020.

NANCY M. WELLS

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College of Human Ecology E220, MVR Hall
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EDUCATION

University of California - Irvine, School of Social Ecology, Irvine, California
NIMH Post-Doctoral Trainee, Department of Psychology & Social Behavior, 2000 - 2001

University of Michigan, Horace H. Rackham Graduate School, Ann Arbor, Michigan
Ph.D. Psychology and Architecture (joint degree), April 2000

Cornell University, College of Human Ecology, Ithaca, New York
M.S. Design & Environmental Analysis, Human-Environment Relations, January 1994

Connecticut College, New London, Connecticut
B.A. *summa cum laude* with honors and distinction, Psychology, May 1986

CURRENT POSITION

Associate Professor, 2007 – present, Design & Environmental Analysis, Cornell University,
Ithaca, NY

Graduate Faculty, Horticulture Department, Cornell University, 2003 - present

RELEVANT PUBLICATIONS

- Wells, N.M. (2008). Do kids need nature? A brief review of the research evidence. In E. Goodenough (Ed.) *A Place for Play* University of Michigan Press, Ann Arbor, MI.
- Wells, N.M. and Yang, Y. (2008). Neighborhood Design & Walking: A quasi-experimental longitudinal study of low-income Southern women moving to neotraditional or suburban neighborhoods. *American Journal of Preventive Medicine*, 34(4), 313-319.
- Wells, N.M. and Lekies, K.S. (2006). Nature and the Life Course: Pathways from childhood nature experiences to adult environmentalism. *Children, Youth, and Environment*. 16 (1), 1-24.
- Wells, N.M. and Evans, G.W. (2003). Nearby Nature: A buffer of life stress among rural children? *Environment and Behavior*, 35 (3), 311-330.
- Wells, N.M. (2000). At home with nature: effects of "greenness" on children's cognitive functioning. *Environment and Behavior*, 32(6), 775-795.

OTHER SIGNIFICANT PUBLICATIONS

- Wells, N.M. & Donofrio, G.A. (In press). Urban planning, the natural environment, and public health. *Encyclopedia of Environmental Health*.

- Wells, N.M. and Harris, J.D. (2007). Housing quality, psychological distress, and the mediating role of social withdrawal: A longitudinal study of low-income women. *Journal of Environmental Psychology*, 27, 69-78.
- Wells, N.M., Ashdown, S.P., Davies, E.H.S., Cowett, F.D. and Yang, Y. (2007). Environment, Design and Obesity: Opportunities for interdisciplinary collaborative research. *Environment and Behavior*, 39 (1), 6 – 33.
- Wells, N.M. and Olson, C.M. (2007). The Ecology of Obesity: Perspectives from life course, design, and economics. *Journal of Hunger & Environmental Nutrition*, 1(3), 99-129.
- Wells, N.M. (2005). Our housing, our selves: a longitudinal investigation of women and dwelling. *Journal of Environmental Psychology*, 25, 189-206.

SYNERGISTIC ACTIVITIES

1. Living Environments Aging Partnership (LEAP), PI - developed to involve community older adults in Cornell courses related to the built and natural environment. Each semester teams of students and elders develop a product or project to improve environments for older adults. Funded by the Foundation for Long Term Care (FLTC) and the Corporation for National and Community Service (CNCS).
2. Minority Mentoring Program. Serve as faculty mentor in College of Human Ecology minority mentorship program.
3. Faculty Advisor, Cornell Elderly Partnership, Cornell University Public Service Center.
4. Co-Chair, "Ecology of Obesity, College of Human Ecology Conference, 2004 - 2005
5. Proposal Reviewer, The Robert Wood Johnson Foundation, Active Living Research Program and Canadian Institutes of Health Research, Knowledge Creation Programs Branch

URBAN RESEARCH

I have a long track record conducting research within urban areas. For the last decade, my collaboration with Habitat for Humanity (HfH) has enabled me to conduct longitudinal studies examining the relationships between housing quality and mental health; neighborhood characteristics and physical activity; in addition to nearby nature and cognitive functioning. I have collected data in cities ranging from Detroit to Atlanta. I have conducted interviews with urban women and children in the largest Michigan cities including Detroit, Grand Rapids, and Ypsilanti. More recently, my research examining environmental influences on obesity as brought me to the southeastern United States, to cities in Georgia, Alabama and Florida. I have also studied the efficacy of outdoor programs targeting urban minority youth. My research has been funded by the Robert Wood Johnson, Active Living Research Program; by the U.S. Forest Service; and by the United States Department of Agriculture.

