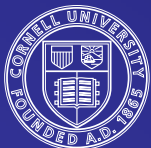


Cornell Center for a Sustainable Future



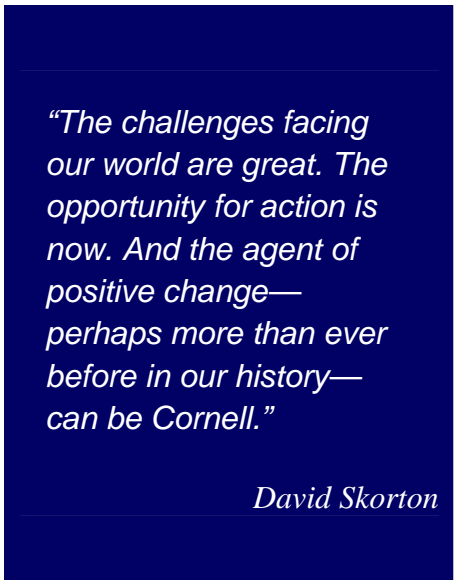
**Annual Report
2008**



Cornell University

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CCSF Mission

CCSF advances multidisciplinary research and cultivates innovative collaborations within and beyond Cornell to foster a sustainable future for all.

About the CCSF

Created in 2008 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: **Economic Development, Energy, and Environment.**

CCSF supports and adds value to sustainability efforts across Cornell, including programs and initiatives in Cornell colleges, schools, centers, institutes, and offices, including the Institute for Social Sciences, the Presidents Climate Commitment Implementation Committee, the Office of Environmental Compliance and Sustainability, Cornell International Institute for Food, Agriculture, and Development, Bronfenbrenner Life Course Center, Center for Global Sustainable Enterprise, Northeast Regional Climate Center, and many others.

CCSF is funded through a generous donation from the **David R. Atkinson Fund for a Sustainable Future**, with additional funding from **Cornell University, Michael Zak, the Toward Sustainability Foundation, and Cornell alumni and friends.**



Message from the Directors

Cornell was founded in 1865—not to train a professional class, as had previously been the norm in higher education, but to help a society emerging from sociopolitical upheaval to grapple with rapid technological, institutional, and economic change. Nearly 150 years later, Cornell maintains an unsurpassed commitment to rigorous and relevant research to address society’s most important challenges.

The Cornell Center for a Sustainable Future (CCSF) was born of a multiyear, cross-campus dialogue on sustainable development. In a time of widespread retrenchment in higher education, sustainability is one of the few areas of real growth. The reason is simple: *the world faces serious challenges for which traditional scientific excellence is necessary but not sufficient.* Problems related to energy, the environment, and economic development are interlocked, transcending individual disciplines. The science and engineering needed to develop clean technologies cannot be separated from the ecological study of Earth’s integrated human and natural systems or from the social science of human behavior and well-being.

Sustainability research requires new ways of thinking and organizing that build on the successes of traditional, discipline-based research and teaching to interconnect distinct research communities and integrate researchers with practitioners. CCSF therefore advances a “disciplinary-plus” model that connects disciplines through problem-oriented research and external partnerships to achieve important discoveries that



Francis J. DiSalvo, *Director*

Anurag Agrawal, *Associate Director, Environment*

Christopher Barrett, *Associate Director, Economic Development*

Jefferson Tester, *Associate Director, Energy*

Helene Schember, *Executive Director*

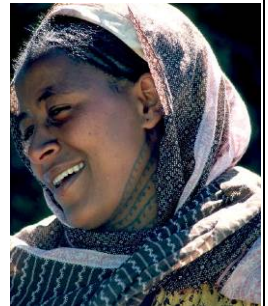
David Dieterich, *Partnerships Director*

have tangible, real-world impact. This model requires an emphasis on creating “connective tissue” between those with appropriate talents and expertise in order to catalyze new intellectual collisions that spark discovery and real progress for humanity.

We began operations in 2008, hiring our last staff member and occupying offices in Rice Hall during the fall semester. *In this first partial year, more than 125 faculty across nine colleges and schools have become involved in CCSF’s various activities.* CCSF-supported faculty, centers, and institutes have launched a range of highly innovative new research collaborations across campus and with industry, government, and the not-for-profit sector. In just these few months, CCSF-affiliated faculty and units have already accomplished noteworthy achievements, as detailed in the pages that follow. It is

enormously gratifying to us at CCSF to launch new activities that lead to the subsequent successes of our colleagues, students, and partners. These are early days at CCSF, but all indications are that our model is working:

Sustainability is flourishing at Cornell.



Message from David Atkinson



I am very excited that Cornell has established the Cornell Center for a Sustainable Future. Let me explain why.

It's my view that the sustainability issues confronting mankind are formidable. The world's population may well increase 40 percent to nine billion by 2050. With continued economic growth and growth in real incomes in the emerging economies, the move toward improved diets may lead to a doubling in demand for the world food crop by mid-century.

