Review of UH Academic Centers and Institutes for FY 2016

Information and Contacts:

Center or Institute Name: University of Houston Coastal Center

Year Established: 1968

Website Address (url): http://www.uhcc.uh.edu/

Director:

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12/31/2016 — Date

University of Houston Coastal Center
Annual Report for 2015-2016

Introduction and historical context

The University of Houston Coastal Center (UHCC) was formally established by President Hoffman in 1968. From 1976 to 2010, it was administered by Dr. Glenn Aumann. During Dr. Aumann's tenure, the primary missions of the UHCC were support of graduate students (in the form of small grants) and support of research (by providing access to pristine prairie and large open spaces as needed). During this time, the UHCC did not capture IDC return from funded projects, and it operated as a free University facility.

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 strategic plan for the UHCC was developed in 2010 following discussions with Dr. Birx, Vice President for Research. This plan emphasized growing the externally-funded research mission of the UHCC. Subsequent direction from the Vice President for research emphasized the importance of diversifying the user base among multiple colleges.

Over the following four years, University-wide budget cuts, coupled with repeated turnover in leadership and vision at the Division of Research, made the 2010 plan irrelevant. Pennings and Lefer continued to recruit new faculty to work at the UHCC and to pursue opportunities for the institute. In September 2014, the Vice President for Research and the Dean of the College of Natural Sciences and Mathematics agreed that the UHCC would start reporting to NSM instead of DOR. At the same time, an audit revealed that the original UHCC center paperwork from 1968 had been lost. Dr. Guoquan Wang (Earth and Atmospheric Sciences) replaced Dr. Lefer as Assistant Director in 2015.

Pennings and Wang are currently directing the UHCC while working with the Dean of NSM to develop a new funding and strategic plan that provides a measure of long-term stability for the operations of the UHCC. A proposal to (re-)create the UHCC as an academic center reporting to the Dean of NSM was approved by the UH Committee on Academic Centers and Institutes on November 17, 2015, but has not yet been approved by the Provost. Nevertheless, use of the facility for research and education continues to increase.

B. Goals and objectives

The goals of the UHCC are to 1) develop a facility that meets the needs of environmental scientists for field sites, equipment and facilities, 2) develop a facility that meets the needs of environmental educators for field courses and informal educational activities, 3) develop a facility that provides the unique opportunity for environmental

service activities benefitting Houston, Texas and the nation, and 4) foster productive collaborations among those using the UHCC.

The primary objectives over recent years have been to 1) increase the number of faculty working at the UHCC, 2) diversify the user base among multiple colleges, 3) increase the number of academic courses using the UHCC, 4) hold annual meetings of advisors and users to foster interactions centered on the UHCC, and 5) develop a new funding and strategic plan that provides long-term stability for the operations of the UHCC.

C. Mission

The primary mission of the UHCC is to support environmental research on the Texas coast by providing researchers with access to field sites, equipment and facilities. A secondary mission of the UHCC is to conduct service and educational activities related to the environment.

The UHCC is the only field laboratory serving the University of Houston. It provides a unique and essential facility for faculty doing environmental research, because it provides large areas of land (~1,000 acres) where equipment or experiments can be deployed, it provides access to a highly-endangered natural habitat (pristine coastal prairie), and the equipment and experiments are fairly secure because the UHCC property is partially fenced and has a caretaker who lives on site.

By preserving a large stand of pristine coastal prairie, the UHCC is also serving the nation at large. Coastal prairie is a highly endangered habitat (less than one tenth of one percent remains), and the prairie at the UHCC is one of the highest quality prairies (as assessed by plant diversity) in the nation. Conservation organizations and State and Federal agencies are highly aware of the conservation value of the prairie at the UHCC, and regularly express concern to the director about the long-term stability of the property.

The UHCC provides an ideal location for field courses taught by several UH departments, including Architecture, Biology and Biochemistry, Earth and Atmospheric Sciences (EAS), and Science Education, and for courses taught by other institutions in the Houston metropolitan area. The UHCC provides access to equipment and field sites coupled with immediate access to an air-conditioned building that has laboratory space and restrooms. Work can be done outside, but it is easy to retreat inside if rain or high temperatures require it.

