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ANNOUNCEMENT
Academic Venture Fund Awards
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The Atkinson Center for a Sustainable Future (ACSF) announces its spring 2013 **Academic Venture Fund** awards. Designed to stimulate original cross-disciplinary research in sustainability, the annual AVF seed awards emphasize research with potential to grow by engaging external partners, including industry, government, foundations, and NGOs, and create viable solutions to our world's most pressing problems. The 33 proposals submitted represent a vibrant, innovative, and interdisciplinary research effort under way at Cornell. Nine proposals were ultimately selected, for total funding of approximately \$860,000.

The current round of selections launches an impressive range of sustainability initiatives. A team of engineers, health experts, and social scientists will build an interactive smartphone app that provides convenient, personalized nutrition monitoring. Another project brings together an economist and a soil scientist to test a directly traded coffee initiative that will encourage sustainable practices among the poorest small coffee growers and give them access to high-end markets. A team of water experts across several disciplines will develop a hydrologic database and a set of environmentally sound water standards for the Andes, a region ripe for new water and hydropower projects.

This group of awards includes investigators from five colleges: Agriculture and Life Sciences, Arts and Sciences, Engineering, Human Ecology, and Veterinary Medicine. Nearly 80 percent involve investigators from three or more departments, and more than half encompass two or more of the Center's sustainability themes of **energy, environment, and economic development**.

The AVF supports projects that would not be funded by traditional granting organizations because the proposed research is interdisciplinary, still early in development, high risk, or some combination of these factors. The 33 submissions were rigorously reviewed by panels composed of faculty with expertise from across the university. Many more promising proposals were submitted than could be funded.

To learn more about the Atkinson Center and the AVF awards, visit our website at www.acsf.cornell.edu/AVF.

*The Academic Venture Fund is supported by generous contributions from
David and Patricia Atkinson, Kathleen Marble, and the colleges.*

ACSF Blog:
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Monarchs: Conservation and Controversy



The monarch butterfly is a conservation icon. Environmental groups warn of increasing threats to the charismatic butterflies; an influential 2013 report documented populations at a 20-year low. But earlier studies showed no decline in monarch populations. The researchers will resolve these contradictory findings, verify the trend of monarch populations, and then conduct extensive interviews to tackle some broader questions: How do scientists, NGOs, and other conservation actors respond to scientific ambiguity? And how do contradictory findings about icons like the monarch shape public, organizational, and scientific messages about environmental change?

Investigators: Anurag Agrawal (EEB), Steven Wolf (NTRES), Bruce Lewenstein (COMM)

Funding: \$90,000

Duration: 12 months

A Toilet with Biological Pathogen Control



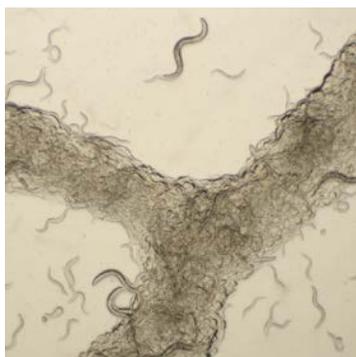
The developing world urgently needs proper sanitation to suppress diseases spread by human waste. Cornell researchers have invented a simple toilet that uses a solar-heated fermentation bag to produce butyric acid—an integrated bioreactor that kills *E. coli*, parasitic worm eggs, and other pathogens. Treated toilet contents are safe to apply as fertilizer. While continuing to test the technology, the team will survey three Ethiopian communities to establish that the design is culturally acceptable and construction and operating costs sustainable—the next step toward widespread adoption of this innovative toilet.

Investigators: Lars Angenent (BEE), Dwight Bowman (VTBIO), Tammo Steenhuis (BEE), David Lee (AEM), Fouad Makki (DSOC)

Funding: \$100,000

Duration: 12 months

Small Molecules to Vanquish Parasitic Worms



Soil-transmitted worms—including *Ascaris*, *Trichuris*, and hookworm—threaten 4.5 billion people worldwide, compromising human health and productivity in the world's poorest regions. Children are at the greatest risk. Parasitic worms also attack young pigs, raising the cost of this popular protein source. Cornell researchers will apply cutting-edge chemical technology to discover novel small molecules, called ascarosides, in *Trichuris* worms. An ascaroside-based vaccine to protect children and livestock from worm infections is the ultimate goal—boosting economic development, slashing human and animal health care costs, and reducing soil drug contamination.