CURRICULUM VITAE

NAME: Thomas H. Whitlow

TITLE: Associate Professor, Department of Horticulture, Cornell University

CAMPUS ADDRESS: 23 Plant Science

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EDUCATION

<u>Year</u>	<u>Degree</u>	<u>Institution</u>
1982	Ph.D. M.S.	University of California, Davis
1972	B.A./B.S.	SUNY College of Environmental Science and Forestry

Selected Publications

Barney, J. N. and T. H. Whitlow, 2007. A unifying framework for biological invasions: the state factor model. *Biol Invasions* 10:259-272.

Barney, J. N. and T. H. Whitlow. 2008. Evolution of an invasive phenotype: shift to belowground dominance and enhanced competitive ability in the introduced range. *Plant Ecol.* <<http://dx.doi.org/10.1007/s11258-008-9481-3>><http://dx.doi.org/10.1007/s11258-008-9481-3>

Bauerle, W. L., T.H. Whitlow, T.L. Setter, F.M. Vermeulen, and T.L. Bauerle. 2003. Ecophysiology of *Acer rubrum* L. seedlings from contrasting hydrologic habitats: Growth, gas exchange, abscisic acid, and stable isotope discrimination. *Tree Physiology*. 23:841-850.

Whitlow, T. H. , N. L. Bassuk, and D. L. Reichert. 1992. A Three Year Study of Water Relations of Urban Street Trees *Jour. Appl. Ecol.* 29:436-450.

Whitlow, T. H. , N. L. Bassuk, T. G. Ranney and D. L. Reichert. 1992. An improved method for using electrolyte leakage to assess membrane competence in plant tissues. *Plant Physiology* 98:198-205.

In Preparation

Whitlow, T. H. and R. S. Beil. 2008. Real time evaluation of PM2.5 deposition velocity to leaf surfaces. *Atmos. Enot.*

Whitlow, T. H. and R. S. Beil. 2008. Return frequency of extreme PM2.5 events at small domain scales. *Atmos Enot.*

Whitlow, T. H. and J. Anguita. 2008. Fine scale spatial variation in proinflammatory cytokine induction by atmospheric particulates. *Envtl. Health Persp.*

Dosmann, M. S. and T. H. Whitlow. 2008. Salt spray tolerance in coastal *Koelreutaria paniculata*: an interplay of morphological and physiological mechanisms. *Funct. Ecol.*

Synergistic activities

Urban Silviculture Project: Trees to Improve Respiratory Health

Under this broad umbrella, I have conducted numerous air quality monitoring campaigns in cooperation with New York/Cornell Cooperative Extension, the US Forest Service, the NSF Baltimore Ecosystem Study, Prof. Max Zhang (Mechanical and Aerospace Engineering, Cornell), Prof. Juan Anguita (Dept of Veterinary And Animal Science, UMass), Prof. Elizabeth Buckles (NYS College of Veterinary Science, Cornell), Melissa Peffers and Edward Burgess (Environmental Defense Fund, NYC), Dr. Thomas Matte (NY Dept. of Public Health), Dr. David Wheeler (NY DOT) and many others. Most recently I collaborated with many other researchers to monitor the effects of closing Park Ave. to traffic for 3 consecutive Saturday mornings in August. This past June, with NYCCE, I organized an interdisciplinary symposium in NYC titled Urban Forestry and Respiratory Health: Linking Science to Practice

Research in Urban Sites

I have studied the ecology of urban trees since 1982 when I joined the Urban Horticulture Institute at Cornell. A natural outgrowth of studying how trees respond to the extremes of urban environments is to examine the reciprocal effects trees have on their environment, especially the ecosystem services they render to city dwellers. Since 2002 I have been supported by the USDA and USFS to study the ability of leaves to remove fine particulates from the atmosphere, the local impact this may have on ambient particulate concentrations, and the implications this has for human respiratory health. I have developed novel approaches for both lab and field studies that are tightly time resolved and suited to quantifying particulate dynamics at small spatial scales in cities. I have extended my monitoring protocol to include analysis of induction of cytokines active in bronchial inflammation caused by fine particulates. This permits me to characterize landscapes in terms of their risk of inducing an asthma attack.