This growth in food demand will take place in a world in which some forms of agricultural production are already unsustainable. Examples include agricultural production based on irrigation using underground aquifers or runoff from disappearing mountain glaciers. A further complication for boosting crop output is the 45-year trend of decelerating improvement in the yield per acre of key agriculture crops.

Another important issue is that the world's economy is based on an abundance of low-cost energy. We are most likely approaching a peak in conventional oil production and—excluding the impact of the current world economic downturn—moving into an era of higher-cost energy. New technologies and alternative sources are sorely needed.

These challenges are occurring in a world where greenhouse gasses are driving global warming. These emissions need to be significantly reduced. Based on current thinking, global warming that is already inevitable will heat-stress agricultural production,

increase the chances of drought, and lead to more violent and unpredictable weather.

These increased human demands on the planet are placing enormous pressure on the environment and the earth's biodiversity. Some biologists think we are witnessing the sixth great species extinction since the beginning of life on earth.

It has been encouraging in recent decades to see many countries transition to vibrant emerging economies, but unfortunately, many other countries and large numbers of people remain extremely poor. There is a growing disparity between those doing well and those in abject poverty—a worrying source of world instability.

Problems in sustainability are interrelated and involve many disciplines. Solutions are likely to come from addressing these issues on an interdisciplinary basis. Universities are the best institutions in America to grapple with these pressing challenges, and Cornell, as a distinguished private and land-grant university with a leading position in the agricultural sciences, is the best positioned American university to take on crucial challenges in sustainability.



David Atkinson '60

Cornell University Council
Chair, CALS Task Force on Environmental
Sustainability and Development

Highlights of 2008

Since CCSF opened in the spring of 2008, more than 125 faculty from nine different colleges and schools have joined in various CCSF activities around sustainability. The array and potential of the scholarship launched is stunning, matched only by the energy and ingenuity of the faculty, staff, and students whom CCSF supports.

Twelve multidisciplinary faculty groups won highly competitive **Academic Venture Fund (AVF) awards** to launch innovative new collaborative research programs or to convene workshops drawing together Cornell experts and external partners. Three-quarters of the AVF proposals included investigators from more than one college or school. **Twice monthly, CCSF hosted a topical lunch that brought together 10–20 faculty, staff, and students from across campus**, most of them previously unfamiliar to one another, to discuss a sustainability-related area of research. In **collaboration with the Presidents Climate Commitment Implementation Committee**, CCSF awarded four competitive small grants to faculty-led projects in support of the development of Cornell's Climate Action Plan. We helped sponsor **six conferences and workshops around sustainability themes**, as well as the **International Scientific Committee on Problems of the Environment Biofuels Project**, led by Bob Howarth of Ecology and Evolutionary Biology, and contributed to **eight major multi-investigator, multiyear proposals requesting more than \$80 million**. The first of these, led by Carla Gomes of Computer Science and Applied Economics and Management, was one of only four projects (out of more than 100 proposals) to receive a National Science Foundation Expeditions in Computing award for \$10 million to establish Cornell's new Institute for Computational Sustainability.

The bedrock of a research university is its faculty. **Recruitment and retention of the finest minds is prerequisite to global leadership in sustainability.** CCSF has already played a **central role in this critical area**. We helped retain two key sustainability faculty: Jocelyn Rose, a plant biologist conducting fundamental work on plant cell walls relevant to biofuel production, and Stuart Hart, professor of management and the S. C. Johnson Professor of Sustainable Global Enterprise. Along with the College of Agriculture and Life Sciences, CCSF also launched a **cluster hire in climate change science**, with a focus on atmospheric science and terrestrial biogeochemistry. The current hiring effort is a collaboration representing eight departments across three colleges. Subsequent phases will focus on the social sciences and humanities and on design and engineering issues relevant to climate change. Finally, we launched a strategic review of areas of current or prospective Cornell preeminence in sustainability scholarship, around which upcoming cluster hires will be organized.

With its team in place and its offices in Rice Hall opened as of November, **CCSF activities are accelerating rapidly**. Go to <http://sustainablefuture.cornell.edu> to see the range of exciting activities Cornell faculty, staff, and students are initiating. **Sustainability scholarship is flourishing at Cornell!**



Academic Venture Fund Awards

The Academic Venture Fund (AVF) is a new funding initiative launched in 2008. Intended to stimulate original cross-disciplinary research in sustainability science at Cornell, the fund promotes activities with the potential to attract external partners in industry, government, nongovernmental organizations, and foundations. The 35 proposals received represent a vibrant, innovative, interdisciplinary movement for sustainability at Cornell. In this first year of funding, CCSF evaluated proposals from many colleges and schools across the Cornell campus. Three-quarters of the proposals included investigators from more than one college or school. The funding requests exceeded \$3.5 million, and we were obliged to decline many promising proposals. After an extensive peer and panel review process, CCSF funded 12 proposals totaling \$885,000. The second AVF competition will take place in the spring of 2009.