The UHCC provides an ideal location for field courses in Petroleum Engineering and Oil&Gas Exploration, because we host wells from two oil companies on our property. Several faculty members at the EAS department offer field trips related to seismic survey and environmental studies in the UHCC campus. The EAS department offers the two-week-long UH Geophysics Field Camp at UHCC, which is a core course for UH geophysics majors. The UH Geophysics and Seismology program was ranked as the the most popular (No. 1) geophysics and seismology program in the United States by both Geology Schools and Campus Explorer, two prestigious ranking groups.

The field teaching at UHCC has become a fundamental component of the UH geophysics and seismology program. We are exploring more possibilities. The UHCC also provides open and safe space for research and training activities using unmanned aerial vehicle (UAV) techniques. Faculty members from the Allied Geophysical Laboratory (AGL) at EAR department, the National Center for Airborne Laser Mapping (NCALM), and the Department of Civil and Environmental Engineering are testing their UAV-born survey sensors and methods in UHCC.

Finally, the UHCC provides a unique venue for outreach and service activities related to the environment. In particular, we work closely with groups that are restoring coastal prairie habitat by providing a seed supply. The high diversity of the vegetation at the UHCC makes seed from our facility more desirable for restoration than seed from other prairie sites.

Few of the activities conducted at the UHCC could be moved to other UH properties, and the natural habitat itself is irreplaceable.

D. Metrics

The 2010 Strategic Plan for the UH Coastal Center set out goals for increasing external funding that were based on the assumption that DOR would continue previous strong levels of support for the UHCC. Over the following four years, University-wide budget cuts that severely affected the UHCC, coupled with repeated turnover in leadership and vision at the Division of Research, and the eventual transfer of the UHCC from DOR to NSM, have made the 2010 plan irrelevant. Once our administrative status is finalized, we will work with the NSM Dean to develop a new strategic plan for the UHCC that reflects our new reporting structure and funding situation. In the meantime, we have sought interim funding commitments sufficient to support the UHCC caretaker and basic maintenance. For the moment, we are broadly tracking research, education and service activity as our metrics.

E. UH Participants and level of participation

College of Natural Sciences and Mathematics

Department of Earth and Atmospheric Sciences

Robert Stewart (geophysics research and education, UAV test). Active.
Bob Wang (geophysics research and education, GPS and LiDAR Survey, UAV test). Active.
James Flynn (atmospheric science research and education). Active.
Bernhard Rappenglueck (atmospheric science research). Active.
Jon Snow (geological research). Stores research supplies at UHCC.
Regina Capuano (hydrology research and education). Currently inactive.
Shuhab Khan (geoenvironmental field course). Currently inactive.
Robert Talbot (atmospheric sciences). Currently inactive.

Department of Biology and Biochemistry

Ann Cheek (ecology education). Active.
Kerri Crawford (ecology research). Active.
Angela Laws (ecology research). Active
Steven Pennings (ecology research). Active.
Diane Wiernasz (evolution research). No activity this year.
Larry Williams (ecology education). Active.

College of Architecture

Patrick Peters (Architecture education). Active.
Bruce Race (Sustainability education). Seeking opportunities.

College of Education

Wallace Dominey (environmental education for K12 teachers). Active.
John Ramsey (environmental education). Open to opportunities.
Sissy Wong (environmental education). Open to opportunities.

Cullen College of Engineering

Saurabh Prasad (remote sensing). Seeking opportunities.
Christopher Chung (control of exotic species). Seeking opportunities.
Kostarelos Konstantinos (sensor technology). Seeking opportunities.
Miao Pan (sensor networks). Seeking opportunities.
Lawrence Schulze (control of exotic species). Seeking opportunities.
Petroleum Engineering program. Interest in two active oil wells on UHCC property.

Effectiveness. The UHCC is providing a valuable resource to faculty in NSM, with use for research, education and outreach steadily increasing. We have engaged faculty in Architecture whose courses will assist with renovation scenarios for the UHCC. The UHCC is potentially a valuable resource for faculty in Education, but current use is in the early stages. The UHCC is potentially an extremely valuable resource for faculty in Petroleum Engineering, but they are overwhelmed trying to set up their new program, and we have not yet been able to develop this potential.

F. Outside Interactions

Academic

Rice University: Evan Siemann (ecology research). Active.
San Jose State University: Craig Clements (fire research). No activity this year.
Texas A&M: Charles Criscione (parasite life history research). Active
University of Dayton. Chelse Prather (ecology research). Active.

