

Live oak super group – Integrating individual research strengths for multiplicative research results: *Faculty contributors* – Egan, Miller, Braam, Saltz, Kohn, Masiello,

Research idea – The live oak tree is one of the defining aspects of the Rice University campus and symbolic of the coastal ecosystem within which we all live and work. It is also an amazingly complex system and the home to a species-rich community of interacting organisms including microbial communities, insect herbivore communities, and invertebrate and vertebrate predators. The oaks themselves are highly dynamic, with immune responses to infection and insect damage, stress responses to temperature or drought, and boom and bust years for reproductive output. The live oaks are also part of complex natural and urban environments, where they impact microclimates, property values, water use and hydrology.



The live oaks are also part of complex natural and urban environments, where they impact microclimates, property values, water use and hydrology. **The objective of this research theme is to focus and integrate the individual strengths of the IBB associated faculty and the greater Rice community, with a wide range of research expertise, on a single study system in a way that will generate multiplicative effects of our research efforts and facilitate future external funding.**

Current strengths – The Department of BioSciences is a new merged department between disciplines ranging from ecology, evolution, behavior, and genetics to biochemistry and cell biology. One goal would be to merge these talents and focus them on a specific study system that would catalyze research collaboration and generate multiplicative results. The next step will be to reach out to other IBB faculty in Earth Sciences, Computer Science, and other environmental researchers to generate a cross-disciplinary research and education program encompassing the entire spectrum of biological, chemical, and engineering disciplines working on a linked project. Logistically, there are hundreds of live oaks directly on campus and the surrounding area, where they play an important role in both natural and urban environments.

Required investment – Short-term investments might include funding for post-docs and graduate students tasked with linking different groups or catalyzing collaborative projects. Additional short term funding could target pilot research projects that would serve as preliminary data for external grant proposals, memory space and computing time on Rice University's Shared Computing Resources, funds to support conference attendance or funds to host a small targeted 'live oak' conference here at Rice, and open access charges for publications. Intermediate funding might include additional personnel, including a lab research technician, a field technician to maintain greenhouse and common garden experiments with sapling trees, a staff bioinformatician and/or computer programmer that would also be tasked with linking labs between genomics and environmental live oak research, as well as to fund computer time on the Rice. Long-term investments might include targeted senior and junior faculty hires to compliment this effort and fill in holes in our current faculty's research mosaic. Infrastructure funding might include building new greenhouse space for research. Lastly, we hope that this theme can attract new investments from administrators and fundraisers here at Rice for targeted investment in the future.

Potential impact of that investment at Rice – This large collaborative effort will position Rice researchers for external funding from NSF and/or the USDA, as well as from other conservation and environmentally oriented sources. In addition, these efforts may have the biggest impacts of our education goals at Rice University. If we are working in detail on a local study system that is right outside the door to almost every classroom on campus, experiential learning will be a natural extension. Lastly, this theme is synergistic with other new collaborations, including the research field station (Miller), where we might plant a research garden of live oaks.