The California State University
WATER ADVOCACY TOWARDS EDUCATION & RESEARCH

14th Annual
CSU Water Advocacy Towards Education & Research
Conference

Our WATER's Future: Challenges and Next Steps

April 13, 2023

14TH ANNUAL
CSU-WATER CONFERENCE

Welcome Message

Hello Conference Attendees,

We are so excited and pleased to bring you the first conference as 'CSU-WATER' (Water Advocacy Towards Education and Research), which officially launched July 1, 2022. We bring some new diretions and areas of emphasis and engagement. We've focused our core goals on outreach across the CSU, with external partners, and integration of these across California to best address our onerous and dynamic water issues. To best achieve these goals, we've added internal governance in the formation two faculty-based groups; an Internal Working Group and Campus Reps. In my visits to 10 CSU campuses so far, I've learned of so many great efforts focused on water education, programs, and research. It seemed natural to create the Campus Rep group to serve as information pipelines with CSU-WATER and across campuses.

Stories of campus water activities will be highlighted in our newly launched CSU-WATER newsletter, which first came out in March. The newsletter and Campus Reps are just part of what we've created to encourage you to reach out and let us know about your water education, community, and research fronts.

We also aim to help you engage more thoroughly with other water professionals. Join us! Since the launch of CSU-WATER, we have led or been Co-PI's on $9.27M in total proposed funding.

This year's conference theme is 'Our WATER's Future: Challenges and Next Steps' including panels on Floods, Water Quality, and Water Quantity. We also offer five special guest speakers who have been instrumental in our CSU-WATER network building. During the sessions I encourage you to consider additional connections within and among water issues in our state and how you can be active in our CSU-WATER networks.

Best Regards,

Steve Hammond
Interim Executive Director
CSU-WATER

Vision, Mission, & Key Goals

Vision
CSU-WATER will be a resource for education, research, and policy development to help state agencies, regulators, and lawmakers achieve a long-term, sustainable water supply for California based on good science. CSU-WATER aims to convene and organize the vast knowledge and expertise related to water within the CSU and will help foster collaborations to demonstrate this capacity as a resource in California for information and solutions regarding the state's water resources.

Mission
CSU-WATER is designed to target the capabilities and resources within the 23 California State University Campuses to provide academic preparation, applied research, and partnerships with stakeholders, addressing all aspects of water use. CSU-WATER serves to focus synergistically with the many centers and programs of excellence within the CSU on water issues. The goals listed below support the key elements in the CSU-WATER mission.

Key Goals
- To develop academic and community partnerships to create public awareness and broad support to address water issues.
- To increase and support CSU research and external funding through multi-campus collaborations.
- To promote CSU awareness of resources to support student water-related career opportunities.

Special thanks to the CSU-WATER Conference Planning Committee:

Jennifer Alford, San Bernardino
Pitiporn Asvapathanagul, Long Beach
Carisse Ballard, Monterey Bay
Julian Fulton, Sacramento
Christopher Gibson, Fullerton
Riya Ganguli, Northridge
Thomas Horvath, Monterey Bay
Laurie Huning, Long Beach
Emmanual Iyiegbuniwe, San Marcos
Michael Karp, San Bernardino
Crist Khachikian, Northdidge
Keila Khatib, San Jose
Yize Li, Bakersfield
Sami Maalouf, Northridge
Rae McNeish, Bakersfield
John Olson, Monterey Bay
Erik Porse, Sacramento

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AGENDA

Our WATER's Future: Challenges and Next Steps
CSU-WATER Conference
April 13, 2023