University of Houston Downtown: Michael Tobin (course field trips). Active.
University of New Mexico: Jennifer Rudgers (plant ecology research). Active.
University of New Mexico: Ken Whitney (experimental evolution research). Active.
University of Texas Rio Grande Valley. Christopher Gabler (ecology research). No activity this year.

Agency

NASA: Barry Lefer (atmospheric science research). Still in contact with UH atmospheric science group.

Conservation

Native American Seed: seed harvests. Active.
Coastal Prairie Partnership: Jaime Gonzalez and Lan Shen (restoration research, conservation, education). Active.
Texas Master Naturalists: seed harvests. Active.

Effectiveness. The UHCC is providing a valuable resource to a number of outside groups. In particular, we provide a valuable research site for several NSF-funded projects from outside universities, and an extremely valuable source of seed for prairie restoration in Texas and Louisiana. We have developed a collaboration with the Coastal Prairie Partnership focused on the “pocket prairie” on the UH main campus that will both be a resource in its own right and serve as an advertisement for the UHCC. There is strong community interest in the UHCC, and we would be able to do considerably more outreach activities than we currently do if we had the necessary staff.

G. Role of the Institute

Within UH

The UH Coastal Center serves a number of UH faculty, primarily in NSM, who need the space or habitats uniquely provided by the UHCC (Section E).

Regional

The UHCC serves conservation organizations in the Texas and Louisiana area by providing tours and seed for prairie conservation (Section F).

National

The UHCC serves faculty in the Houston area and nationally who need the space or habitats provided by the UHCC (Section F).

The UHCC serves the nation by conserving a pristine parcel of high-quality coastal prairie, a habitat type that is highly endangered (Section C).

Other units

The UHCC is the only field laboratory serving the University of Houston. Few of the activities conducted at the UHCC could be moved to other UH properties, and the natural habitat itself is irreplaceable.

Students

Graduate and undergraduate students are active at the UHCC through the research programs in faculty laboratories, and through courses that utilize the UHCC.

H. Anticipated Changes

We are working with the NSM Dean to develop a new strategic plan for the UHCC that reflects our new reporting structure and provides long-term stability for the UHCC. A proposal to (re-)create the UHCC as an academic center reporting to the Dean of NSM was approved by the UH Committee on Academic Centers and Institutes on November 17, 2015, but has not yet been approved by the Provost.

Pennings and Wang are continuing to recruit new faculty to conduct research, education and service activities at the UHCC.

The UHCC was awarded some deferred maintenance funds in 2016 that allowed us to paint the exterior and replace exterior doors. We have requested additional deferred maintenance funds to renovate the bathrooms which are currently not ADA compliant.

Pennings has twice submitted FSML (Field Stations and Marine Laboratories) proposals to NSF that would support renovations of some of the laboratory space at the UHCC. These proposals were not funded, but we obtained useful feedback from the reviewers and NSF program officer, and could resubmit in the future when we have the right opportunity.

I. Current Measures of Performance

(1) Personnel. The UHCC does not yet have an official membership process (a formal membership process is part of the proposal to (re-)create the UHCC that is currently under review). A list of faculty who use the UHCC or are interested in doing so is provided in section E. We don't track how many postdocs or students from these labs are active at the UHCC. The UHCC has a single full-time staff person (Mr. Tim Becker) who is responsible for maintenance, security, grounds-keeping, janitorial duties, and providing logistical support to research operations.

(2) Funding.

Category	2015-2016 income	Comments
OVPR	$21,917	
NSM	$10,000	
EAS	$5,000	
BIO	$5,000	
User fees	$1,050	Variable among years
IDC return	$1,195	Variable among years.
Seed sales	$3,026	Highly variable among years.
Donations	$785	First year for donations
Total	**$47,973**	

(3) Contracts and Grants. The UHCC does not directly receive grants; rather, faculty with grants through their departments work at the facility. A list of awards for projects active at the UHCC follows.

Awards Active during 2015-6 ($2,626,691 to UH)

PI: Kerri Crawford. Sand dune restoration: Do plant diversity and soil microbial amendments enhance ecosystem services? Texas Sea Grant: 1/2016 to 1/2018, $238,600.

PI: James Flynn (100%), “Monitoring Related to Ozone Formation in and Particulate Matter Transport into the Houston Region”, Texas Commission on Environmental Quality [$312,859] April 2015 – June 2016.