Research Projects

Improving the Stability and Productivity of Algal Bioreactors for Biofuel Production

Aquatic microalgae offer several features that make them an attractive prospect for biofuel production, including rapid growth and the ability to thrive on marginal land and in brackish water. Despite this potential, no large-scale facilities for commercial algal biofuel production currently exist, due to significant profitability and scale-up problems. Using a well-studied algal species, *Chlamydomonas reinhardtii*, the research team of Beth Ahner (BEE), Ruth Richardson (CEE), and Maureen Hanson (MBG) will focus on the production of a high-value



industrial enzyme, along with oil and carbohydrate accumulation. They will develop diagnostic proteomic methods for algal culture monitoring involving rapid detection of specific proteins in a complex background—a new tool that stands to increase output of both the enzyme and lipids or oil for biodiesel.

Integrated Digital Design Environment for Sustainable Architecture

Commercial, industrial, and residential buildings are responsible for approximately 48 percent of the total energy use in our country. Architects need tools for life-cycle analysis, material evaluation, and energy modeling in the early stages of the design process, when decisions that affect the long-term sustainability of buildings are made. The research team of Don Greenberg

(JGSM, ARCH), Kevin Pratt (ARCH), Dana Cupkova (ARCH), and Ken Torrance (MAE) will develop interactive visual and analytic tools that will integrate architectural form finding and environmental analysis in a seamless three-dimensional digital environment. The group will create new visualization methods for energy simulations, verifying the simulations with field measurements in a number of Cornell's new buildings.



Forecasting Disease and Economic Consequences of Climate Change

C. Drew Harvell (EEB), Laura Harrington (ENTOM), Kelly Zamudio (EEB), Stephen Ellner (EEB), Art DeGaetano (EAS), Carla Gomes (CIS, AEM), and Katherine McComas (COMM) have formed a Disease and Climate Network at Cornell to address the critical challenges of climate change on species diversity, conservation, and health. The team will develop algorithms and computational tools to forecast climate-driven disease outbreaks in corals, amphibians, and mosquito-borne infections in humans, which will serve all researchers interested in human and wildlife infectious diseases. They ultimately aim to project climate-driven damage to biodiversity and human health and estimate the economic impacts of disease outbreaks driven by climate change, with a larger goal of promoting international policy change.



Academic Venture Fund Awards

Environmental, Energetic, and Economic Potential of Biochar



Modern bioenergy systems can produce biochar, a stable charcoal product. When applied to agricultural fields, biochar greatly enhances crop yields, while reducing the need for traditional

chemical fertilizers—and the environmental impact of croplands. Cornell scientists Johannes Lehmann (CSS), Norm Scott (BEE), Brent Gloy (AEM), Antonio Bento (AEM), Stephen Younger (CFNP), Janice Thies (CSS), John Gaunt (CSS), Lindsay Anderson (BEE), Drew Lewis (CUAES), and Francis Vanek (CEE) aim to quantify biochar's potential as a tool to fight climate change. Their integrated economic, energy, and life-cycle data analysis will provide a framework for further research to establish biochar as the sole option within the dominant and emerging bioenergy technologies that currently provides carbon-negative energy and safe sequestration of atmospheric carbon dioxide.

Understanding Aflatoxin Accumulation in Maize



Mycotoxins—toxic compounds produced by fungi—contaminate an estimated quarter of the world's food supply. Chronic exposure to one of the

most potent mycotoxins, aflatoxin, has recently been shown to suppress the immune system and stunt growth. Professors Michael Milgroom (PLPA), Rebecca Nelson (PBG, PLPA), and Charles Nicolson (AEM) will examine aflatoxins in maize in East Africa, with an initial emphasis on low-resource maize-growing farm households. The ultimate objective is to identify the most effective and feasible interventions to reduce aflatoxin exposure for high-risk populations. The team will also conduct a pilot project to begin to quantify the relative impact of agronomic, environmental, and behavioral fac-

tors on aflatoxin accumulation in maize and exposure in humans.

Vibro-Wind Technology

Francis Moon (MAE), Ephrahim Garcia (MAE), Hod Lipson (MAE), Charles Williamson (MAE), Wolfgang Sachse (TAM, MAE), and Kevin Pratt (ARCH) will



investigate the principles and feasibility of vibro-wind power: harvesting energy from the wind as it flows around commercial and residential buildings. An alternative to conventional wind turbines, vibro-wind power extracts energy from small vibrating elements mounted on the structure, converting kinetic energy into electrical energy that can be used in the building's operation. The group will analyze the effects of wind on single and multiple interacting flexible structures, from the millimeter to the meter scale. This new technology for integrated power generation may complement solar energy, especially in regions like central New York where solar availability is low and in areas of high building density.

