

# University of Houston Coastal Center

## Annual Report 2010-2011

Drs. Steven Pennings (Biology and Biochemistry) and Barry Lefer (Earth and Atmospheric Sciences) assumed responsibility for administration of the UHCC in September 2010, with Pennings serving as Director and Lefer as Assistant Director. A five-year plan for the UHCC was developed in 2010 following discussions with Dr. Birx, Vice President for Research.

### Activities in 2010-2011

In 2010-2011 we maintained ongoing research strengths in 1) micrometeorology and 2) coastal ecology, 3) hired a postdoc to develop a prairie research program, 4) improved UHCC infrastructure to better support research activities, 5) taught a field course at the UHCC, 6) maintained a service mission supporting research by faculty at UH and Rice, and 7) held a meeting of our Advisory Committee.

**1) Micrometeorology and Air Quality.** Multiple funded projects (see below) use the UHCC micrometeorology tower and other instrumentation at the UHCC. The UHCC serves as an undeveloped, “control” location for comparison with other stations in the Houston metropolitan area.

**2) Coastal Ecology.** Multiple funded projects (see below) use the UHCC for logistical support. In 2010-2011 we received new funding from the National Science Foundation, the Environmental Institute of Houston, and Texas Sea Grant (tentatively funded).

**3) Prairie ecology.** In 2010-2011 we hired a postdoc to develop the prairie research program. The postdoc, Dr. Chelse Prather, has been very active in gathering new data, forging connections with prairie ecologists at Rice, Texas A&M and elsewhere, and developing connections with prairie restoration stakeholders in Texas. We anticipate submitting grant proposals for prairie ecology in the 2011-2012 academic year.

In addition to these three research programs, the UHCC has agreed in principle to provide a location and logistical support for a research program in green airports under development by Dr. Max Shauck, Earth and Atmospheric Sciences.

**4) Infrastructure.** In 2010-2011 we improved the alignment of the micrometeorology tower, improved web access at the UHCC to facilitate real-time data transmission to main campus, replaced an aged small skiff for coastal ecology studies, assembled files (maps, aerial images) for a GIS of the UHCC, and added data and information relevant to research (publications, species lists) to the UHCC web site.

**5) Field course.** In the summer of 2012, the Earth and Atmospheric Sciences department offered a field course at the UHCC. This course, taught by Drs. Barry Lefer and Shuhab Khan, exposed students to field methods in Earth and Atmospheric Sciences. Normally, such courses are taught at remote field camps, entailing additional expense and inconvenience for students and faculty. Offering the course at the UHCC eases these financial and logistical constraints, and is of considerable benefit to the EAS department.

**6) Service Mission.** The UHCC contains one of the highest quality stands of coastal prairie in Texas. Coastal prairie is a highly endangered habitat, with less than 1% of the original habitat remaining. The open-air greenhouse at the UHCC is a valuable facility for conducting outdoor mesocosm experiments. In addition, the extensive open spaces at the UHCC provide a location for storage of large samples and for research activities requiring space that is not available on campus. In 2011-2012 the UHCC hosted research projects by Dr. Evan Siemann (Rice University), Dr. Ken Whitney (Rice University), graduate students from Rice University and Texas A&M University; provided seed and plants for to local stakeholders for prairie restoration activities; and supported storage of equipment and samples for faculty from Biology and Biochemistry and Earth and Atmospheric Sciences at UH.

**7) Advisory Committee.** Pennings and Lefer met with the UHCC Advisory Committee in March of 2011. Minutes of the meeting are attached.

## Funding

15 awards in place during 2010-2011 and 1 new award tentatively funded for 2011-2012

### **Current awards (total: \$2,415,555)**

Title: HGB Ozonesonde Launches and Vertical Ozone Profiled in Eastern Texas 2010

Award number: 582-5-64594-FY10-11

PI: Barry Lefer, Co-PI: Bernhard Rappenglueck

Sponsor: Texas Commission on Environmental Quality

Project Period: 02/24/10 – 07/08/11

Total Award: \$135,000

Title: HGB Ozonesonde Launches and Vertical Ozone Profiled in Eastern Texas 2010-  
Extension

PI: Barry Lefer

Award number: 582-5-64594-FY10-11

Sponsor: Texas Commission on Environmental Quality

Project Period: 07/09/2011 – 09/31/2011

Total Award: \$67,000

Title: Ozone and Carbon Monoxide Monitor Operation, University of Houston Sites

Award number: 582-5-64594-FY10-12

PI: Barry Lefer, Co-PI: Bernhard Rappenglueck

Sponsor: Texas Commission on Environmental Quality

Project Period: 03/16/10 – 03/18/11

Total Award: \$125,000

Title: Improving the Characterization of Pollution Transported into Texas

Award number: 582-5-64594-FY10-13

PI: Dr. Xun Jiang, Co-PI: Barry Lefer

Sponsor: Texas Commission on Environmental Quality

Project Period: 05/07/10 – 01/31/11

Total Award: \$150,000

Title: University of Houston Study of Houston Atmospheric Radical Precursors (SHARP)  
Data Analysis