7:45 am	**Conference Opens – Breakfast, Networking and Poster Session**	
8:20 am	**Conference Overview**	**Laura Ramos**, Associate Director, CSU-WATER
8:30 am	**University Welcome**	**Vanya Quiñones**, President, CSU Monterey Bay
	CSU-WATER Welcome	**Steve Blumenshine**, Interim Director, CSU-WATER
8:50 am	Water Markets and Drought Resilience Post-SGMA	**Anita Chaudhry**, CSU Chico
9:15 am	**Flood: Challenges and Opportunities**	
	• Is Flood Risk in the Sacramento-San Joaquin Delta Increasing?	**Stefan Talke**, Cal Poly SLO
	• Understanding Coastal Flooding Within the San Francisco Bay Delta - How Can Modelling Help?	**Serena Lee**, Cal Poly SLO
	• A Numerical Model Analysis of the San Francisco Bay And Sacramento-San Joaquin Delta	**Drake Abrahamsson**, Cal Poly SLO
	• Dam Breach Modeling for California's Emergency Preparedness	**Danielle Salt**, Sacramento State
10:15 am	**Networking Break & Poster Session**	
10:30 am	**Water Quantity**	
	• Future Groundwater Depletion May Exceed Long-Term Sustainability Goals Set by SGMA in the Central Valley, California, USA (2020-2070)	**Matthew Weingarten**, San Diego State
	• Sediment Delivery to Freshwater Ecosystems Following Wildfire	**James Guilinger**, CSU Monterey Bay
	• Optimal Planning and Design of Seawater Reverse Osmosis Plants. A Holistic Approach	**Sami Maalouf**, CSU Northridge
	• OpenET: Operational Evapotranspiration Data for Water Management in the Western United States	**AJ Purdy**, CSU Monterey Bay
11:30 am	Research Overview and Collaboration Opportunities with the Southern California Coastal Water Research Project	**Eric Stein & Steve Weisberg**, Southern California Coastal Water Research Project
12:00 pm	**Networking Lunch & Poster Session**	
1:00 pm	Examples of Youth Engagement and Workforce Development Programs in ACWA and Santa Clara Valley Water	**John Varela**, Association of California Water Agencies & Santa Clara Valley Water
1:30 pm	**Water Quality**	
	• Testing and Remediating Lead (Pb) Concentrations in Drinking Water at Child Care Centers	**Brian Currier**, Sacramento State
	• Identifying Areas at Risk From Sea Level Rise-Induced Groundwater Contamination in Coastal California	**Ben Chou**, CSU Northridge
	• Characterization of Stormwater Debris Model Parameters in Southern California's Dense Urbanized Watersheds	**Kian Bagheri**, San Diego State
	• Simulated Leaching and Photodegradation of Tire Wear Particle-Derived Compounds in Water	**Kelly Hollman**, San Diego State
	• Modeling the Photochemical Removal of Pharmaceutical Compounds in Planted Constructed Wetlands	**Tesfayohanes Yacob**, Cal Poly Humboldt
2:30 pm	Introduction to the California Water Boards and the Surface Water Ambient Monitoring Program (SWAMP)	**Anna Holder**, California State Water Resources Control Board
3:00 pm	**Networking Break & Poster Session**	
3:15 pm	Irrigation Water Economic Hardship on Farms	**Jasbir Sidhu**, Punjabi American Growers Group
3:45 pm	**Grant Roundtable**	**Jennifer Alford**, Associate Director of Research, CSU-WATER
4:30 pm	**Closing Remarks**	**Steve Blumenshine**, Interim Director, CSU-WATER
4:45 pm	**Networking Happy Hour**	

KEYNOTE SPEAKERS

Research Overview and Collaboration Opportunities with the Southern California Coastal Water Research Project

Eric Stein, Department Head, Biology Department, Southern California Costal Water Research Project

Dr. Eric Stein is a principal scientist at the Southern California Coastal Water Research Project (SCCWRP), where he is head of the Biology Department. Dr. Stein oversees a variety of projects related to in-stream and coastal water quality, bioassessment, hydromodification and environmental flows, watershed modeling, and assessment of wetlands and other aquatic resources. His research focuses on effects of human activities on the condition of aquatic ecosystems, and on developing tools to better assess and manage those effects. Dr. Stein has authored and co-authored over 150 journal articles and technical reports and participates on numerous technical workgroups and committees related to water quality and aquatic resource assessment and management. Prior to joining SCCWRP in 2002, Dr. Stein spent six years as a Senior Project Manager with the Regulatory Branch of the Los Angeles District Corps of Engineers, and four years with a private consulting firm.

Steve Weisberg, Executive Director, Southern California Costal Water Research Project

Dr. Stephen Weisberg is Executive Director of the Southern California Coastal Water Research Project Authority (SCCWRP), a research consortium formed by 14 California water quality agencies to ensure a solid scientific foundation for their management activities. His research focuses on developing molecular tools to support environmental monitoring. He serves on the Governing Board and scientific advisory committees for several other organizations involved with development and adoption of new technologies, including the Southern California Coastal Ocean Observing System, the California Ocean Protection Council Science Advisory Team, the California Water Quality Monitoring Council, the California Sea Grant Advisory Team, the NOAA Science Advisory Board and the EPA's Board of Scientific Counselors. He received his Ph.D. in biology from the University of Delaware, and his B.G.S. from the University of Michigan.

Examples of Youth Engagement and Workforce Development Programs in ACWA and Santa Clara Valley Water

John Varela, Board Chair, Santa Clara Valley Water District & Region 5 Chair, Association of California Water Agencies

Director John Varela was appointed to the Santa Clara Valley Water District Board of Directors in December 2015. He was elected by the voters in November 2016, and re-elected in 2018 and 2022. Director Varela is the 2023 board chair. His current term expires in 2026.

