Managing Climate Risks

For the last few months ABE Distinguished Professor Dr. James W. Jones has been focused on developing the new Florida Climate Institute. Dr. Keith Ingram and Dr. Clyde Fraisse of the ABE department are working with Dr. Jones, as well as other faculty in IFAS and other colleges at UF and Florida State University.

“Cooperation between the two universities brings together the different scientific disciplines needed to address the many complexities of using climate change information to make more sustainable decisions and policies that will benefit Florida and Floridians in the future,” explains Jones.

This institute will build on the successful research and extension program on climate risk management that Dr. Jones co-developed with faculty from other universities in Florida, Georgia, and Alabama.

“A major aim of the institute is to provide information that Floridians need to respond to changes in climate and climate variability. Changes in climate in Florida have been different than global trends, and those differences are critically important for developing appropriate responses to changes in our region,” notes Jones.

The main goal of the institute will be to serve as a focal point for research, education, and extension programs to build adaptive capacity and resilience in Florida’s diverse natural and managed systems. The institute will conduct research to quantify Florida’s historical climate trends, to create seasonal, decadal, and longer term climate forecasts and scenarios for Florida based on best scientific methods, and to engage stakeholders in research, extension and education programs.

Chair’s Message...Dr. Dorota Z. Haman

Greetings to all of you...alumni, friends and all the readers of our newsletter. Despite economic difficulties that surround us, the Department is doing very well and it is still a great time to be a graduate of ABE. Most of the students graduating this year have received good job offers, or decided to continue their education in graduate or professional schools. Our enrollment is up, with the total number of undergraduate students at 338 this fall. We have 178 engineering, 36 packaging and 122 AOM undergraduate students. Our graduate student number is 108, up from 89 in 2008, with 68 of them in the Ph.D. program. Both ABE programs have been rated #7 in the country by the U.S. News and World Report in its 2009 rankings.

Our faculty brought almost $4 million of new funding in the FY 2009 even under these difficult economic conditions. The new $2 million cellulosic ethanol pilot plant, a part of the Center for Excellence of the Florida Institute for Sustainable Energy, was opened last October in a newly built addition to Rogers Hall. Our faculty, staff and students continue to be recognized at University, state and national levels for their good work and numerous contributions to the profession.

Overall, it has been a good year! On behalf of our entire ABE family, I want to thank you for your continuous dedicated support of the Department and wish you a very good academic year 2009-2010. Please stay in touch with us. If you have something to share or want to get involved in Department activities, please contact me (352-392-1864, dhaman@ufl.edu). I always enjoy hearing from you.
Website continues to improve

The interactive website that farmers, growers and others rely on “continues to evolve”, notes Clyde Fraisse, a University of Florida assistant professor who helps coordinate the site. Recent developments in AgroClimate include tools that allow growers to forecast the accumulation of growing degree-days and chill hours based on the current phase of the El Niño Southern Oscillation (ENSO) phase but also verify the current levels of accumulation at all stations belonging to the Florida Automated Weather Network (FAWN) operating in the state.

“This is a very important innovation since most weather networks track the accumulation of these variables but do not forecast them”, explains Fraisse. “With this information growers can decide in advance if they will need to apply chemical sprays that help break dormancy if insufficient chilling is predicted.”

Another exciting development is a tool that is being tested with strawberry growers to help them decide when to apply fungicides. This tool, developed in cooperation with Dr. Natáilia Peres at the IFAS-Gulf Research and Education Center, was tested during the last season and a grower reported reducing the number of applications by half without any effect on fruit quality or yield.

“Our research has confirmed that dry winters such as the one we had in 2008-2009, a La Niña winter, do not favor the development of diseases and growers can reduce costs and improve the quality by reducing the number of fungicide applications,” said Fraisse. “This winter may be different as the Pacific Ocean is now transitioning into the El Niño phase that normally brings wetter and cooler winter and spring seasons”, he said.

The development of El Niño could indeed have dramatic impacts on the climate of the Southeast for the remainder of 2009 as El Niño hinders hurricane development in the Atlantic basin and leads to less active seasons.

Forecast Summaries are also now available on the website for the previous month’s weather for Florida, Georgia and North Carolina. The reports include data such as average temperature and rainfall, summaries of extreme weather events, and weather impact on agricultural production and practices.