PI: Bernhard Rappenglueck, Co-PI: Barry Lefer

Sponsor: Texas Commission on Environmental Quality

Project Period: 06/07/10 – 06/30/11  
Total Award: \$290,534

Title: SHARP Data Analysis: Radical Budget and Ozone Production  
PI: Dr. Barry Lefer  
Sponsor: Air Quality Research Program - University of Texas at Austin  
Project Period: 11/15/10 – 08/14/11  
Total Award: \$199,368

Title: Quantification of industrial emissions of VOCs, NO<sub>2</sub> and SO<sub>2</sub> by SOF and mobile DOAS  
PI: Dr. Bernhard Rappenglueck, Co-PI: Barry Lefer  
Sponsor: Air Quality Research Program - University of Texas at Austin  
Project Period: 11/15/10 – 08/14/11  
Total Award: \$258,198

Title: Dallas Measurements of Ozone Production  
PI: Dr. Barry Lefer  
Sponsor: Air Quality Research Program - University of Texas at Austin  
Project Period: 02/15/10 – 08/14/11  
Total Award: \$195,054

Title: Surface Measurements and One-Dimensional Modeling Related to Ozone Formation in the Suburban Dallas-Fort Worth Area  
PI: Dr. Barry Lefer  
Sponsor: Air Quality Research Program - University of Texas at Austin  
Project Period: 02/15/10 – 08/14/11  
Total Award: \$98,134

Title: Operations of the Radar Wind Profiler at the UHCC  
PI: Dr. Barry Lefer  
Cooperative Agreement: M05AC12284  
Sponsor: Bureau of Ocean Energy Management, Regulation, and Enforcement  
Project Period: 10/15/10 – 10/14/11  
Total Award: \$35,835

Title: HGB Ozonesonde Launches and Vertical Ozone Profiled in Texas 2010 extension  
Award number: 582-5-64594-FY10-11ext  
PI: Barry Lefer  
Sponsor: Texas Commission on Environmental Quality

Project Period: 02/08/11 – 09/01/11  
Total Award: \$106,316

Title: RAPID Deepwater Horizon Oil Spill: Insights into Salt Marsh Food Webs from the  
Deepwater Horizon Oil Spill

PI: Steven Pennings  
Sponsor: National Science Foundation  
Project Period: 7/2010-6/2011  
Total Award: \$131,115

Title: Marsh Platform Dissection as a Response to Sea Level Rise: Eco-Physical  
Mechanisms of Sediment Erosion

PI: Steven Pennings, Duncan FitzGerald (Boston University)  
Sponsor: National Institute for Coastal Climate Research  
Project Period: 4/2010-8/2011  
Total Award: \$125,000

Title: GCE II: Georgia coastal ecosystems

PI: Merryl Alber and Steven Pennings  
Sponsor: National Science Foundation  
Project Period: 2006-2012  
Total Award: \$4,920,000. This is a multi-investigator project, with about 15 participating  
scientists. UH subcontract has been \$393,147 over the first 5 y.

Title: Collaborative Research: Biophysical alteration of wetland geomorphology in  
response to rising sea level

PI: Steven Pennings, Duncan FitzGerald (Boston University), Amala Mahadevan (BU)  
Sponsor: National Science Foundation  
Project Period: 9/2011-9/2014  
Total Award: ~\$650,000. \$105,854 to UH.

### **Tentatively Funded**

Title: Mangroves invading Texas salt marshes: does it matter?

PI: Steven Pennings, Anna Armitage (Texas A&M Galveston)  
Sponsor: Texas Sea Grant  
Project Period: 6/2012-5/2014  
Total Award: \$300,000

## **UH Coastal Center Advisory Committee meeting**

March 10, 2011, 1-2:30 pm

### **Present:**

Steven Pennings, UHCC director

Barry Lefer, UHCC vice-director

George Guillen, Environmental Institute of Houston

Dan Wells, Biology and Biochemistry Chair

Jack Casey, Earth and Atmospheric Sciences Chair

Elizabeth Anderson Fletcher, Office of the Vice President for Research

### **Minutes:**

Pennings and Lefer presented an overview of the UHCC, plans to build the research program at the UHCC around four areas (micrometeorology/air quality, prairie ecology, coastal ecology, green airports), activities conducted in the Fall 2010 semester, and plans for the Spring 2011 semester and summer.

The committee provided input on potential research directions, funding opportunities, the wisdom of hiring an executive director, and potential additional members for the Advisory Committee.

### **Detailed comments:**

*Funding:* possible restoration money from USFW

*Research direction and possible new collaborations:* Good start. Look for opportunities with UH energy group, NCALM at UH, NADP national network, CASTNET national network, LTER national network.

*Executive director:* would be good because could manage on-site activities and forge connections with broad community; but evaluate benefit in light of financial cost. A postdoc with a focus on restoration ecology might accomplish many of the same goals.

*Advisory committee:* consider John Huffman (USFW), Bob Harris (CEO of HARC) or Todd Mitchell (HARC).

*Education:* opportunities for joint courses between UH and UHCL in environmental science.

*Outreach:* opportunities for environmental science classes or citizen groups such as Galveston Bay Foundation to do activities at UHCC (would require someone on-site to manage).