

## 2023 UC Merced Climate Action Research Seed Fund Competition

As climate change worsens, water scarcity increases and reliance on groundwater grows. However, groundwater is often contaminated from industrial and agricultural pollution, and underrepresented minorities and lower-income populations are disproportionately exposed to contaminated drinking water. A major contaminant in California is 1,2,3-trichloropropane (TCP), a recognized carcinogen with severe adverse health effects. California's Central Valley, one of the most agriculturally productive areas in the United States, has high levels of TCP contamination, with many of the affected communities classified as disadvantaged.

The proposed research addresses a specific California Climate Adaptation Strategy goal to protect public health by increasing reliable access to safe, affordable drinking water and sanitation. Research goals include making water treatment methods targeting problematic pollutants accessible to disadvantaged populations throughout California. The project takes electrochemical approaches to destroy TCP in an efficient and cost-effective manner. The thrusts of the research involve investigating the needs and constraints for water treatment in Central Valley communities, developing electrochemical treatments for removing TCP from water using copper as the active material, and incorporating the approach into functional treatment devices for testing. The immediate and long-term outcomes of the research include expanding access to information and testing resources for TCP in impacted communities and the availability of dramatically better TCP treatment technologies and understanding of the mechanisms limiting treatment. The research has the potential for substantial impact on health equity and mitigation of clean water scarcity due to climate change.

The project places a significant emphasis on diversity and inclusion, particularly in terms of community engagement and student recruitment. The participating research groups are diverse, with strong representation of women and underrepresented minority students, including first-generation students. The team details plans to recruit and train diverse undergraduate and graduate students, particularly those representative of the most affected communities. The team will also work closely with community organizations in underserved communities to incorporate their perspective and needs into the research and to help educate about TCP and other groundwater contaminants and treatment options. Additionally, materials will be made available in English and Spanish to ensure accessibility to diverse communities. The project's effectiveness will be monitored and tracked for both technical and social impact, including the demographics of undergraduate and graduate students.