The Agricultural and Biological Engineering Department is an active member of the Southeast Climate Consortium, a world premier institution for the application of climate sciences to help agricultural producers manage risks associated with seasonal climate variability and longer-term climate changes. Most products of the Southeast Climate Consortium are available through an on-line decision support system developed by ABE faculty in collaboration with other institutes in the Southeast. The Consortium also issues regular climate and agricultural outlooks through e-mail lists, publications, workshops, and training courses.

“Target audiences include growers’ associations, commodity associations, managers of agricultural and natural resources operations, and extension agents”, Fraisse said.

The AgroClimate web site is a coalition of six universities—Florida State University, University of Florida, University of Miami, University of Georgia, Auburn University and University of Alabama-Huntsville.
BioChar

Addressing Global Warming

Turning trash into treasure sounds like a fairy tale, but ABE assistant professor Bin Gao is working to make that story come true.

Biochar, also known as “agrichar” or “biomass-derived black carbon”, is a charcoal produced from carbon-rich material which has received increased attention recently because it may provide an immediate solution to global warming caused by emissions of carbon dioxide (CO2) and other greenhouse gases. Recent advances in biochar technologies makes it possible to turn some solid wastes (trash) into value-added biochar and bioenergy (treasure).

“Unlike most carbon-neutral biomass energy systems, biochar technology is carbon-negative,” says Gao.

In the natural carbon cycle, the plant withdraws carbon from the atmosphere to grow biomass through photosynthesis. After the plant dies, however, plant biomass decomposes rapidly and emits an equal amount of CO2 back into the atmosphere, which is a carbon neutral process.

“Instead of allowing the plant to decompose, biochar technology can be used to sequester the carbon by converting plant biomass into a much more stable form called “biochar”, notes Gao. “It stops the emission of CO2 back to the atmosphere and stores it in virtually permanent soil carbon pools, which is a carbon-negative process.”

Biochar technology not only produces sustainable bio-energy, it has the potential to store massive amounts of carbon in soils for hundreds to thousands of years, so land application of biochar has been proposed as a novel approach to establish a significant, long-term sink for atmospheric carbon dioxide in terrestrial ecosystems. In addition, it can also improve the soil quality and enhance crop productivity.

Cellulosic Ethanol

Bio-Fuels Lab Opens

With great fanfare the new cellulosic ethanol pilot plant in Rogers Hall was dedicated on October 10, 2008.

Dignitaries and guests were on hand for a first-hand look at the equipment and process which will convert the inedible parts of plants into fuel ethanol.

The pilot plant uses a conversion process developed by microbiologist Lonnie Ingram, director of the Florida Center for Renewable Chemicals and Fuels. Ingram developed genetically engineered bacteria that can break down the inedible portions of plant material.

The ABE Department will be adding a faculty member in the biofuels research area who will work in the pilot plant.

ABE Alumns Earns Recognition

Dale Zimmerman receives Professional Engineer Award

The American Society of Agricultural and Biological Engineers has named ABE Alumnus Dale Zimmerman, PE, 2009 Professional Engineer of the Year in recognition of his outstanding contributions and service to clients, colleagues, students, and society as a design engineer and leader of an engineering consulting firm.

Zimmerman is president of Mock, Roos & Associates, Inc., a 54-year-old consulting engineering firm in West Palm Beach, Florida, and has served as the president since 1991. His firm’s engineering projects have included stormwater management, irrigation, water reuse, pump stations, potable water and wastewater systems and treatment, water wells, best management practices, animal waste management, water quality monitoring, geographic information systems (GIS), and roadways.

A 44-year member of ASABE, Zimmerman has provided leadership to various technical and professional engineering organizations. He has served in officer positions in the Florida Section and as a member of the Society’s Board of Directors and is a currently a Foundation Board Trustee.

Many photos in this issue are courtesy of UF/IFAS
Two AOM students go the distance

Fargo Bound

When duty calls students sometimes have to step outside their comfort zones...literally! Doug Renk is a research assistant who acquired industrial experience in Morehead Minnesota, right across the border from Fargo North Dakota. That’s where the ABE bio-process lab set up a large bioreactor that gasifies tons of sugar beet scraps to demonstrate the effectiveness of converting this waste to renewable natural gas.