Ke 'Max' Zhang, Ph.D
Assistant Professor
Sibley School of Mechanical & Aerospace Engineering
Cornell University

287 Grumman Hall
Cornell University
Ithaca, NY 14853
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A. Professional Preparation

Tianjin University, China	B. S. E.	1998	Thermal Engineering
Tianjin University, China	B. S.	1998	English Language
University of California, Davis	Ph. D.	2004	Mechanical Engineering

B. Appointments

Assistant Professor, Mechanical & Aerospace Engineering, Cornell University 8/06 - present
Postdoctoral Researcher, University of California, Davis 8/02 – 7/06

C. Awards

University Corporation for Atmospheric Research Fellowship 2000, 2002
Atmospheric Chemistry Colloquium for Emerging Senior Scientists Fellowship 2005

D. Publications

(i) Publications Most Closely Related to the Project

Zhang KM, Wexler AS, Niemeier DA, Zhu YF, Hinds WC, and Sioutas C "Evolution of particle number distributions near roadways Part III: Traffic analysis and on-road size resolved particulate emission factors," *Atmospheric Environment* 39(22): 4155-4166, 2005.

Zhang KM, Wexler AS, Zhu YF, Hinds WC, and Sioutas C "Evolution of particle number distributions near roadways Part II: The road-to-ambient process," *Atmospheric Environment* 38(38): 6655-6665, 2004.

Zhang KM and Wexler AS, "Evolution of particle number distributions near roadways Part I: Analysis of aerosol dynamics and its implication for engine emissions measurement," *Atmospheric Environment* 38(38): 6643-6653, 2004.

Westerdahl, D., Wang, X., Zhang, K.M., and Pan, X-C., Characterization of on-road vehicle emission factors and micro-environmental air quality in Beijing, China, accepted by *Atmospheric Environment*.

(ii) List of Significant Related Publications

Nolte, C.G., P.V. Bhave, Dennis, R.L., Arnold, J.R., Zhang, K.M. and A.S. Wexler, "Modeling Urban and Regional Aerosols – Application of CMAQ-UCD module to a coastal urban site", *Atmospheric Environment* 42(13): 3179-3191, 2008.

Zhang, K.M. and Wexler, A.S., Modeling Urban and Regional Aerosols – Development of the UCD Aerosol Module and Implementation in CMAQ Model, *Atmospheric Environment* 42(13): 3166-3178, 2008.

Zhang KM, Wexler AS, Knipping EM, Bhave PV and Tonnesen GS "Size distribution of sea salt emissions as a function of relative humidity," Atmospheric Environment 39(18): 3373-3379, 2005.

Zhang KM and Wexler AS "An asynchronous integrator for atmospheric applications: aerosol dynamics," Atmospheric Environment 40(24): 4574-4588, 2006.

Zhang KM and Wexler AS, "A hypothesis for growth of fresh atmospheric nuclei," Journal of Geophysical Research-Atmospheres 107(D21), 4577, doi:10.1029/2002JD00218, 2002.

Zhang KM and Wexler AS, "Modeling the number distributions of urban and Regional aerosols: theoretical foundation," Atmospheric Environment 36(21): 1863-1874, 2002.

F. Synergistic Activities

Instructor, MAE 501: Future Energy Systems, 2007 - present

Instructor, MAE/EAS 648: Air Quality and Atmospheric Chemistry, 2007 - present

E. Current Research Projects in Urban Cities

- PI, University Transportation Research Center (UTRC): "Hotspot Analysis of Fine Particles (PM_{2.5}) for Environmental and Health Impacts Assessment of Transportation Emissions in South Bronx", January 2008 - December 2008
- Co-PI, New York State Energy Research and Development Authority (NYSERDA): "Impacts of Clean Diesel Strategies/Technologies on Air Quality and Exposure in New York", February 2008-January 2010
- PI, New York State Energy Research and Development Authority (NYSERDA): "Modeling microenvironmental air quality in Rochester, NY", August 2008-July 2010
- PI, US Environmental Protection Agency (USEPA): "Evaluating urban air quality impacts of low sulfur fuel and clean vehicles in Beijing, China", March 2008 – December, 2008
- Co-PI, Collaborative Activities for Research and Technology Innovation (CARTI): "Characterization of the Ambient Air Quality in Syracuse, NY", May 2007 - April 2010