



Urban Resilience to Extremes Sustainability Research Network Research Experiences for Undergraduates (REU) SUMMER 2017

Opportunity 1: Miami, FL

Flood mitigation and ecosystem restoration strategies that enhance human-ecosystem connectivity and health in coastal urban systems

Under the direction of Dr. John Kominoski and the UREx SRN Miami Team at FIU, the REU student will work on two existing ecosystem restoration and coastal flood mitigation projects - Wagner Creek/Seybold Canal Restoration Project (Downtown & Miami River), and Indian Creek Seawall Redevelopment (Miami Beach).

The research will explore how flood mitigation and ecosystem restoration efforts impact urban ecosystem connectivity and functioning, as well as human interactions and use of coastal urban systems. Urban coastal regions are experiencing increasing flooding with sea-level rise and runoff, and increased connectivity of polluted stormwater runoff in urban aquatic ecosystems is a human and environmental health concern. Miami is a rapidly developing urban coastal city with coastal flooding and water quality challenges that affect both the downtown district including the Miami River and Miami Beach. Two large-scale flood mitigation and ecosystem restoration projects will target both flooding and water quality challenges. The Wagner Creek/Seybold Canal Restoration Project focuses on the removal of toxic sediments and restoration of riparian areas along the main tributary to the Miami River to enhance water quality and recreation access to the river. More information about the Kominoski Lab (the home for this project) can be found here (<https://kominoskilab.wordpress.com/>).

REU Activities:

Research opportunities consist of partnering with existing graduate research to test the question: How does water and sediment quality, and whole-stream ecosystem metabolism change following the removal of upstream contaminated sediments? The Indian Creek Seawall Redevelopment Project focuses on increasing coastal green infrastructure development as well as stormwater retention on Miami Beach. Research opportunities will consist of partnering with developing graduate research to test the question: How does the implementation of green infrastructure, stormwater retention, and seawall enhancement change stormwater source (e.g., marine, municipal, precipitation runoff) and quality during wet season storms? Research will compare stormwater from sections along Indian Creek with greater versus lesser green infrastructure, stormwater retention, and seawall enhancement.

REU Responsibilities:

- Learn basic methods for field and laboratory assays and procedures
- Read relevant literature and work alongside graduate students to design and implement experiments to test general questions outlined above
- Participate in the UREx SRN REU program
- Develop a research poster that could be presented at a professional scientific meeting
- Participate as a co-author on manuscript(s)

Desired Qualifications, Interests and Skills:

- Enthusiastic, well organized, and self-motivated
- Coastal urban systems
- Ecology & Sustainability
- Climate change
- GIS experience, ideal
- Desire to work outside in sun and rain, and get dirty
- Strong written and verbal skills