Plug-in Hybrid Electric Vehicles

Plug-in hybrid electric vehicles (PHEVs) have launched an electrified transportation sector. K. Max Zhang (MAE), Tim Mount (AEM),



Bob Thomas (ECE), Lindsay Anderson (BEE), Oliver Gao (CEE), Ying Hua (DEA), Andrew Hunter (CBE), Francis Vanek (CEE), and Ray Zimmerman (AEM) will evaluate the effects of electrifying transportation on energy use and emissions. They will study PHEVs as distributed energy systems, assessing their potential to accommodate renewable energy and link the transportation, utility, and building sectors. The project will culminate in a symposium on the electrified transportation sector and its implications for New York State.

Academic Venture Fund Awards

Workshops

Cornell Workshop on Large-Scale Wind-Generated Power



Wind power represents the most rapidly growing renewable energy source in the United States and an important growth industry for the state of

New York. Led by Professors David Caughey (MAE), Zellman Warhaft (MAE), and Alan Zehnder (TAM), this workshop will bring world-renowned experts in the field of wind power to Ithaca to consult with Cornell faculty interested in developing a major program in this area. Through plenary lectures open to the public and in-depth working groups, the event will address critical research issues that must be resolved in order to meet the U.S. Department of Energy's ambitious goal of generating 20 percent of the nation's electrical power from the wind by 2030.

Managing Sources of Uncertainty for Sustainable Resource Management

Evan Cooch (NTRES), Bernd Blossey (NTRES), Daniel Decker (NTRES), Richard Stedman (NTRES), Jerry Stedinger (CEE), Jon Conrad (AEM), Cliff Kraft (NTRES), Carla Gomes (CIS, AEM), and David Shmoys (ORIE) will host a workshop on adaptive resource management (ARM), an approach for progressively reducing uncertainty through management actions, for researchers in a wide range of disciplines. While the basic tenets of ARM are well established, several important technical challenges remain. The group will devise a structure for accurately describing the uncertainties in real world systems and identify the most robust and efficient methods and tools for optimal decision making in uncertain conditions.

Building Social Networks for Biological Inventories and Information

We are more likely to value and protect the organisms around us when we understand them. Recent information technology that leverages social networks offers a powerful strategy for promoting positive behavioral changes toward the environment. This workshop, organized by Harry

Greene (EEB), Janis Dickinson (NTRES, LabO), Shorna Broussard (NTRES), Josh Donlan (EEB), Geri Gay (COMM), Johannes Gehrke (CS), Steven Kelling (LabO), Kathleen O'Connor (JGSM), and Brian Wansink (AEM), will play a central role in developing the first social network for the environment, simultaneously reconnecting citizens with their environment and aggregating biodiversity data for improved management.

Urban Trees for Sustainable Cities



This workshop—the first step in the larger Cornell Community Forestry initiative—will bring together urban forestry and sustainability experts from

Cornell and across New York State to define a research agenda and methodology for understanding the social and ecological outcomes of urban tree planting in New York City. It will be led by Marianne Krasny (NTRES), Keith Tidball (NTRES), Nina Bassuk (ORIE), Shorna Broussard (NTRES), Janis Dickinson (NTRES, LabO), Gretchen Ferenz (CCE-NYC), John Nettleton (HE-NYC, CRP), Stephan Schmidt (CRP), Richard Stedman (NTRES), David Weinstein (NTRES), Nancy Wells (DEA), Thomas Whitlow (ORIE), and K. Max Zhang (MAE).

Environmental Sustainability in an Aging Society

Although the nation's rapidly aging population has potentially enormous implications for environmental sustainability, little research exists on the topic. This workshop will launch the Cornell Aging and the Environment Collaboration (CAEC), laying the groundwork for a program of basic and applied research on the relationship between aging and environmental and energy issues. Led by Professors Karl Pillemer (HD), Linda Wagenet (DSOC), and Nancy Wells (DEA), an interdisciplinary network of Cornell scholars will meet to determine a research agenda and plan the next steps in development of the research program, in preparation for seeking additional external funding.



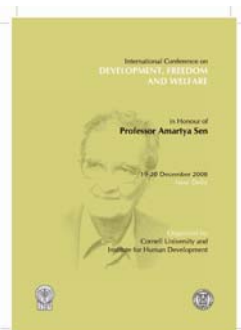
Sustainability Conferences and Events

In addition to its peer-reviewed **Academic Venture Fund**, the Cornell Center for a Sustainable Future funds a variety of other events, including workshops, forums, conferences, and seminars. Often these activities are supported jointly with colleges, schools, departments, other centers, and the Presidents Climate Commitment Implementation Committee. CCSF also provides support for major proposals and assists in the attraction and retention of key sustainability faculty. Below is a sampling of projects funded in 2008.