“Nothing prepared me for the skin-ripping prairie winds, except maybe the layers of Coast Guard issue clothing that I packed,” said Doug. “My face cover turned ice white within minutes of loading feedstock material which I quickly brought inside to avoid it freezing into 40 pound blocks of beet ice.”

All the hard work and frosty appendages paid off as Doug returned to Fargo in August for a full-time position with American Crystal Sugar.

Energy in Ecuador

When Marco Pazmino, ABE visiting professor, invited students to participate in an energy project in Ecuador, AOM student Jaime Chavez headed back to his home country to join the course.

Professor Ron Besser addressed the issue of CO2 emissions, concentration calculations, power cogeneration, solar photovoltaic cells and their components, and world wide energy consumption and trends.

All the students participating were required to take an energy case and provide an engineering system which would fit the parameters and reduce fossil fuel and its derivatives as energy. Jaimie was assigned to the Anaerobic Digestion Group.

“Our challenge was to design a system which used a minimum of 30% of foodwaste from a town of 50,000 people in the state of New Jersey and convert it into energy,” explained Jaime.

After solving the challenge of building an anaerobic digester system using the food waste from the school’s cafeteria, they designed a system which generated 16MW of electricity using the minimum amount of garbage as well as generating value added fertilizer.

Happy Trails to ABE Friends

It’s never easy to say goodbye to friends and co-workers, but a wave of retirements has struck the ABE Department this year.

In March advisor extraordinaire Mary Hall said a fond farewell to dozens of guests who gathered to wish her a happy retirement. Mary spent her last few months in the department training Robin Snyder to take on the advising role.

At the end of June the department bid farewell to accountant Jeanette Wilson and technician Larry Miller both of whom had worked in the department for many years.

AOM alumni should have many fond memories of club meetings and classes led by professor J. Wayne Mishoe, who chose the end of July to say his farewell to the ABE family.

We hope to see all of these friends at our holiday celebrations so it’s only goodbye for now.

ABE’s on Facebook

Speaking of friends, you can never have too many so we invite you to join the new ABE Facebook group. Just search for the ABE-UF Alumni and Friends group on the Facebook search bar. Then invite your other ABE friends to join. It’s a way to search for classmates and catch up on current and former students, faculty and staff.

Use the ABEinfo@ufl.edu e-mail address to send address, e-mail and employment updates to the department. We try hard to keep track of our alumni, so be sure to drop us a line. If you prefer to keep in touch by mail just fill out and send in the form at the back of the newsletter.
Highlights and Developments

Packaging Research

Nanocomposite materials in high barrier multilayer films

This work is being sponsored by the US Army Food Laboratory and is seeking to improve oxygen barrier properties of multi-layered flexible films used in meals-ready-to-eat (MRE) packaging.

Dr. Bruce Welt stated, “The goal of this project is to attempt to eliminate the foil layer using advanced polymers incorporating nanoparticles.” Specific aims of this project are to evaluate specific blends of nano-materials in order to achieve synergistic results.

Designing modified atmosphere packages

Modified atmosphere packaging (MAP) is commonly used to package ready-to-eat produce such as lettuce and salads. MAP requires gas exchange properties of the package to be matched to gas consumption and production of packaged produce. When this match can’t be made, manufacturers turn to perforations to enhance gas exchange. ABE’s packaging lab developed a new application that combines fiber optic oxygen sensors with an environmentally controlled, well mixed vessel.

Dr. Bruce Welt said, “The apparatus provides a simple and inexpensive way to measure gas transmission rates of perforated films.”

Faculty Invest in High Performance Computing

IFAS was not always involved with the campus-wide supercomputer, but when Rafael Muñoz-Carpena, ABE associate professor, was approached about spearheading a move to get IFAS involved, he saw the benefits right away. The HPCC is a unique facility run by the faculty and overseen by a faculty board. Researchers support expansions and updates of software and hardware by earmarking money from their grants specifically for supercomputing. The faculty funds are then matched by different tiers of university administration and other colleagues to update or expand the capabilities of the HPCC. Rafael Muñoz-Carpena organized a group of several ABE faculty members that could benefit from the use of HPCC and who easily found ways to use the HPCC on an almost daily basis. The HPCC can run models of how components of a complex system might interact. For example, in studying water resources, a model might include forces of nature, impacts from people and how much water is present in a region. Each component would come with its own variables and uncertainties, but all the “what-if” scenarios could be considered by using a supercomputer. This group of faculty invested $35K of money from their research programs that grew to $150K through Department and IFAS Research Dean’s matches providing one fifth of funds needed for the latest HPCC Phase III addition. This facility helps with the type of computer problems that can’t be solved with a regular computer: problems of climate change, changes over large areas and times, huge mathematical models and genetic decoding.

