State University of New York
College of Environmental Science and Forestry

GRADUATE ASSISTANTSHIPS IN ARID-LAND RIPARIAN FOREST ECOLOGY AND TREE-RING RESEARCH AT SUNY-ESF

We seek **three** well-qualified PhD and Masters students to join two funded projects investigating drought and its impact on riparian vegetation in the Southwestern USA (Arizona and California). The overall projects combine a range of methods (dendrochronology, forest inventories, stable isotopes, remote sensing, and hydrological modeling) to explore the effects of drought and climate change on riparian woodlands, and to develop water stress indicators to assess forest health at multiple scales. The projects are funded by the National Science Foundation (NSF) and US Department of Defense's Strategic Environmental Research and Development Program (SERDP), and emphasize the sustainability and management of riparian ecosystems in drought-prone landscapes. Research questions will focus on riparian ecosystem response to drought and methods will include field sampling to inventory riparian forest structure and health, collecting and analyzing tree rings for growth trends and annual water use efficiency using carbon isotopes, and assessing critical thresholds for riparian forest decline.

We welcome applications from motivated, curious students with experience in ecological research. Ideal candidates will have a BS or MS in ecology, environmental science, or a related field; a strong quantitative and statistical background; the ability to work in remote field settings; and interest in riparian forest ecology and tree ecophysiology in dryland regions. Positions start in Fall 2018 and are funded for a minimum of three years for PhD and two years for Masters students, and provides a competitive stipend, tuition and benefits. More detail below.

Project Inquiries (please contact me before applying):

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Research page: **http://www.esf.edu/fnrm/stella/default.htm**

Co-PI and collaborators: Michael Singer (Cardiff Univ.), Kelly Caylor (UCSB), Dar Roberts, (UCSB)

Email inquiries should include: Brief statement of interest and experience, CV, transcripts, GRE scores, English proficiency scores (if applicable). Research writing samples are also welcome.

Image Caption: Riparian forests along perennial streams in Southern California.

Projects:

- ***Linking basin-scale, stand-level, and individual tree water stress indicators for groundwater-dependent riparian forests in multiple-use river basins*** **(NSF-funded)**

- ***Detection of forest water stress due to climate change in drought-prone regions of the Southwestern USA*** **(SERDP-funded)**

Project background:
Managing water resources is increasingly challenging in many river basins globally as the climate becomes warmer and drier. Human demand on water resources, particularly groundwater, is high in multiple-use river basins where significant withdrawals occur for intensive agriculture and industry. The interaction between high groundwater extraction by humans and climatic drought, such as that which is currently affecting large areas of the U.S. Southwest, can result in rapidly declining water tables with strongly negative consequences for groundwater-dependent ecosystems (GDEs). Riparian forests, which are hotspots of biodiversity and support key functions and habitats within river corridors, are particularly sensitive to drought, climate change, and declining groundwater water levels, with reduced growth, vigor, and physiological function. These conditions, if they persist, lead to riparian forest decline, with substantial risks to the ecosystems they support and the services they provide to society.

These projects will use a suite of interdisciplinary methods to measure water stress in riparian forests that are linked to changes in climate and groundwater availability. The interdisciplinary project team from SUNY-ESF, Cardiff University, and UC Santa Barbara, in collaboration with The Nature Conservancy and other partners, will couple high-resolution remote sensing with field-based tree-ring research and groundwater well data to develop water stress indicators across a range of geographic scales from individual trees to forest stands to an entire riparian corridor. The ultimate goal of the project is to identify trends and thresholds in forest response to groundwater decline that can be used to develop sustainable groundwater management approaches for protecting groundwater-dependent ecosystems in multiple-use river basins.

About SUNY-ESF:
Founded in 1911, SUNY-ESF is the nation's oldest school dedicated to the study of the environment, developing renewable technologies and building a sustainable future. The ESF main campus is in Syracuse, NY and has regional campuses throughout Central New York and the Adirondack Park. Providing a small-college atmosphere with a low student/faculty ratio that allows for personal attention and mentoring for students, ESF is one of nine Ph.D. degree granting campuses within the SUNY system, and is designated a Carnegie RU/H (Research University/High Activity) school. Integration of research and teaching is emphasized and the college has a strong undergraduate research program where advanced undergraduate students regularly work with graduate students and faculty. ESF has nine regional campuses/field stations and maintains nearly 25,000 acres in college properties offering unrivaled opportunities for field-based research. On ESF's main campus, access to chemical instrumentation, advanced electron microscopy, computing clusters and growth chambers is available. In addition, the ESF campus is contiguous with that of Syracuse University and in close proximity to SUNY Upstate Medical University, giving students and faculty the added resources of a larger institution of higher education, including a wide array of courses, computer and library facilities. The City of Syracuse is uniquely situated between the Finger Lakes Region, Lake Ontario, and the Adirondacks, providing abundant opportunities for outdoor recreation.