Conferences and Events

Development, Freedom, and Welfare

Organized by *Kaushik Basu (ECON)* and *Ravi Kanbur (AEM/ECON)*. This conference in honor

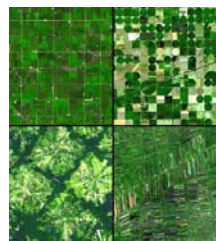


of Amartya Sen in New Delhi, India, was a joint initiative of Cornell and the Institute for Human Development in New Delhi. The conference was a first step toward greater collaboration between Cornell and India. Professor Sen has made the case for the poorest of the poor and for

plurality in cultural perspectives, advancing the cause of a policy agenda focused on human development and a tolerant and democratic polity. Three Nobel laureates took part (Sen, Joseph Stiglitz, and Edmund Phelps) along with India's prime minister.

SCOPE Biofuels Rapid Assessment Project

Organized by *Robert Howarth (EEB)*. The worldwide use of liquid biofuels grew rapidly during the past 10-15 years, and has accelerated remarkably just since 2005. Production is expected to double by 2015. The charge of the International Scientific Committee on Problems of the Environ-



ment (SCOPE) Biofuels Project is to perform a comprehensive, systematic, and comparative analysis of the environmental benefits and costs of commonly used and potential future biofuels. Cross-cutting aspects of economic and social concerns are included in the process. Proceedings from the international meeting are due out shortly. The first phase of the project lays out a road map for a larger, more sustained effort required to address the complexity of the situation. Along with CCSF, funding for this work

is provided by the United Nations Foundation, the German Research Foundation (DFG), Cornell University through the Biogeochemistry and Biocomplexity Initiative and an endowment from David R. Atkinson.

Beyond Diversity: Re-Situating Pluralism

Organized by *Karim-Aly S. Kassam (NTRES)*.

This workshop addressed how our understanding of pluralism can be enriched by integrating perspectives drawn from ecological systems and historical dimensions.



Aiming to foster meaningful communication between the social, biological, and physical sciences and the humanities, the objectives of the workshop included articulation of an enriched concept of pluralism, identification of new and integrated areas of research, and development of a strategy for further research.

Defining Sustainable Development

Organized by *Liz Leaderman (Law)*. This

conference on land use, climate change, and water resources was held at the Cornell Law School, bringing professors, practitioners, students, and community leaders together to consider what sustainability really means and what role law may have in accomplishing sustainable development. Speakers considered what sustainable development is and how the broad goals implied by the term "sustainable" can be achieved.



Faculty Recruitment and Retention

Conferences and Events, Continued

Wildlife Conservation Research at Cornell— From A to Z (The Arctic to Zambia)

Organized by Alexander Travis (VET). The College of Veterinary Medicine and the Cornell Center for a Sustainable Future hosted this one-day symposium on research related to wildlife conservation at Cornell. This symposium highlighted just a few of the many individuals from units across campus who are working for wildlife conservation and introduced the Center for Wildlife Conservation, a virtual center facilitating collaboration.



Moving Out of Poverty

Organized by Matthew Freedman (ILR). This two-day workshop featured research on the barriers low-income households face in obtaining and keeping jobs, with a particular focus on alternative strategies for increasing job accessibility. The event highlighted the often-overlooked environmental consequences of different types of programs and fostered dialogue among researchers in a broad array of fields about the private and social costs and benefits of these programs.



Cornell Climate Change Conference.

Organized by Michael Hoffmann (ENTM, AGEX). Designed to build bridges across disciplines and departments, the CU Climate Change Conference was held on May 7, 2008 in Kennedy Hall so faculty and staff could learn what others are doing and collaborate. Panel discussions addressed such issues as assessments of climate change, adaptation, mitigation, communication and policy. Following the presentations, the panelists and more than 100 attendees met in break-out sessions with facilitators to brainstorm about how to keep momentum building in this area at Cornell.



Faculty Recruitment and Retention



CCSF contributed to a retention package for Professor **Jocelyn Rose** in the Department of Plant Biology. Rose's research interests are centered on the structure, function, and metabolism of plant cell walls and their pivotal role in growth, development, and interactions with pathogens. Cellulosic cell wall modification represents a central component of the biofuels industry, as well as providing the building blocks for a broad range of plant-derived products. CCSF also provided funds to support Professor **David Wilson** in Molecular Biology and Genetics. Wilson is a key collaborator of Rose's. The CCSF funds provided to Wilson allowed him to continue a vital program on cellulases until funding from external sources could be arranged.



CCSF contributed to a retention package for Professor **Stuart Hart**, the S. C. Johnson Chair in Sustainable Global Enterprise, in the Johnson Graduate School of Management. Hart is an authority on the implications of sustainable development and environmentalism for business strategy. Hart is organizing the Cornell Global Forum on Sustainable Enterprise in New York City (June 2009) focusing on creating profitable businesses that simultaneously raise the quality of life for the poor, respect cultural diversity, and conserve the ecological integrity of the planet for future generations. Hart's latest book is *Capitalism at the Crossroads*.

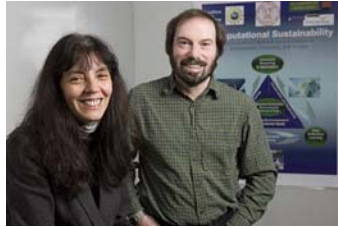
"While every American must participate to achieve these [sustainability] goals, Cornell can have a proportionally higher impact. A diverse multidisciplinary team approach is needed; fortunately Cornell has an abundance of talent and experience across the board."