PI: James Flynn (100%), “Characterization of Background PM2.5 and NOx north of the Houston Metropolitan Area”, Texas Commission on Environmental Quality [$489,000] February 2015 – April 2018.

PI: James Flynn (100%), “Monitoring Related to Ozone Formation in and Particulate Matter Transport into the Houston Region”, Texas Commission on Environmental Quality [$312,859] April 2016 – June 2017.

PI: Angela Laws. Senior personnel: CM Prather, M Strickland, J Jonas, D Bransen, A Joern, S Pennings. Is a diverse grasshopper community beneficial to the health and functioning of rangeland ecosystems? USDA. 2015-2018. $150,000.

PI: Chelse Prather. Pennings is Senior Personnel and UH subcontract lead. Are micronutrients important in structuring plant and herbivore communities? A test in coastal tallgrass prairie. NSF. 2015-2018. $271,662 to UH.

PI: Wallace Dominey. Pennings is instructional team member. University of Houston Regional Collaborative for Excellence in Science Teaching, Source of Support:

Texas Regional Collaboratives for Excellence in Science Teaching (University of Texas- Austin), Award Period: 05/01/2015- 07/30/2016, Award UTA15-000261, UH G109772, Award Amount: $164,901

PI: Barry Lefer (50%), Co-PI: James Flynn (50%), “Analysis and Presentation of Spatial and Temporal Variability of NO2 and O3 in Support of DISCOVER-AQ Houston” (G109273) NASA [$49,999] December 2014 – December 2015

PI: Steven Pennings and Anna Armitage. Mangroves are invading Texas salt marshes: what are the consequences? Texas Sea Grant. $176,603. 5/2014-4/2016.

PI: Merryl Alber, Steven Pennings. LTER: Georgia Coastal Ecosystems III. National Science Foundation. $5,880,000. UH budget $292,021. 2012-2018.

PI: Guoquan Wang. Title: TUES (Transforming Undergraduate Education in Science, Technology, Engineering and Mathematics): Integrating GPS and LIDAR into geosciences education. Sponsor: NSF. Project period: October 1, 2013—September 30, 2016. Total Award: $168,187.

PI: Charles Criscione, William Font. NSF DEB # 1145508 “Biodiversity in the parasitic fluke genus Alloglossidium: Evolutionary origins of changes in life cycle complexity” (not included in UH total funding).

PI: Ken Whitney, Loren Rieseberg. National Science Foundation DEB 1257965. Repeatability and genetic architecture of adaptive introgression: a long-term experimental evolution study in sunflowers (not included in UH total funding).

PI: Jenn Rudgers. National Science Foundation. COLLABORATIVE RESEARCH: Parsing the effects of host specificity and geography on plant-fungal symbioses under climate change. Rudgers, J.A.; Collins, S.; Porras-Alfaro, A.; Jumpponen, A.; Herrera, J. 09/01/2015 - 08/31/2019. $406,134 to UNM, $1,089,436 total (not included in UH total funding).

Pending Awards

Kerri Crawford. National Science Foundation: DEB, PCE. 2017-2020. How will climate change affect plant-soil feedback? Amount requested: $667,579

PI: James Flynn (100%), “Monitoring Related to Ozone Formation in and Particulate Matter Transport into the Houston Region”, Texas Commission on Environmental Quality [$280,000] April 2017 – June 2018.

Bernhard Rappenglueck, “BLIMA-highRes [Boundary Layer Study combining an Integrative Measurement Approach and high Resolution WRF-LES Modeling]”, National Science Foundation (NSF) [$389,774.00], March 01, 2017 – February 28, 2019

Bernhard Rappenglueck, co-PI: Yunsoo Choi “Improved Description of the Planetary Boundary Layer Height”, Earth and Atmospheric Science - Research Grant (EAS-RG) [$28,378.00], January 01, 2017 – December 31, 2017

Ryan Reihart. 2016. Prairie Biotic Research Grant. $1,000.

Likely Submissions in near future

Criscione (Texas A&M). Hoping to submit an NIH proposal in 2017 entitled “Evolutionary genomics of precocious life cycle development in parasitic flatworms”.

(4) Expenditures. The UHCC does not have a business manager and relies on staff in the department of Biology and Biochemistry to handle our accounts. We are currently not able to recompense the department for this service. Major expenses were funding for the UHCC caretaker, who provides grounds-keeping, maintenance, security, janitorial and research services, various expenses related to maintenance of the facility, and matching or seed funding for research projects.

