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**ANNOUNCEMENT**

**Academic Venture Fund Awards**

For release on: May 19, 2009

The Cornell Center for a Sustainable Future announces the spring 2009 awards from the **Academic Venture Fund**. Initiated in 2008, this fund is designed to stimulate original, cross-disciplinary research at Cornell in sustainability science, emphasizing work having the potential to involve external partners such as industry, government, foundations, and NGOs. The 26 proposals submitted in response to 2009 AVF solicitation represent a vibrant, innovative, interdisciplinary movement at Cornell.

Exceptionally broad representation was seen in the proposals, which included investigators from the Colleges of Agriculture and Life Sciences; Art, Architecture and Planning; Arts and Sciences; Engineering; Human Ecology; and Veterinary Medicine; the Johnson Graduate School of Management; the Faculty of Computing and Information Science; the Schools of Industrial and Labor Relations; the Cornell Cooperative Extension; the Boyce Thompson Institute for Plant Research; and the Laboratory of Ornithology. Nearly 90% of the proposals were cross-departmental and over three-quarters of the submissions included investigators from more than one college or school at Cornell. Nearly a third of the submissions were from teams spanning three or four colleges/schools.

To evaluate the submissions, CCSF convened three review panels, each composed of six distinguished faculty. Each proposal received at least three written reviews in addition to a panel review. The ranked funding recommendations of the three panels were reviewed by the CCSF leadership team and final award decisions were based on the reviews and available funding. Five proposals were selected for funding in this round of the AVF. Many more promising proposals were submitted than CCSF could fund and there are tentative plans to open another AVF competition in six months to a year.

Created in the fall of 2007 by the Office of the Provost, the Cornell Center for a Sustainable Future (CCSF) serves the sustainability research community at Cornell. The Center addresses the breadth of sustainability research with three interconnected themes: **Energy, Environment, and Economic Development.**

To learn more about the CCSF, please visit our website at <http://www.ccsf.cornell.edu/>. For information about the twelve AVF awards made in 2008, visit: <http://www.ccsf.cornell.edu/grants/AVF/AVF2008.php>.

### **Sustainability of Food Systems**



Consumer interest in “eating local” has increased sharply in recent years, although locally grown food still accounts for a small share of food sales. Local food systems offer environmental and health benefits and support rural development, but the conventional supply chain also has its advantages: variety, convenience, and a year-round inexpensive product. This two-part, multidisciplinary project will yield a method for assessing the sustainability of food systems, including farming practices, transportation, processing and storage, food consumption, and disposal of wastes. A series of seminars and workshops will bring together a diverse group of Cornell scientists and external leaders in sustainable food systems to develop a methodological framework for assessing the benefits and constraints of food systems. An exploratory study will apply the group’s model, comparing the sustainability of one local and one conventional supply chain for a fruit (apples) and a vegetable (leafy greens). The project will quantify the overall sustainability of a shift from conventional to local food systems, shedding light on key policy questions about the nation’s food supply, including environmental impacts, the use of natural resources, diet quality, and the economic and social welfare of farmers, distributors, and consumers.

*Investigators:* Miguel Gomez (AEM), Huaizhu Gao (CEE), Dennis Miller (FDSC), Ardyth Gillespie (NS), Jonathan Russell-Anelli (CSS)

*Duration:* 24 months

### **Assessing Carbon Sequestration in Complex Agricultural Landscapes**



Land use drives climate change—it is responsible for nearly one-third of total carbon emissions—and climate change, in turn, threatens global food production. Major national and international initiatives are in place to assess carbon budgets for trading and/or offset investment programs for the energy, forestry, and industrial sectors, but there are no comparable programs for complex agricultural landscapes. A significant barrier to assessing such carbon provisions has been the absence of viable methods for assessing emissions, sequestration, and storage from landscapes that include multiples of crops, trees, and livestock. This project will provide a practical new approach to landscape-level carbon accounting. Beginning with comprehensive soil samples and data on land use, vegetation, topography, and water resources, the group will use statistical and GIS methods to identify the minimum data sets required for rigorous, but cost-effective monitoring of changes in land use carbon and related ecosystem services in complex rural landscapes with many small-scale farmers and other land users. Researchers will carry out field analyses in New York State and Zambia to refine the sampling protocols and statistical tools. This novel methodology will support emerging efforts to promote and regulate climate-friendly agriculture and provide access by small landowners to carbon trading and/or offset investment programs in the United States and around the world.