Jefferson Tester

Sustainability Proposal Support

CCSF supports faculty responses to grant opportunities from government, industry, foundations, and other organizations. The goal is to build internal connections and communication, resulting in new multidisciplinary approaches to sustainability science and scholarship. Primarily due to deadlines, competition, and scope, it is generally not possible to fund proposal activities through the Academic Venture Fund, so CCSF maintains a separate fund for these activities.

More than 10 multidisciplinary proposal teams are actively developing sustainability related proposals with support from CCSF. These efforts will represent more than \$50 million in new funding to Cornell in the sustainability area.



Institute for Computational Sustainability. CCSF supports this institute created through the National

Science Foundation’s Expeditions in Computing Program. Professor Carla Gomes (ECE, AEM), the center’s director, believes that “Computer scientists can—and should—play a key role in increasing the efficiency and effectiveness of the way we manage and allocate our natural resources, while enriching and transforming computer science.”



Biofuels Policies. This study by Antonio Bento (AEM), Bob Howarth (EEB), and Susan Riha (EAS) examines how current and proposed U.S. biofuel policies interact with other national policies and goals,

with an emphasis on consequences for environment quality. Initially the study will encompass agricultural conservation, reserve lands and biodiversity, water quality and coastal marine “dead zones,” and emission of greenhouse gases.

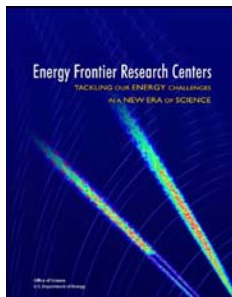
Area Poverty Research

Center. Preparations are underway for a response to the Department of Health and Human Services’s competition for funding of an Area Poverty Research Center. Currently DHHS funds three poverty centers, but there has never been one in the Northeast. Cornell is well positioned to attract funding and will use the CCSF support to develop environment and sustainability aspects of the proposed themes, which build on Cornell’s diverse multidisciplinary faculty strengths. This proposal effort is being led by Stephen Morgan (SOC) and Daniel Lichter (PAM). The Center for the Study of Inequality and the Bronfenbrenner Life Course Center are jointly sponsoring this effort.



Energy Frontiers Research Centers. During

the summer of 2008, the federal Department of Energy’s Office of Basic Energy Sciences solicited proposals for Energy Frontier Research Centers (EFRCs) to accelerate the rate of scientific breakthroughs needed to create advanced energy technologies for the next



spell out, if space is not a concern]]century. EFRCs will pursue the fundamental understanding necessary to meet the global need for abundant, clean, and economical energy. CCSF supported three proposals from across campus.

“We will harness the sun and the winds and the soil to fuel our cars and run our factories. And we will transform our schools and colleges and universities to meet the demands of a new age. All this we can do. All this we will do.”

Barack Obama

Presidents Climate Commitment

CCSF and the Presidents Climate Commitment Implementation Committee (PCCIC) joined together in 2008 to sponsor a small grants competition. This program to support contributions to the development of Cornell's Climate Action Plan (CAP) was open to faculty in any academic department at Cornell; staff and students were encouraged to apply through a faculty sponsor. An internal review panel selected four projects for funding, awarding a total of nearly \$80,000. The funded research will provide concrete strategies for reducing Cornell's greenhouse gas emissions and help Cornell successfully launch its Climate Action Plan. These small grants will be the first of many collaborations between the PCCIC and CCSF directed toward tapping faculty expertise for help with CAP initiatives.

Climate Action Plan Small Grants Program



Geological Storage Options for Carbon Capture and Sequestration from Cornell's Power Plant.

Louis Derry and Jason Phipps-Morgan (EAS) are assessing the feasibility and cost of stripping carbon

dioxide from the exhaust stream of Cornell's power plant and piping it deep below ground for permanent geological storage. The practice could reduce Cornell's carbon footprint by preventing greenhouse gas from entering the atmosphere.



Analysis of Community Attitudes toward Elements of Cornell University's Climate Action Plan. Richard Stedman (NTRES) and Katherine McComas (COMM) are analyzing

Ithaca community support and opposition to specific Climate Action Plan initiatives, including conservation measures and alternative sources of energy. They will recommend strategies for communication and public involvement that address the needs of Cornell and the surrounding community.



Smarter Lighting for a Greener Campus. Ying Hua (DEA) is identifying smart lighting approaches that could be implemented in new and older buildings on campus to limit their use of electricity.

Energy consumption may be significantly reduced by using daylight as the primary light source and replacing outdated lighting with high-performance systems and advanced controls.



Building Engineering for a Sustainable Cornell.