Category	**2015-2016 Expenditures**	**Comments**
Salary	$35,844	UHCC caretaker (Tim Becker)
Fringe	$9,459	UHCC caretaker (Tim Becker)
M&O	$17,584	Maintenance expenses, modest matching or seed funding for research projects.
Travel	$136	Matching or seed funding for research projects.
Total	**$63,022**	

(5) Publications and Presentations. Below we list publications from 2013-2016.

In review or in press

Aziz, A., R.R. Stewart, and S. Green, Effect of GPR antenna frequency on near-surface imaging: To be submitted to J. Measurement.

Carrillo, J & E. Siemann. Native plant competition mediates the biocontrol impact of above- and belowground herbivory on an invasive tree (35 pages, 2 Tables, 6 Figures), Ecological Applications.

Cheek, A. O. In press. Estimating fish population size using a mark-recapture technique. Article in: McMahon, K. ed. Tested studies for laboratory teaching.

Volume 38. Proceedings of the 38th Conference of the Association for Biology Laboratory Education (ABLE). http://www.ableweb.org/proceedings/index.php

Cuchiara G.C., Rappenglück B. Analysis of a Large-Eddy Simulation of the Planetary Boundary Layer in the Houston-Galveston area, Texas, Quart. J. Roy. Meteor. Soc., submitted

Cuchiara G.C., Rappenglück B. Single-Column Model and Large Eddy Simulation of the Evening Transition in the Planetary Boundary Layer, Environ. Fluid. Mech., in revision.

Guo, H., C. Weaver, S. P. Charles, A. Whitt, S. Dastidar, P. D'Odorico, J. D. Fuentes, J. S. Kominoski, A. R. Armitage and S. C. Pennings. Coastal regime shifts: Rapid responses of coastal wetlands to changes in mangrove cover. In press, Ecology.

Jumpponen, A. J. Herrera, A. Porras-Alfaro, J. A. Rudgers. (in press) Chapter 11. Biogeography of root-associated fungal endophytes. In L. Tedersoo (Ed.) Biogeography of Mycorrhizal Symbiosis. Springer-Verlag. In press.

Prather, CM, M. Strickland, A. Laws, and D. Branson. In Review. Herbivore species identity and composition affect soil enzymatic activity through altered plant composition in a coastal tallgrass prairie. Soil Biology and Biochemistry.

Siemann, E., S.J. DeWalt, J. Zou, W.E. Rogers. In press. An experimental test of the Evolution of Increased Competitive Ability Hypothesis in multiple ranges: invasive populations outperform those from the native range independent of insect herbivore suppression (42 pages, 5 tables, 4 figures), Annals of Botany Plants.

Wang, Y, J. Ding, L. Zhu, L. Xiao, E.Siemann. Contrasting effects of invasive plant volatiles on host selection of generalist and specialist herbivores (28 pages, 1 table, 5 figures)

Wang, H., L. Zhang, X. Ma, J. Zou, E. Siemann. In press. The effects of elevated ozone and CO2 on growth and defense of native, exotic and invader trees (29 pages, 5 tables, 6 figures), Journal of Plant Ecology.

Wang, Y, L. Zhu, E. Siemann and J. Ding. Repeated damage by specialist insects suppresses the growth of a high tolerance invasive tree (22 pages, 1 Table, 2 Figures), Biocontrol.

Yang, Q., J. Ding, E. Siemann. Ecological and evolutionary interactions of plants and foliar herbivores depend on soil biota (30 pages, 3 tables, 6 figures)

Zhang, L. J. Zou, E. Siemann. Interactive effects of elevated CO2 and nitrogen deposition accelerate litter decomposition cycles of invasive tree (Triadica sebifera) In press. (50 pages, 5 tables, 8 figures), Forest Ecology & Management.

2016

Lee, Dongie. Compaction of aquifer at different depths: observations from a vertical GPS array at the Coastal Center of the University of Houston. M.S. Thesis, Department of Earth and Atmospheric Sciences, November 2016.

Li, X. W. Guo, E. Siemann, W. Huang, J. Ding. 2016. Interactions of aboveground and belowground heterospecific herbivores varied in tallow tree native and invasive genotypes(Triadica sebifera) Oecologia 182:1107-1115

Li, S. and S. C. Pennings. 2016. Disturbance in Georgia salt marshes: variation across space and time. Ecosphere 7(10):e01487. DOI: 10.1002/ecs2.1487.