Director Varela serves on Valley Water's Agricultural Water Advisory Committee, Water Commission, and the joint water committees for Morgan Hill, Gilroy, and San Felipe Division Reach One.

Director Varela is a former Morgan Hill city mayor and councilmember. He serves on the Board of Directors for Association of California Water Agencies, Joint Venture Silicon Valley, Morgan Hill Chamber of Commerce, and the Pajaro River Watershed Flood Protection Authority. He is also involved in the South County Regional Wastewater Authority and Safe Clean Water Independent Monitoring Committee.

Introduction to the California Water Boards and the Surface Water Ambient Monitoring Program (SWAMP)

Anna Holder, Environmental Scientist, California State Water Resources Control Board

Anna Holder (she/her) is an Environmental Scientist in the Office of Information Management and Analysis (OIMA) at the California State Water Resources Control Board. She is Surface Water Ambient Monitoring Program's (SWAMP) Bioaccumulation Monitoring Program Coordinator, Safe to Eat Workgroup Co-chair, and OIMA's Tribal Coordinator. Anna obtained her M.S. and B.S. from CSU Monterey Bay in Applied Marine and Watershed Science. Regardless of role, Anna uses data science, ecology, and science communication to inform the sustainable and equitable management of California's natural resources.

Irrigation Water Economic Hardship on Farms

Jasbir Sidhu, Punjabi American Growers Group

Jasbir Sidhu migrated to the USA at the age of 12 in 1976 and completed his education in California with a degree in Electrical/Electronic Engineering. His professional career of 28 years was very successful starting from entry-level engineer to executive management and GM (General Manager) of Consumer Electronic division at Western Digital Corporation, where he was responsible for the $1B business annually and long-term corporate strategy.

Sidhu retired from high-tech industry and joined biological company Cisbay as President and part owner of the company. Cisbay focuses on microbial technology for soil rejuvenation and wastewater treatment. Within three years, the business successfully grew to 10 countries with effective business models and product strategy.

During the Covid-19 timeframe in 2020, Sidhu helped start a non-profit organization called PAGG (Punjabi American Growers Group) to help family farmers in California. The PAGG organization, founded in September 2020, represents California Punjabi-Sikh farmers who farm over 700,000 acres in California. The organization currently has over 350 members farming over 200,000 acres. A majority of the members are in Fresno and Madera counties in California, but is now expanding in other counties of the state. PAGG's goals are to provide ag technical knowledge, business education, government laws/regulations or government policies, reduce farm input costs, optimize farming operation and market knowledge and gain fair market pricing. PAGG utilizes social media, two Punjabi radio programs, a website, and hands on workshops to empower farmers.

Last year, Sidhu started a fertilizer company called Fertilizer Depot Inc. to provide customized solutions for farms in addressing some of the key fundamental issues with water/soil and trees. This is the first fertilizer company owned by a Sikh/Punjabi in California. The company sources raw material directly from the manufacturer and provides custom formulations at reduced costs compared to the industry. Sidhu also has a joint family farm in Kerman, Ca since 1986. Sidhu's parents worked very hard to get their kids educated while still connected to their farming roots.

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GRANT WRITING TIPS

Campus Support

Each campus should have a grants/contracts office that is able to provide grant writing/development support as well as guide you through your University requirements.

Understanding the Grant Application

Read and understand the application requirements, guidelines, and instructions carefully, including:

- Deadlines
- Funder's priorities and objectives
- Necessary components/documents

Common Components of a Grant Proposal

- Project summary/abstract - a brief summary of the project/research.
- Project narrative/project description – answers to funder questions should be detailed and comprehensive, yet easy to understand.
- Scope of work – provides a detailed description of the proposed project or research and serves as a basis for evaluating the feasibility of the project/research. (More information below)
- Organizational capacity – demonstrates the organization's ability to successfully implement the project/research.
- Personnel/management plan – a list of the personnel involved in the project/research, including their roles and responsibilities (may include attachment of resumes or biographical sketches).
- Evaluation plan – outlines the data collection and analysis methods that will be used to monitor and evaluate the success of the proposed project or research.
- Sustainability/future plans – how the project or research will be sustained after the grant funding ends and ensure long-term success. Demonstrates to the funding organization that the project/research will have a lasting impact and will continue to benefit the target audience or community even after the funding has ended.
- Letters of support/commitment - from partners/collaborators, if any.