K. Max Zhang (MAE) is evaluating laboratory exhaust hoods, a major source of energy loss for Cornell buildings, to determine if a more effective design could provide the necessary ventilation while

reducing energy use. The project will assess the costs and benefits of retrofitting campus buildings with various types of exhaust hoods.

"In signing the Presidents Climate Commitment, I was building on earlier, ongoing efforts to reduce energy consumption and improve sustainability, something that has been a Cornell priority for years."

David Skorton

Topical Lunches 2008

CCSF initiated the topical lunch program last summer. The goal of this popular program is to create new connections among Cornell researchers who are working on related topics in sustainability. Through informal, working lunches on a specific theme, scholars are brought together to share their expertise and have the opportunity to form new collaborations and launch new research initiatives with significant potential for future funding. We typically set aside two dates per month, providing a modest lunch and a moderated forum for discussion. In 2008, 12 lunches were attended by nearly 200 researchers from seven colleges and schools across Cornell. Many of these groups continue to meet and 10 of the 12 have submitted proposals to the Academic Venture fund or to other sponsors.



June

- **Mycotoxins**
Organizers: Michael Milgroom (PLPA) and Rebecca Nelson (PLPA)
- **Resource-based assessment of environmental conservation**
Organizer: Steven Wolf (NTRES)

July

- **Improving the stability and productivity of algal bioreactors for biofuel**
Organizer: Beth Ahner (BEE)

August

- **Assessing climate change vulnerabilities and adaptation strategies for agriculture and water resources in New York**
Organizers: Art DeGaetano (EAS), Rebecca Schneider (NTRES), David Wolfe (HORT), and Susan Riha (EAS)
- **Adaptively managing for sustainable resource use: challenges and opportunities**
Organizer: Evan Cooch (NTRES)

“Sustainability inherently requires a long-term vision.”

Christopher B. Barrett

September

- **Climate change and disease ecology**
Organizers: Drew Harvell (EEB), Kelly Zamudio (EEB), and Laura Harrington (ENTOM)
- **The private sector's role in poverty alleviation and economic development**
Organizer: Mark Milstein (JGSM)
- **South America: producing a blueprint for a green continent**
Organizer: Rick Allmendinger (EAS)

November

- **Earth system science at Cornell**
Organizers: Natalie Mahowald (EAS), Christine Goodale (EEB), David Hysell (EAS), and Todd Walter (BEE)
- **Environmental, energetic, and economic potential of biochar**
Organizers: Johannes Lehmann (CSS), Brent Gloy (AEM), and Norm Scott (BEE)

December

- **Development of operational criteria for assessing species' relative vulnerabilities to climate change**
Organizer: Joseph Bernardo (NTRES)
- **Distributed energy systems research for a low carbon economy**
Organizers: K. Max Zhang (MAE), Tim Mount (AEM), and Bob Thomas (ECE)

Faculty Advisory Committee

The CCSF's Faculty Advisory Committee

(FAC) was formed in early 2008 and the first meeting took place on March 13, 2008. The FAC guides the activities of the CCSF. At least 25 faculty—18 regular voting members and 7 or more ex officio members—comprise the FAC. Key topics addressed during the nine meetings held this year include:

- Establishing the FAC Charter
 - Recommending the solicitation and evaluation processes for the Academic Venture Fund program
 - Forming subcommittees and defining areas for study
 - Recommending approaches for faculty recruitment and cluster hiring in sustainability
 - Determining CCSF's role in education and outreach
- **Voting members:** Six tenured or tenure-track Cornell University faculty members represent each of CCSF's major program areas. One of the faculty members in each major area is that program's associate director, with the remaining five members appointed by the CCSF director and respective associate director in consultation with the FAC's chair and college deans.
 - **Ex officio members:** These members include the CCSF's director, executive director, and other staff as designated by the director; a representative of the Office of the Provost (currently the vice provost for life sciences); and representatives of interested Cornell Colleges.
 - **Leadership:** The chair and vice chair of the FAC are nominated and chosen annually by vote of the committee. The chair or vice-chair presides at FAC meetings and, in consultation with the CCSF director, prepares meeting agendas. David Sahn was elected chair and Natalie Mahowald vice-chair for the 2008-09 academic year.
- **Subcommittees:** The FAC relies on six subcommittees for study, inquiry, guidance, and implementation. The subcommittees (and chairs for 2008-09) are:
 - Academic Venture Fund (Hoffmann)
 - Communications (Cowen)
 - Education (Clancy)
 - Events (Hay)
 - Faculty Recruitment (Donaghy)
 - Outreach (Hoffmann).

