Biological and Environmental Research (BER): RENEW Awards

Climate-Ready Engineers for Water Resources Applications

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Climate change is expected to enhance the water cycle and alter the characteristics (e.g., frequency, severity) of extreme events (e.g., droughts, floods, extreme precipitation, heatwaves, wildfires) around the world. Extreme events can have significant societal, environmental, infrastructure, and economic impacts, yet many questions remain about the impact of climate change on water and energy supplies and how a better understanding of the changing extremes and their impacts can be translated into direct use (e.g., engineering design, resource management, risk assessment, adaptation and mitigation practices). Engineers must be prepared to address such challenges that climate change and extremes pose to our natural and built systems (e.g., water, food, energy, and transportation systems and infrastructure). To develop a climate-literate and prepared future engineering workforce, engineering students need to be engaged with current climate science, especially since existing design standards and codes were not created to account for climate change-fueled extremes and may need to be reevaluated and updated. Since engineers are vital boundary spanners in making climate science actionable and translatable into sustainable practices, this project aims to lead the development of a climate-ready engineering workforce that is prepared and trained to address water challenges across a variety of spatiotemporal scales. We propose to create the 4-year Climate-Ready Engineers for Water Resources Applications (CREW-RA) program at California State University, Long Beach (CSULB) in partnership with the Calibrated & Systematic Characterization, Attribution & Detection of Extremes (CASCADE) Science Focus Area (SFA) at Lawrence Berkeley National Laboratory (LBNL) to train engineering students through hands-on experience and mentorship at the intersection of engineering and climate science. Via collaboration and co-mentorship, graduate and undergraduate students will engage in Earth and environmental systems modeling under the overarching theme of identifying, characterizing, and quantifying climate extremes, their drivers, and translating impacts to the water and energy sectors. CREW-RA alumni will possess distinct skill sets rooted in climate and hydrologic modeling, statistical data analysis, and scientific supercomputing that will enable them to become our future leaders, founded in their ability to integrate climate science into engineering applications. Such training and cultivated skills are vital, yet often missing for engineering students, especially for underrepresented and minority groups in the field. CREW-RA will act as a critical paradigm for integrating climate science into other fields of engineering in the future by equipping a diverse, next generation of engineers to excel and lead projects that address climate change challenges across sectors. CREW-RA will also serve as a means to develop a sustained collaboration beyond the project duration between CSULB and LBNL.

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