4-H Explores Energy at ABE

It’s not unusual to see a group of high school students excitedly touring the UF campus, but this year a group of students were energized in a different way. They attended the annual 4-H Congress and spent several days learning about alternative energy in a series of workshops offered by the ABE Department. This was the 2nd summer that faculty in the ABE department offered six hands-on workshops to the 4-H participants.


Dr. Art Teixeira coordinated the event and even facilitated the workshop on biogas production. ABE graduate students also worked closely with the students on the activities.

In addition to the student participants a group of five teachers from St. Augustine High School attended the workshops to develop their future plans to teach green energy.

“The overall experience provided us with a list of exciting, relevant alternative energy science fair project ideas for our students,” said instructor Gail Cullum.
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ASABE 奖项

- Dr. Mike Dukes
  - Florida Section Young Engineer

- Dr. Ken Campbell
  - Florida Section Distinguished Achievement Award

- Dr. Kati Migliaccio
  - Outstanding Reviewer, Soil & Water Division & Florida Section Young Extension Worker

- Dr. Rafael Muñoz-Carpena
  - Florida Section Special Recognition

- Dr. Guillermo Baigorria
  - Florida Section Young Researcher

- Dr. Brian Boman
  - Florida Section Professional Engineer

- Maggie Lanigan
  - Florida Section Outstanding Student

- Eban Bean and David Kaplan
  - ASABE Graduate Student Paper Awards

- Dr. Greg Kiker
  - Human and Ecological Risk Assessment (HERA) Paper

- Dr. Ray Bucklin
  - Elected to the 2008 Rural Builder Hall of Fame

- Dr. Reza Ehsani
  - Int’l Soc. For Hort Sci. Medal as Co-convener for ISHS Symposium

- Dr. Melanie Correll
  - Theta Tau Engineering Honor Society recognition honor for mentors

- Dr. Rafael Muñoz-Carpena
  - IFAS International Achievement Award

- Dr. Kati Migliaccio
  - Richard Jones Outstanding New Faculty Research Award

- Dr. Guillermo Baigorria
  - Florida Section Young Researcher

- Dr. Wendy Graham
  - Distinguished Leadership Award of Merit

- Dr. Art Teixeira
  - International Award of Merit

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  - IFAS International Achievement Award

- Dr. Kati Migliaccio
  - Richard Jones Outstanding New Faculty Research Award

- Cheryl Porter and Steve Feagle
  - IFAS Superior Accomplishment

学生活动

- Cecilia Amador
  - Doris Lowe and Earl and Verna Lowe Scholarship, Marilyn Little Scholarship and Manny Fernandez Graduate Student Scholarship

- Nicholas Crookston
  - Italian Packaging Paper Competition and Robert Sheffler Packaging Innovation Competition

- Melissa Germain
  - ISTA R. David LeButt Scholarship and Robert Sheffler Packaging Innovation Competition

- Melissa Haley
  - Ag Women & Vam York Scholarship

- Magalie Laniel
  - Richard F. Heaney Memorial Scholarship (IBPA)

- Peter Larbi
  - Herlong Endowed Scholarship

- Samantha Smith
  - CALS University Scholar

- Nathan Wangusi
  - Rotary Foundation Ambassadorial Scholarship

- Zuzanna Zajac
  - James Davidson Graduate Travel Scholarship
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- [ ] Business Title or Position________________
- [ ] Company/Organization_________________
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- [ ] Tell us what you’ve been up to:
  (Career, Professional Awards, Leadership Positions, etc).

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Send your contribution and update to:

UF-ABE Department
Robin Snyder
PO Box 110570
Gainesville, FL  32611
Many of the hands-on teaching methods and field visits adopted in the summer course focus on data from the Brazilian site conditions and the Tropics, where modern engineering design methods are applied to address water conservation and pollution control issues. The program provides a unique opportunity for UF undergraduate students to enhance not only their engineering training, but also their understanding of global issues in water resources.