

UC Irvine 2021 UC ANR CE Specialist Position Proposal

Position Title: Southern California Wildland Fire and Watershed Management Specialist

Position description: Housed in the UCI Department of Civil and Environment Engineering (CEE) in the Henry Samueli School of Engineering, the position will bridge research and education programs across schools and centers on UC Irvine campus, including the School of Physical Science, School of Social Ecology, the School of Biological Science and Water UCI. The position will strengthen UCI's existing collaborations with South Coast Extension and Research Center (ERC) and establish new connections with other ERCs and ANR Centers in the University of California system (UC Berkeley and UC Santa Barbara) to build the network for prediction and management of wildfires and to understand the impact of wildfires on watershed pollution. The CE specialist will advance research collaborations with Orange County Fire Authority (OCFA), the Irvine Ranch Conservancy, The Pacific Southwest Research Station (Riverside) of US Forest Service, as well as the Prescribed Fire councils under UC ANR. The position would lead to: Understanding and developing key issues of fires typical of Southern California (SoCal) landscapes- marked with complex terrain, native shrub type vegetation and invasive species; Designing forest management and fuel management operations such as prescribed burns, mastication, fuel thinning; Optimizing wildland fire goals against the practices of conservation, forest resource extraction, grazing and tourism and carbon sequestration; Watershed resilience, connected to healthy forest and shrubland management practices; Impact of wildfires on water pollution from firefighting practices (e.g. PFAS) and organic transformation (e.g. PAH and other trace organics).

Justification: With changing climate, land use change, and a proliferation of human population in the wildland urban interface, wildfires are becoming more extreme and more complex. Wildfires and ecosystem disturbance processes in general are high variable in space and developing a successful research program in wildfires and integrated ecosystem disturbance science requires area specific knowledge development. In California, the nature, severity, and frequency of wildfires are distinctly different across regions. The Sierras, dominated by coniferous forests, have a different fire regime as opposed to the shrub dominated water limited landscapes of SoCal and Orange County. These ecosystems also provide ecosystem-services and are characterized by a wide range of biodiversity. Moreover, the highly complex terrain of SoCal provides unique challenges by accentuating Santa Ana driven winds which can lead to extreme fire risks. The combustion characteristics of shrubs are significantly different from coniferous forests, which is further complicated by invasive annual species which make the landscape drier and more prone to fires. Therefore, managing landscapes to develop a more fire resilient SoCal requires wildland fire specialists who are accustomed to the unique aspects to SoCal wildland fires. Therefore, creating of a wildland fire extension position at UC Irvine is strongly recommended.

Research: The CE will work closely with UCI faculty across the campus and South Coast ERC to prepare research sites for fuel treatment operations, conduct prescribed burns using a variety of ignition technique, collect fuel inventory data, and implement monitoring platforms for short- and long-term observations of ecosystem processes such as fire behavior, drought, insect outbreak, post fire flooding and debris flow. These field data will support the quantification of carbon and water fluxes and water quality using static and mobile sensing platforms such as flux towers and drones. The UCI team will also maintain dashboards to share the collected datasets with researchers in other UC campuses, ERCs and ANR Centers focusing on fire and water resources.

The position will establish a fire network that connects Northern, Central and Southern California regions.

Extension: The research outcomes will be used in educating public and stakeholders through existing and new outreach programs (e.g. South Coast ERC Hub for Urban Living). The CE in collaboration with South Coast ERC and UCI faculty will provide short term tutorials such as field techniques or fire ecology/prescribed burn operations, using drones for field work, field sampling etc. to graduate, undergraduate and K-12 students. In collaboration with South Coast ERC, the team will build a Citizen Science program to education public and stakeholders on fire science through field trips and observation. The CE will also provide support for field trips associated with courses taught by faculty, such as ‘The Science of Engineering of Wildfires’ taught by Prof. Tirtha Banerjee at CEE and the [Ridge to Reef](#) (R2R) program at UCI.

ANR Network: This CE will work closely with South Coast ERC advisor and staff, and team up with the Water Quality, Health and Justice Specialist position proposed by UC Irvine as a cohort to support each other on a new campus. The CE will establish new connections with CE Wildfire Specialists at UC Santa Barbara, UC Berkeley and Central Sierra to form a California fire network. Together, the CE will work across the UC System and will closely interface with fire safe councils, UC prescribed fire consortium and resource conservation districts.

Network External to ANR: The position will work closely with local authorities such as Orange County Fire Authority (OCFA), Irvine Ranch Conservancy, US Forest Service, and CalFire. The CE will also be expected to engage regularly with the public through field-day type events on and off campus. Moreover, the position will be synergistic to existing wildland fire and water research networks based at UCI such as the Smart Practices and Architectures for Rx (prescribed) fires in California ([SPARX-Cal](#)), the International Network of Networks for the Prediction and Management of Wildland Fires ([iFireNet](#)), the Centre for Ecosystem Climate Solutions ([CECS](#)), and [Water UCI](#).

Support: The CEE department will provide office and research space for the position. The position will be supported by and work synergistically with several faculty led groups in CEE, ESS and Department of Ecology and Evolutionary Biology. A 500 acres field research site jointly developed in collaboration with the Banerjee lab and OCFA will be used as a natural laboratory, along with other research sites operated by [UCI Nature](#) such as the UCI Ecological Preserve.

Other support: The CE will also help in grant writing activities to agencies such as CalFire, EPA, CA Strategic Growth Council, CA Energy Commission, CA Air Resources Board, USDA, Fish and Wildlife, Department of Interior, DOD SERDP, and the Joint Fire Science Program which require a strong fieldwork and extension component.

Headquarters and Coverage Area: The position will be located at UCI. It will be statewide in scope with a focus on SoCal’s shrub dominated, mountainous ecosystems.

Developed and proposed by: Tirtha Banerjee, Assistant Professor, Sunny Jiang, Professor and Chair, Efi Foufoula Georgiou, Professor, CEE, UCI; Mike Goulden, Professor, James Randerson, Professor, ESS, UCI; David Feldman, Professor and Director, Water UCI, Michael Mendez, Department of Urban Policy and Public Planning (UPPP), UCI; Steven Allison, Department of Ecology and Evolutionary Biology, UCI. Darren Haver, Advisor and Director, South Coast ERC; Max A. Moritz, CE Wildfire Specialist, ANR, U.C. Santa Barbara; Lenya Quinn-Davidson, Area Fire Advisor, UC Cooperative Extension, Director, Northern California Prescribed Fire Council.