Liu, W., Maung-Douglass, K., Strong, D.R., Pennings, S.C. and Zhang, Y. 2016. Geographical variation in vegetative growth and sexual reproduction of the invasive Spartina alterniflora in China. Journal of Ecology 104:173-181.

Wang, H. X. Ma, L. Zhang, JW. Zou and E. Siemann. 2016. UV-B has larger impacts on invasive populations of Triadica sebifera but ozone impacts do not vary. Journal of Plant Ecology 9:61-68.

Zengel, S., C. L. Montague, S. C. Pennings, S. P. Powers, M. Steinhoff, G. Fricano, C. Schlemme, M. Zhang, J. Oehrig, Z. Nixon, S. Rouhani, J. Michel. 2016. Impacts of the Deepwater Horizon oil spill on salt marsh periwinkles (Littoraria irrorata). Environmental Science & Technology. DOI: 10.1021/acs.est.5b04371.

Zengel, S., S.C. Pennings, B. Silliman, C. Montague, J. Weaver, D.R. Deis, M.O. Krasnec, N. Rutherford, Z. Nixon. 2016. Deepwater Horizon oil spill impacts on salt marsh fiddler crabs (Uca spp.). Estuaries and Coasts 39:1154-1163. DOI 10.1007/s12237-016-0072-6.

Zengel, S., J. Weaver, S. C. Pennings, B. Silliman, D. R. Deis, C. L. Montague, N. Rutherford, Z. Nixon and A. R. Zimmerman. 2016. Five years of Deepwater Horizon oil spill effects on marsh periwinkles (Littoraria irrorata). Marine Ecology Progress Series. DOI 10.3354/meps11827.

2015

Bock, D. G., C. Caseys, R. D. Cousens, M. Hahn, S. M. Heredia, S. Hübner, K. G. Turner, K. D. Whitney, and L. H. Rieseberg. 2015. What we still do not know about invasion genetics. Molecular Ecology 24: 2277-2297.

Guo, H., S. A. Chamberlain, E. Elhaik, I. Jalli1, A. Lynes, L. Marczak, N. Sabath, A. Vargas, K. Więski, E. M. Zelig and S. C. Pennings*. 2015. Geographic variation in plant community structure of salt marshes: species, functional and phylogenetic perspectives. PLOS ONE 10(5): e0127781. doi:10.1371/journal.pone.012778.

He, Q., M. D. Bertness, J. F. Bruno, B. Li, G. Chen, T. C. Coverdale, A. H. Altieri, J. Bai, T. Sun, S. C. Pennings, J. Liu, P. R. Ehrlich, B. Cui. 2014. Economic development and coastal ecosystem change in China. Scientific Reports 4:5995, DOI: 10.1038/srep05995.

Hübner, L., S. C. Pennings and M. Zimmer. 2015. Sex- and habitat-specific movement of an omnivorous semi-terrestrial crab controls habitat connectivity and subsidies: a multi-parameter approach. Oecologia 178:999-1015.

Whitney, K. D., K. W. Broman, N. C. Kane, S. M. Hovick, R. A. Randell, and L. H. Rieseberg. 2015. QTL mapping identifies candidate alleles involved in adaptive introgression and range expansion in a wild sunflower. Molecular Ecology 24: 2194-2211.

Yang Q., B. Li, and E. Siemann. 2015a. The effects of fertilization on plant-soil interactions and salinity tolerance of invasive Triadica sebiferum. Plant Soil 394:99-107.

Yang Q., S. Wei, L. Shang, J. Carrillo, C.A. Gabler, S. Nijjer, B. Li, E. Siemann. 2015b. Mycorrhizal associations of an invasive tree are enhanced by both genetic and environmental mechanisms. Ecography 38:1112-1118.

2014

Ahern, J. R. and K. D. Whitney. 2014. Sesquiterpene lactone stereochemistry influences herbivore resistance and plant fitness in the field. Annals of Botany 113: 731-740.

Ahern, J. R. and K. D. Whitney. 2014. Stereochemistry affects sesquiterpene lactone bioactivity against an herbivorous grasshopper. Chemoecology 24: 35-39.

Carrillo J., D. McDermott, and E. Siemann. 2014. Loss of specificity: Native but not invasive populations vary in tolerance to different herbivores. Oecologia 174: 863-871.