Investigators: Judith Appleton (BAKERI), Frank Schroeder (CHEM)

Funding: \$67,212

Duration: 12 months

The Cornell NutriPhone: Personalized Micronutrient Analysis



A team of Cornell engineers, health experts, and social scientists are developing a smartphone-based system for personalized micronutrient monitoring called the NutriPhone. Inadequate nutrition is responsible for a variety of health and social problems. Many micronutrient deficiencies are reversible, but lack of a simple system for diagnosing deficiencies and tracking an individual's diet means that most sufferers are unaware they aren't getting the nutrients they need. This new technology promises a reliable, cheap, and convenient way to monitor nutrition levels with an interactive phone app.

Investigators: David Erickson (MAE), Saurabh Mehta (NS), Julia Mehta (NS),
Joe Francis (DSOC)

Funding: \$100,000

Duration: 12 months

An Environmental Flows Framework for the Andes



Flowing waters from tropical mountains sustain a substantial part of the world's population. These resources are poorly understood, despite growing regional demand for water. Cornell researchers will develop a hydrologic database for the tropical Andes to promote environmentally sound water policy for riverine biodiversity and ecosystem services. They will organize a working group in Ecuador, bringing together water experts from universities, government agencies, and nonprofits to assess coming changes and vulnerabilities in Andean running waters and develop standards for environmental flows in tropical mountain regions.

Investigators: Alexander Flecker (EEB), Michael Todd Walter (BEE), Gregory Poe (AEM),
William Fisher (NTRES)

Funding: \$91,820

Duration: 12 months

Sustainable Coffee: A Better Model for Smallholder Farmers



Several coffee certification schemes are designed to integrate smaller growers in developing countries, yet the certifications' requirements actually exclude the poorest farmers. The relationship coffee model (RCM) provides an alternative. RCM allows smallholder farmers to form long-term trading partnerships with roasters, establishing fair prices and ensuring a consistent product. Reports of RCM's positive economic and environmental impacts have been anecdotal so far. Partnering with a leading buyer of sustainable coffee, the researchers will engage Colombian smallholders to develop farm-level sustainability performance

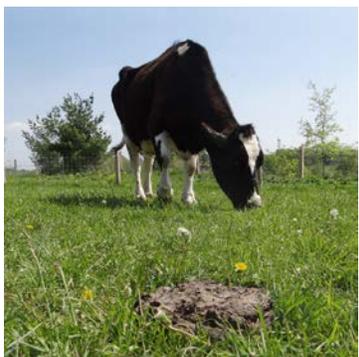
indicators and provide the first rigorous analysis of RCM.

Investigators: Miguel Gómez (AEM), Harold Van Es (CSS)

Funding: \$52,118

Duration: 12 months

Biodegradation of Cattle Manure Using Fly Larvae



Manure is a major challenge for livestock operations and a threat to groundwater and human health. This team is creating a natural strategy for waste management and developing a profitable animal feed at the same time. The researchers will use dairy manure as a nursery for fly larvae. The larvae biodegrade the manure, reducing mass and excess nutrients so that it can be safely sold as organic compost. The harvested larvae are ground into larva meal—a high-protein food source for animals that substitutes for fishmeal and human food grains.

Investigators: Vimal Selvaraj (ANSC), Jan Nyrop (ENT), Patricia Johnson (ANSC), Mark Milstein (CSGE)

Funding: \$125,000

Duration: 18 months

Understanding Clouds for Better Climate Prediction



More accurate climate change predictions require a better understanding of clouds, which have an important impact on the Earth's climate. Yet scientists lack basic information about "cloud physics." Clouds' growth, evolution, and properties depend on water condensation and freezing mediated by aerosols. The research team will build new experimental instruments to measure the properties of supercooled liquid water and refine kinetic models of condensation and freezing. These fundamental findings about water's behavior will bring new precision to climate predictions and simulations of the atmosphere.

Investigators: Abraham Stroock (CBE), James Engstrom (CBE), Peter Hess (BEE), Natalie Mahowald (EAS), Poul Petersen (CCB)

Funding: \$145,000

Duration: 18 months

What Causes Brown Tides?



Harmful algal blooms (HABs)—often brown or red—are increasing worldwide, spurred by global warming, industrial development, and agriculture. HABs pose a serious threat to fish and aquatic plants, depleting drinking water resources and disrupting the sustainability of our ecosystems. The research team will construct a microfluidic device with more than 80,000 microhabitats to investigate the environmental conditions that cause HABs to form. Identifying the environments that trigger rapid algae growth will allow policymakers and regulatory agencies to predict, control, and eliminate HABs for safer water and sustainable aquatic ecosystems.

Investigators: Mingming Wu (BEE), Beth Ahner (BEE), Nelson Hairston (EEB), John Guckenheimer (MATH)

Funding: \$90,000

Duration: 12 months