Scope of Work

Scope of Work helps ensure that the project is well-defined, achievable, and aligned with the goals and objectives of the funding organization. It also serves as a reference point throughout the project, helping to ensure that the project stays on track and meets its goals and objectives.

- Objectives – a clear and concise statement of the project's overall goals and objectives.
- Activities – a detailed description of the specific activities that will be carried out as part of the project, including timelines and milestones.
- Deliverables – a list of the specific outputs and outcomes that will be produced by the project, such as reports, publications, or products.
- Timeline – outlines the major milestones of the project and the expected completion dates.
- Budget/budget narrative – a detailed budget that outlines the costs associated with carrying out the project, including personnel, equipment, materials, travel, and other direct and indirect costs. Pay attention to what costs are eligible or ineligible and make sure the budget is realistic and accurately reflects the costs of the project.

Review and Edit

Review and edit the grant application to ensure proper grammar, spelling, and formatting (page limits, word limits, font type, line spacing, margins).

Grant Resources

- Grants.gov - centralized location for federal funding opportunities (USDA, EPA).
- California Grants Portal – all grants and loans offered by California state agencies (DWR, CDFA, CalEPA, DOC).
- National Science Foundation - independent federal agency that supports science and engineering in all 50 states and U.S. territories. Investments account for about 25% of federal support to America's colleges and universities for basic research.
- Grants Resource Center - Available to some CSU campuses. Its search engine, GrantSearch, includes private and federal funding opportunities screened for recurrence and for higher education eligibility.

Additional Resources

- California Grants Portal
- Department of Water Resources Organizational Chart
- CalRural Water Association
- California Regional Water Boards
- California Water Association
- California Water Association Regulated Utilities
- California Strategic Growth Council
- California Domestic Water Company
- California Water Efficiency Partnership (Wholesale Providers)
- Water Education Foundation
- Pacific Institute (Water Resiliency)
- Public Policy Institute of California
- California Association of Resource Conservation Districts
- CA Governor's Office of Planning and Research
- CA Department of Conservation
- CA EPA
- CA Department of Food and Agriculture
- CA Integrated Regional Water Management (IRWM)
- CA Sustainable Groundwater Management Act (SGMA)

POSTER ABSTRACTS

Development of a Smart Water Pre-treatment System for Controlled Environment Agriculture Using Micro-plasma and AI Machines | By Sankha Banerjee, Abel Lopez, Jose Guerrero, Nadine Barton, Luis Cordova, Prakhyat Gautam, and Manan Sehgal

An innovative micro-plasma-assisted water treatment process coupled with integrated nanofiltration systems for the removal of micro and nanoparticle-based organic and inorganic contaminants to improve the efficiency of the downstream ion exchange processes allowing treatment of waters with elevated levels of total dissolved solids (TDS). Additionally, the feasibility of other downstream processes such as electrodialysis and electro-deionization processes will be assessed based on system parameters such as ionic species removal/recombination and TDS levels of the water sources. A new water stream is created in areas where conventional water sources are diminishing. Imported fertilizer and water transportation requirements are reduced, saving energy, and lowering GHG and NOx emissions.

Rethinking the Future of Dairy Wastewater at the Water-Energy Nexus: Steam Hydrogasification Based Process for Synergistically Treating Agriculture-Derived Waste Streams | By Marco Ceja and Zhongzhe Liu

California is the largest producer of agricultural products in the United States and holds almost all of the nation's top ten agricultural counties according to the Census of Agriculture by the USDA. In particular, the Central Valley of California is one of the world's most productive agricultural regions and many Valley counties (e.g. Tulare, Fresno, Kern) are at the top of the nation's agriculture producing counties. Accordingly, California generates more than 20 million dry tons of agricultural residues per year and the Valley has the highest concentration of agricultural wastes (e.g. orchard and vineyard pruning, crop residues, animal manure). However, traditional treatment methods such as land application, burning, and biological conversion still generate some concerns (e.g. parasite, air pollution, non-stabilized byproducts). In addition, the Valley is home to the largest concentration of dairies in California. Tulare County is the largest milk producer in the United States, accounting for about $1.6 billion in 2016. The City of Tulare established a large industrial wastewater treatment facility for treating regional dairy wastewater. Treating high-strength wastewater such as dairy wastewater is still challenging and has a higher cost compared to municipal wastewater. Hence, new solutions to sustainable and synergistic treatment of regional agricultural wastes and dairy wastewater are highly needed. Steam hydrogasification reaction (SHR) is an advanced and self-sustainable technology that can convert agriculture-derived waste streams (typically high moisture content) into renewable energy and fuels without costly drying process. The Department of Energy National Energy Technology Laboratory has performed an in-depth techno-economic analysis of the SHR-based process and confirmed that the SHR-based process has the potential for 12% higher efficiency at 18% lower capital costs compared to other state-of-the-art gasification technologies. In this study, the SHR-based process was used to synergistically treat the commingled agricultural wastes (e.g. dairy wastewater, orchard prunings) for the first time. The preliminary experimental data showed that SHR-based process led to high carbon conversion and desired syngas composition for further downstream upgrading such as water gas shift (WGS) reaction. When WGS is integrated with SHR, the final product is renewable fuel, synthetic natural gas (SNG).

