

UC Irvine 2021 UC ANR CE Specialist Position Proposal

Position Title: Water Quality, Health and Justice Specialist

Position: Jointly housed in the Department of Civil and Environment Engineering (CEE) and School of Social Ecology at UC Irvine, the Urban Water Quality, Health and Equity Specialist will connect faculty in these schools and other units in water resource and quality management, treatment and reuse, low impact development, and health and social equity with the South Coast Research and Extension Center's (REC) long-term efforts. The position will expand Water UCI's efforts in policy research in response to/and support for decisions by the State Water Resources Control Board that affect actions of local water agencies facing a wide range of water quality, access and affordability challenges. The CE Specialist will also enhance existing research collaborations between UCI faculty with College of Natural and Agricultural Sciences faculty at UC Riverside while also strengthening ties with Desert REC toward solutions in the Salton Sea region whose well-being has become a major environmental justice issue facing California, as well as faculty at UC Berkeley, which is home to a CE specialist in Water Justice, Policy and Planning. The Steele/Burnand Anza-Borrego Desert Research Center managed by UC Irvine also offers synergistic support to the position and proposed programs in addressing and resolving water resources problems at the socio-ecological interface of science and policy.

Justification: The proposed position aligns well with the mission of UC ANR and California Institute for Water Resources in integrating California's research, extension, and education programs to develop evidence-based solutions to water resource challenges. UC Irvine is located in the center of Orange County, less than 10 miles from the UC ANR South Coast REC. The current impacts of an over-stressed water supply in urban areas such as Orange County and portions of the Inland Empire fall most heavily on water agencies with smaller revenue bases prompting significant economic challenges as they can only afford to make capital investments to provide a more secure water supply with difficulty. The South Coast REC's Hub for Urban Living has already set the foundation for the success of this position, providing a link to a community of agencies, professional groups, regulators, and diverse publics seeking to manage the transition to greater stormwater harvesting, on site treatment, and water reuse for fit-for-purpose end uses. South Coast REC also provides access to land for research on the use of reclaimed municipal wastewater and stormwater quality management. This position together with UC Irvine team will assist and empower those agencies to regulate threats to public health (including pathogens and chemicals of emerging concern) through providing evidence-based supporting data and findings with respect to threat as well as disparities of impact. In addition, from a social and environmental justice standpoint, the position can focus on how lesser-resourced water agencies in areas of California can adequately identify, prioritize, and develop effective and equitable regulatory compliance and enforcement strategies to ensure health and safety. This is timely because reclaimed municipal wastewater and on-site recycling of agriculture wastewater and urban stormwater can serve as key long-term components of the State's diminishing water supply. In short, this CE Specialist will conduct interdisciplinary research that will increase the likelihood of adoption of publicly-acceptable technologies or processes.

Extension: The close collaboration between UCI and UC ANR will expand outreach efforts to involve diverse stakeholders, and integrates research objectives across wastewater treatment engineering, agricultural science, environmental sciences, policy, social science and economics with multiple feedback channels. The position will develop stakeholder outreach programs to solicit inputs and to disseminate research outcomes to target audiences in collaboration with UC ANR programs; and develop an integrated interdisciplinary educational program to train students, farmers, state and local water engineers, water quality regulators, landscapers, NGOs and general public about opportunities to manage drainage and storm waters and how these strategies fit within a portfolio of other management practices.

Research: The new position will improve our research efforts in multiple areas, including but not limited to: (1) design and test integrated natural and engineered treatment technologies to remove or reduce salt, nutrients, selenium and trace organics of toxicological concern from agricultural drainage water, municipal wastewater and urban stormwater; (2) analyze long-term economic, environmental, and societal benefits of on-site

treatment and reuse of irrigation water, stormwater and municipal wastewater; (3) develop and analyze different policy and management scenarios for successful implementation of technologies in the affected regions; (4) address how residual contaminants in recycled wastewater, including the emergence of antibiotic resistant genes, pathogens and the new classes of contaminants such as nanoparticles influence the soil microbiome structure, plant health, food safety, and environmental quality; (5) improve the engineering processes and develop novel energy-neutral treatment technologies to treat water for reuse in agricultural and landscape irrigation; (6) quantify the risks and provide data to support policy decisions regarding water reuse in food production; (7) examine proposed regulatory changes to enable broader implementation of water reuse in food production; (8) develop a dynamic regional water supply model that can identify the cost and water supply impacts of continuing to provide agriculture with recycled water; and (9) assess the disproportionate impacts of these problems and current responses to them upon water agencies and their communities with smaller revenue bases and less capacity for capital investments to provide a more secure water supply with difficulty.

ANR Network: The position will work closely with the Urban Hub at the South Coast REC. It will also work with Advisors in neighboring counties (San Diego, Riverside, Los Angeles) and across the state. The position will network with the California Institute for Water Resources, the Water Strategic Initiative, and the Water, Climate Change, and Research to Policy Program Teams. As opportunities exist the position will network with the traditional ANR campuses, such as UC Riverside's College of Natural and Agricultural Sciences.

Network External to ANR: The position will improve our research and educational efforts in multiple areas, including but not limited to: (1) design and testing engineering and public health interventions to address water quality challenges in various communities; (2) analyze existing policy and management approaches to water provision and water equity; and (3) develop new policy and compliance mechanisms to achieve water equity in urban communities. We will also educate a new generation of students about opportunities to increase water equity and improve human health. This will prove of special value to the State Water Resources Control Board, Regional Water Quality Control Boards, California Stormwater Quality Association, CA Department of Water Resources, USDA Salinity Lab, regional and local water districts, Farm Bureaus, county watershed and stormwater departments/divisions, Landscaping associations, HOAs, and industry professionals.

Support: The CEE department and School of Social Ecology will provide office and research space for the position and Water UCI will also furnish space as needed. The South Coast REC provides partial support of field research activities including skilled labor in both agriculture and urban systems. Both units will work together with the CE Specialist to establish the proposed programs by providing organizational and staff assistance.

Other support: the UCI CE hire will seek funding from NSF, EPA, USBR and other federal agencies as appropriate. Additionally, we will seek funding from Orange County and Inland empire water agencies for CE projects via its Industry-University Research Center, as well as USDA-AFRI Sustainable Agricultural System, USDA-NIFA, NSF, and other relevant external funding sources including water providers. Other potential supports to the programs include National Alliance for Water Innovation, a Department of Energy Research Hub focusing on desalination and water reuse, National Science Foundation Environmental Engineering program and U.S. EPA office of the water quality. Working closely with State Water Quality Control Board, we will also identify opportunities to collaborate with various stakeholders in the local regions.

Headquarters and Coverage Area: The position will be located at UCI. It will be statewide in scope with a focus on southern California's urban counties.

Developed and proposed by:

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