

A photograph of a mangrove forest with dense green foliage and complex root systems reflected in the water.

FIU

Southeast Environmental
Research Center

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and Environment

**George M. Barley, Jr. Endowed Chair
in Everglades Research
Annual Report
2016-2017**



Miami, August 22nd 2017

Dear Mrs. Mary Barley,

May this letter serve as an acknowledgment of my great appreciation for the support provided through the George Barley Chair, which I was awarded nearly 9 years ago. This financial support has significantly incremented the productivity of my research group and thus of FIU over the years. As a result, my research group has had another highly productive year, with ten publications. Of these eight are directly related to the Everglades ecosystem, ranging from modeling long-term fluxes of carbon export, to the photo-reactivity of dissolved organic matter to the bioavailability of dissolved organic nitrogen, and effects of salinity on mangrove species. The Barley Chair partially or fully supported these research activities. We also published novel information regarding long-range effects of combustion derived organic matter in Antarctica and in the cryosphere worldwide through a collaboration with the University of Colorado, published in the prestigious Journal Geophysical Research.

Financial support from the Barley Chair was primarily provided through salary for graduate students and partial summer salary for me, support for travel to present our results at national and international conferences, and for the acquisition of laboratory equipment and supplies. But more importantly, we have been able to pursue research projects for which funding was otherwise limited or unavailable. Two such on-going projects include: (1) the effect of land-use on the composition and reactivity of dissolved organic matter (mainly soil derived) and dissolved black carbon (fire derived) in a large watershed (Altamaha River, GA); and (2) assessment of the 'age' of dissolved organic carbon in the greater Everglades. The latter is a collaborative effort with the Fish and Wildlife Commission and the University of South Florida. The Altamaha River project represents a major portion of the dissertation of Alan Roebuck, a Ph.D. student in the Environmental Track at FIU's Department of Chemistry & Biochemistry.

We are looking forward to continuing our high level of activity and productivity during the 2017-2018 academic year. The above-described on-going research activities are expected to further enhance our knowledge on human effects of the biogeochemistry of aquatic ecosystems, including the Greater Everglades.

Thanking you again for your continued support, I remain sincerely yours,



A blue ink handwritten signature of Dr. Rudolf Jaffé.

Dr. Rudolf Jaffé
George Barley Endowed Professor
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Impressive Contributions to Everglades Research & Education

Support from the George Barley Jr. Endowed Chair in Everglades Research has been instrumental in driving the continued success of Dr. Rudolf Jaffè's research and mentoring efforts. Dr. Jaffè's research group focuses on studying organic matter dynamics in the greater Everglades ecosystem, including wetlands, estuaries/mangroves and the Florida Bay. He and his team study the molecular characterization of dissolved organic matter using state-of-the-art techniques, photo- and bio-reactivity determinations, and trace metal interactions. With the data that they collect, Dr. Jaffè and his research group are able to better understand and evaluate issues concerning climate change, land-use, human-impacted biogeochemical cycles, and the efficiency of currently implemented water management strategies. In today's world, where the human impact on water resources and wetlands is overwhelmingly clear, Dr. Jaffè's research to better understand this relationship and its consequences is critical. This important and timely work would not be possible without the continued generous support from the Barley Chair.

Support from the Barley Chair during 2016-2017 academic year contributed to the publication of over 10 journal articles in high impact journals, including Environmental Science & Technology, Aquatic Sciences, Organic Geochemistry, Journal of Geophysical Research, and others. Additionally, over the last year, Dr. Jaffè and his team have presented their findings at several distinguished national and international meetings and conferences. The group presented at the Ecological Society of America (ESA), ASLO Aquatic Sciences Conference,

American Chemical Society (ACS), Open Science Conference in Malaysia, and the Greater Everglades Ecosystem Restoration (GEER) Conference.

In addition to Dr. Jaffè's exceptional research success, the Barley Chair also supported his ability to invite Dr. Kaelin Cawley from the NEON Program. The NEON Program is an initiative funded by the National Science Foundation (NSF) aimed at gathering and analyzing data on the impacts that climate change, land use change, and invasive species have on biodiversity and natural resources. Dr. Cawley gave a seminar at Florida International University (FIU) and participated in collaborative research with Dr. Jaffè's team. This partnership, largely made possible by Barley Chair support, allowed for Dr. Jaffè and his team to further expand their research into climate change and land use effects on aquatic biogeochemistry.



Dr. Cawley during research at FIU's BBC campus Marine Sciences Building



Highlight: Graduate Student Research

Thanks to the generous support provided through the Barley Chair in Everglades Research, Dr. Rudolf Jaffè is also able to bolster graduate student research and education. Over the last 2 years, Dr. Jaffè has been supporting Alan Roebuck and Peter Regier (who successfully completed and defended his PhD in the summer of 2017) with their dissertation research.

Mr. Alan Roebuck

Mr. Roebuck's research focuses on how changes in land use influence water chemistry in natural river systems. The Barley Chair provided funds that partially supported Mr. Roebuck's salary during the 2016-2017 school year, allowing him to successfully continue his important work. During the summer of 2016, the Barley Chair also provided support for Mr. Roebuck to complete a five-day sampling trip on the Altamaha River in Georgia. This research focused on the effects of land-use on the water quality of a river system. The Altamaha River in Georgia was selected because it is a large watershed, covering a large percentage of the state, and land-use data and water discharge data are readily available. Specifically, Mr. Roebuck studied the composition of dissolved organic matter and of dissolved black carbon. The latter is a product of either forest fires or fossil fuels, and little is known about its



environmental fate. Through this project, Mr. Roebuck collaborated with the University of Georgia's Long Term Ecological Research (LTER) program, a sister program to FIU's Everglades LTER, and with the Biogeochemistry Group of the University of Oldenburg/Max Plank Institution.

During the trip, Mr. Roebuck was able to collect over 40 different samples representative of land use characteristics. In order to properly analyze these samples, Mr. Roebuck attended a workshop in Boulder, Colorado that taught him the computer modeling technique necessary for analyzing the collected data. The Barley Chair generously contributed funds allowing Mr. Roebuck to attend this workshop. The collection and analysis of these samples resulted in several presentations, including at the South Florida American Chemical Society and at the ASLO Aquatic Sciences Meeting, and is expected to yield a number of high impact publications.

Mr. Peter Regier

Thanks to funding support provided through the Barley Chair, Mr. Regier was able to conduct research on aquatic carbon cycling in the Everglades. His research allowed him to better understand and predict the effects of climate change, water management and Everglades restoration. Funds from the Barley Chair were instrumental in providing Mr. Regier with access to critical research field sites and invaluable tools for analysis and collection of his research data.

In addition, the Barley Chair supported Mr. Regier in presenting his findings at several conferences, including the Ecological Society of America in Summer of 2016 and the ASLO Aquatic Sciences Meeting in Spring of 2017. Additionally, Mr. Regier's research has been published in several acclaimed journals, including *Estuarine, Coastal & Shelf Science* and *Frontiers in Marine Biogeochemistry*. Mr. Regier's research can greatly contribute to the decision-making process for more effective wetland management.



Mr. Regier
collecting samples for
his research.