*Investigators:* James Lassoie (NTRES), David Wolfe (HORT), Alexander Travis (VET), Todd Walter (BEE), Philip McMichael (DSOC)

*Duration:* 12 months

### **The Impact of Green Energy Development on Rural Community Sustainability**



“Green energy” projects promise substantial benefits: reduced carbon emissions, energy sustainability, domestic energy security, and local economic development. With rising energy costs and impetus from a new federal administration, green energy projects now proliferating in the Northeast include wind farms, natural gas extraction, carbon sequestration by reforestation and underground injection, and biofuel agriculture. These opportunities, however, may carry significant risks for rural communities, including impacts on ecological systems, deterioration of natural amenities, land use changes, stressed municipal

services, greater economic inequality, and a “boom/bust” cycle of economic development. This study will evaluate the sustainability of rural communities in the face of a large-scale reorientation of the nation’s energy supply. Focusing on communities touched by green energy development in the Allegheny Plateau region of New York and Pennsylvania, researchers will develop a model for assessing the cumulative effects of multiple energy developments on the local economy and community well-being. The resulting framework will aid the effective implementation of green technology by predicting likely impacts of development—both positive and negative—and pinpointing regions with greater resilience or risk.

*Investigators:* Richard Stedman (NTRES), Rod Howe (DSOC), Susan Riha (EAS), Susan Christopherson (CRP)

*Duration:* 12 months

### **Micropowdered Biomass Combustion: A Sustainable Energy Source for Cornell and Upstate New York**



Converting solid biomass to liquid fuels is a primary focus of biomass energy research—but this conventional approach wastes much of the available plant energy. When the plant itself is burned directly to generate heat, the full fuel energy of the biomass is released. Burner design remains a challenge. Summerhill Biomass Systems has pioneered a promising approach to biomass combustion using micropowdered biomass made from finely ground wood chips. Cornell researchers will test a prototype of the combustion system to characterize emissions and determine how factors such as temperature, fuel composition, and particle size distribution can be manipulated to control pollutant levels. Initial experiments will use powdered hardwoods, the most abundant and commercially attractive biomass feedstock in upstate New York. This clean combustion technology offers a fully local, sustainable energy solution that does not require crop land or fertilizer. Micropowdered biomass combustion has the potential to replace heating oil, kerosene, and propane in a wide variety of industrial, agricultural, and residential applications that require compact, intense flames controlled with the flick of a switch. The research group expects to seek industrial partners to collaborate in producing a viable powder preparation and hardware suitable for test installations at Cornell.

*Investigators:* Robert Thorne (PHYS), Elizabeth Fisher (MAE), Frederick Gouldin (MAE), Ke Zhang (MAE), Antonio Bento (AEM)

*Duration:* 12 months

### A Solar Cell Using Inorganic “Grass”



Silicon solar cells are a versatile, reliable energy conversion technology, but high fabrication and installation costs have limited their adoption. This project promises a new low-cost, low-energy technique for creating silicon solar cells. The group’s innovative process—developed at Cornell—replaces expensive single-crystal silicon wafers with grass-like silicon nanowires grown on metal. The nanowire solar cells are made with simple self-assembled patterning and a self-aligned growth technique, instead of the costly substrates and production processes that have kept solar power out of the reach of many consumers. In the course of the study, researchers will refine the mechanism for single-crystal nanowire growth on a metal substrate, demonstrate the technique’s characteristics, and develop appropriate production technology and prototypes with collaborators at IBM Research and Brookhaven. If proven comparable to current crystalline solar cells, the new solar cells will provide a radical alternative to solar cells now on the market—at a substantially lower price. With the added advantage of compatibility with the solar power infrastructure already in place, nanowire solar cells will constitute a major step toward the goal of making clean, sustainable energy widely available.

*Investigators:* Sandip Tiwari (ECE), Jiwoong Park (CHEM), Christopher Ober (MSE)  
*Duration:* 12 months

The Cornell Center for a Sustainable Future advances multidisciplinary research and cultivates innovative collaborations within and beyond Cornell to foster a sustainable future for all.



Learn more about CCSF on the web:  
[www.ccsf.cornell.edu](http://www.ccsf.cornell.edu)