FAC Members

Economic Development

- Chris Barrett, AEM
- Gary Evans, DEA
- David Sahn, NS,
- Nicolas van de Walle, GOV
- Kim Weeden, SOC
- Lindy Williams, DevSoc

Energy

- Paulette Clancy, CBE
- Natalie Mahowald, EAS
- Kevin Pratt, ARCH
- Jefferson Tester, CBE
- Larry Walker, BEE
- Zellman Warhaft, MAE

Environment

- Anurag Agrawal, EEB
- Todd Cowen, CEE
- Kieran Donaghy, CRP
- C. Drew Harvell, EEB
- Anthony Hay, MicroBio
- Mike Hoffmann, ENTM

Ex Officio

- Rick Allmendinger, EAS
- David Dieterich, CCSF
- Frank DiSalvo, CCB
- Nelson Hairston, EEB
- Barbara Knuth, CALS
- Steve Kresovich, VP-LS
- Mark Lawrence, CCSF
- Mark Milstein, JGSM
- Daryl Nydam, VetMed
- Helene Schember, CCSF



Weeden



Walker



Hoffmann

Financial and Administrative Report

CCSF Business Plan

We connect, stimulate, and seed multi-disciplinary sustainability activities in areas where Cornell holds—or could soon attain—a competitive advantage. Seeded activities must have a plan for leverage, both in longer-term funding and real-world impact.

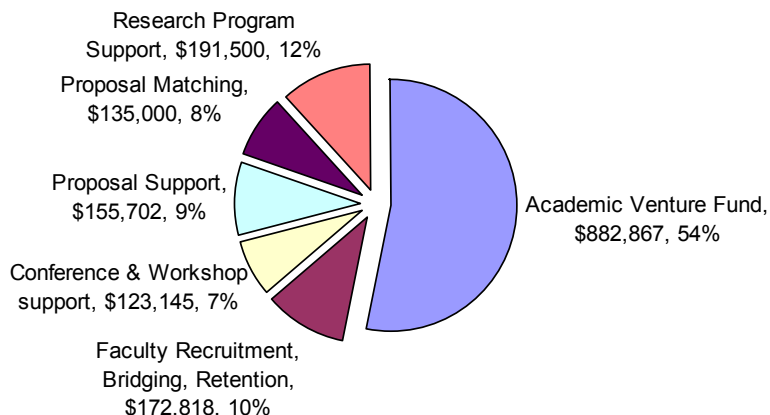
CCSF helps faculty teams establish and build external relationships with government, industry, foundations, NGOs, etc. Advancing multidisciplinary research is necessary but insufficient to achieve the mission of

CCSF. We also seek successful implementation of research findings in order to foster a sustainable future for all.

Further, CCSF aims only to incubate new initiatives; as they grow and succeed, additional resources and recognition go to the faculty team, not to CCSF. Under this business model, CCSF is not "self-sufficient" (absent its donors), but the University as a whole benefits—and we hope and expect society at large will, as well.

Program Budget

CCSF spent \$1,661,031 on sustainability related programs in 2008. A breakdown of the spending is shown at right. A total of 52 activities were funded in 2008, many of which are described in this report. The Academic Venture Fund constituted our major expenditure as other areas such as faculty recruitment bridging and retention and proposal matching take longer to begin and gain momentum. In 2009 we expect that AVF funding, proposal support and conference and workshop will remain constant, while funding for faculty recruitment, bridging and retention and proposal matching will increase substantially.



CCSF Staff

WEB & COMMUNICATIONS MANAGER

Mark A. B. Lawrence

mal64@cornell.edu (607) 255-2178

ADMINISTRATIVE ASSISTANT

Paula Euvrard

pge3@cornell.edu (607) 255-7535

FINANCIAL SUPPORT SERVICES

Cathy Williammee,

Donna Jenney

(Office of Vice Provost for Research)

HUMAN RESOURCES SUPPORT

Deb Shigley

Jamie Washburn

(Office of Vice Provost for Research)

SUSTAINABILITY LIAISON

Daniel Roth

(Office of Environmental Compliance and Sustainability)

CCSF also thanks Professor Alton Clark, Dr. David Filiberto, Melissa Pollock, Sheri Englund, Dolores Dewbury and Gwen Wilcox for their timely and effective support during 2008.

Cornell Center for a Sustainable Future

200 Rice Hall
Cornell University
Ithaca, New York 14853-5601
(607) 255-7535
(607) 255-6714 (fax)

ccsf@cornell.edu



DIRECTOR

Frank DiSalvo
J. A. Newman Professor of
Physical Science
fjd3@cornell.edu
(607) 255-8891

Associate Directors



ECONOMIC DEVELOPMENT

Christopher B. Barrett,
S.B. & J.G. Ashley Professor of
Applied Economics and Management
cbb2@cornell.edu



ENERGY

Jefferson Tester
Croll Professor of Sustainable
Energy Systems
jwt54@cornell.edu



ENVIRONMENT

Anurag Agrawal
Associate Professor of
Ecology and Evolutionary Biology
aa337@cornell.edu



EXECUTIVE DIRECTOR

Helene Schember, Ph.D.
hrs6@cornell.edu
(607) 255-0978



PARTNERSHIPS DIRECTOR

David Dieterich, Ph.D., M.B.A.
dd355@cornell.edu
(607) 254-1380

<http://www.sustainablefuture.cornell.edu>