Chang, L., R. R. Stewart, and N. Dyaur, 2014, Geophysics for astronauts: GSH Journal, 5, 4, 26-27.

Gu X., E. Siemann,L. Zhu, S. Gao, Y. Wang, and J. Ding. 2014. Invasive plant population and herbivore identity affect latex induction. Ecological Entomology 39:1-9.

Guo, H., K. Więski, Z. Lan and S. C. Pennings. 2014. Relative influence of deterministic processes on structuring marsh plant communities varies across an abiotic gradient. Oikos 123:173-178. DOI: 10.1111/j.1600-0706.2013.00425.x.

He, Q., M. D. Bertness, J. F. Bruno, B. Li, G. Chen, T. C. Coverdale, A. H. Altieri, J. Bai, T. Sun, S. C. Pennings, J. Liu, P. R. Ehrlich, B. Cui. 2014. Economic development and coastal ecosystem change in China. Scientific Reports 4:5995, DOI: 10.1038/srep05995.

Holland, J.N. and F. Molina-Freaner. 2013. Hierarchical effects of rainfall, nurse plants, granivory, and seed banks on cactus recruitment. Journal of Vegetation Science 24: 1053-1061.

Holland, J.N., Y. Wang, S. Sun, and D.L. DeAngelis. 2013. Consumer-resource dynamics of indirect interactions in a mutualism-parasitism food web module. Theoretical Ecology 6: 475-493.

Hovick, S.M., and K. D. Whitney. 2014. Hybridization is associated with increased fecundity and size in invasive taxa: meta-analytic support for the hybridization-invasion hypothesis. Ecology Letters 17: 1464–1477.

Huang, W., E. Siemann, L. Xiao, X. Yang, and J. Ding. Species-specific defense responses facilitate conspecifics and inhibit heterospecifics in above-belowground herbivore interactions. Nature Communications 5: 4851. doi:10.1038/ncomms5851

Malek, S. and M. Garbey, Improving Volunteer Computing Scheduling for Evolutionary Algorithms, Future Generation Computer Systems, Vol 29 Issue 1:pp1-14, 2013.

Pennings, S. C., B. D. McCall and L. Hooper-Bui. 2014. Effects of oil spills on terrestrial arthropods in coastal wetlands. Bioscience64:789-795. DOI:10.1093/biosci/biu118.

Sharitz, R. R., Batzer, D. P. and S. C. Pennings. 2014. Ecology of freshwater and estuarine wetlands: an introduction. In, D. P. Batzer and R. R. Sharitz, eds. Ecology of Freshwater and Estuarine Wetlands. Second edition. University of California Press. In press.

Sharitz, R. R. and S. C. Pennings. 2014. Development of wetland plant communities. In, D. P. Batzer and R. R. Sharitz, eds. Ecology of Freshwater and Estuarine Wetlands. Second edition. University of California Press. In press.

Silva A. and R. R. Stewart, 2014, Seismic, sonar, and sunshine: The 2014 UH Geophysics Field Camp at Galveston: GSH Journal, 5, 8.

Whitney, K. D., and E. Gering. in press. Five decades of invasion genetics. New Phytologist.

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(6) Outreach and Service. In 2015-2016, the UHCC hosted visits by the Texas Master Naturalists who collected seed and prairie plants for restoration projects. The company Native American Seed is marketing prairie plant seed from the UHCC for sale to individuals and organizations interested in prairie restoration projects.

Chelse Prather and her students have updated public reference information (Wikipedia, bugguide, etc.) for insect species common at the UHCC. She has also organized tours of her work at the UHCC for the public.

The University of Houston's Office of Sustainability, Department of Biology & Biochemistry, College of Architecture and the Katy Prairie Conservancy worked together to establish a pocket prairie near the university's science building complex in May 2016. This garden is dubbed Shasta's Prairie and it was planted using seeds harvested from the University of Houston Coastal Center and with plants grown using local prairie seeds. Shasta's Prairie will be used by undergraduate biology classes, to support local wildlife, as a demonstration of a sustainable landscape (less water and mowing required), and most importantly, as an on campus reminder of the UH Coastal Center. Additionally, this pocket prairie will give campus visitors and students a glimpse at the ancestral landscape of the UH campus. Signage will be installed that will help tell the story of this new amenity and its connection to the Coastal Center. The pocket prairie will be co-managed by the Office of Sustainability, Department of Biology, and Katy Prairie Conservancy. At UH, Pennings, Crawford and Peters participated.

Two 3-hour faculty workshops during the annual meeting of the national Association of Biology Laboratory Educators, Jun 22 and Jun 23, 2016 used the UHCC laboratory and pond. A total of 12 faculty from US and Canadian universities participated in the workshops. Workshop engaged faculty in a mark-recapture population size estimate designed to occur during 2 – 3 laboratory periods in an undergraduate or graduate course. Organized and led by Ann Cheek.

During February 2016, a group of 43 elementary and middle school science teachers visited the UHCC to complete a one day field experience introducing data collection activities in a coastal grassland ecology. This event was hosted in partnership with the University of Houston's Science Teaching Equity Project (STEP), which provides high-quality, long-term, and sustained professional development to science teachers in the Houston area. Teachers in the STEP program complete at least 120 hours of professional development during a single year. The field experience was co-led by Dr. Angela Laws (UHCC) and Heather Brown (STEP) and was designed to align with one of STEP's year-long project objectives focused on diversity of life. Participants used a quadrant system to conduct a survey of prairie grasses on the grounds of the UHCC. These hands on experience afforded participants the opportunity to build greater depth in their understanding of scientific data collection while discussing the importance of grasslands within their community and around the nation. In addition, UHCC brought awareness to the several pocket prairies present in the greater Houston area. Knowledge of local pocket prairies allow teachers to exposure their students to prairie ecologies without the need to venture outside of the city.

Dr. Laws gave a tour of the UHCC including an overview of the undergraduate education and research opportunities at UHCC to representative from the STEM career counselor office.

Dr. Laws gave a public talk about grassland ecology to the Native Prairies Association in February 2016 (~15 people in attendance).

Dr. Laws participated in a BioBlitz in a Ft. Worth grassland as a grasshopper expert in April 2016 (>200 attendance).

Dr. Laws gave a talk about grasshopper ecology and a demonstration of grasshopper sampling methods to interns working at a Nature Center in Ft. Worth in July (15 attendance).

(7) Courses taught at the UHCC in the 2015-2016 academic year.

UH

BIOL 2397, Introduction to Field Biology, Ann Cheek. Hands on field education. Three hours per day, M – F, for the 24 day June 2016 summer school session. 5 students.

BIOL 4206, Ecology and Evolution Laboratory. Larry Williams. Field trips to UHCC.

GEOL4300 Introduction to Geophysics, Guoquan Wang. ~120 students. A one-day field trip for oil field instrumentation, GPS and LiDAR survey, groundwater monitoring, and land subsidence (October, 2016).

GEOL4332 and GEOL 6324 Geoscience Applications of GPS and LIDAR, Guoquan Wang. ~90 students. A one-day field trip for GPS and LiDAR education (March 2016).

GEOL 4355, UH Geophysics Field Camp. This is a core course for UH geophysics majors. The course is offered by Rob Stewart, Guoquan Wang, and six other faculty members in the May of each summer. The enrollment in the 2016 summer was 63 students. Fundamental geophysics field survey methods were taught in the UHCC campus.

Geophysical data acquisition course. Rob Stewart. Spring 2016. Several field trips to UHCC.

GEOL 6323, Satellite positioning and GPS geodesy, Fall 2016. Guoquan Wang. 20 student. A one-dayhour field trip for GPS and subsidence education (November 2016).

UHD

BIOL-CHEM-GEOL 4260 Environmental Lab and Field Studies, Michael Tobin. Two four-hour field exercises at the UHCC, ~12 students.

(8) User days. We recorded 1,134 visitor-days to the UHCC In 2012, 1,633 in 2013, 1,677 in 2014, 1,794 in 2015, and 2171 in 2016 (as of November) indicating a steady increase in use over recent years. Visits to the UHCC are split between research (~28%), education (~28%) and operation of the oil wells (~42%), with a small number of outreach days. About 24% of the user days are faculty and staff, 7% graduate students, 24% undergraduates, 40% industry and 3% general public.

J. Future Measures of Performance

Administration of the UHCC was transferred from the Division of Research to the Dean of NSM in the fall of 2014. Pennings and Wang are working with the Dean to discuss how the UHCC will be administered and funded in future years, and to develop a new strategic plan. Our general goals will remain unchanged: to continue to increase research, teaching and service activities that are facilitated by UHCC.