Analysis of Water Quality Near Homeless Encampments Along Santa Rosa Creek and Russell Creek | By Athena Everson, Lily Roberts, Claudia Mayo, Anna Lichterman, Ylla Hartman, Hailey Elson, and Jackie Guilford

Our goal was to examine the impact of homeless activity on the water quality of urban creeks in Santa Rosa, CA. Water was sampled upstream and downstream of areas with frequent homeless encampments on Santa Rosa Creek and Russell Creek monthly from October 2022 - February 2023. Water samples were analyzed for fecal bacteria (enterococcus, E. coli), nitrogen, phosphorus, ammonia, TSS, pH, temperature, and conductivity. Concurrent with water sampling, walking surveys were conducted to document signs of homeless activity. The relationship between water quality and homeless activity was determined.

Amending Fertilizers with Carbon Nanoparticles as a Strategy to Improve Lettuce Nitrogen Recovery and Reducing Nitrate Leaching in the Salinas Valley | By Sean Gleavy

The large amounts of nitrogen (N) fertilizer used to sustain lettuce production in the Salinas Valley pose a threat to coastal and groundwater resources. To address water quality concerns, the Central Coast Regional Water Quality Control Board has adopted Ag Order 4.0, which places a limit on N loading from agricultural operations and will require growers to reduce N application rates and improve NUE over time. Strategies commonly recommended to mitigate N losses, such as planting cover crops, are often difficult to fit into the intensive lettuce production systems of the Salinas Valley. The use of carbon nanoparticles (CNPs) as a fertilizer additive is a nondisruptive N management tool that has been shown to improve yields and NUE elsewhere, but the impact of CNPs on lettuce grown on Salinas Valley soils has not been investigated. There is also a need to understand how CNPs impact nitrate leaching from these soils. Recent advances in the manufacturing of CNPs have drastically reduced production costs and have addressed previous health and environmental concerns associated with CNPs, making this technology worthy of investigation in Salinas Valley lettuce production. Our research objective is to evaluate the impact of fertilizer solution amended with CNPs on lettuce yields, NUE, and nitrate leaching using different Salinas Valley soils. Greenhouse studies are in progress in which we are testing eight treatments consisting of different CNP application rates. The same treatments are used in each study, but different soils are used with contrasting texture and nitrate leaching potential. Our preliminary results showed yields were higher in pots receiving N plus 100 mg/L CNPs than in pots receiving only N. We also found that just adding 400 mg/L CNPs to pots without N fertilizer resulted in a 42% yield increase. Soil, leachate, and plant tissue samples are currently being assessed for soil inorganic N, leachate nitrate, and plant tissue N, respectively. All these data will be ready to present at the CSU-WATER conference. Our long-term goal is to use findings from this research to inform future decisions for field studies exploring the use of CNPs as a N management tool in the Salinas Valley.

The De-Aging of Water Resources in the Northern Sierra Nevadas | By Emily Handy

As climate change continues to exacerbate the severity of weather patterns, the majority of the state of California has come to suffer from longer periods of drought and shorter, but more intense rainy seasons. With multi-year droughts comes a decrease in snowpack in the mountains. Alpine watersheds within the Sierra Nevada mountain range are a vital source and storage of water for California and Nevada. Snow water equivalent from snowpack feeds riparian systems that function as California's primary sources of water, which in the northern region of the state predominantly come from local resources. Baseflow conditions are seen earlier in the season and last longer than they used to due to decreased snowpack as a result of climate change. Sagehen Creek, a montane watershed just north of Truckee, CA, follows this behavior. Climate change is contributing to the de-aging of groundwater within aquifers. Without the back pressure of surface water flow supplied by precipitation, groundwater is being discharged from aquifers more quickly than it historically had been replenished, even in the absence of pumping. This is resulting in a disequilibrium, shifting the ratio of modern to old water in these reservoirs so that there is more old water than there was before. Multiple key springs throughout the watershed head tributaries, but these lose radon to the atmosphere as water travels downstream. Points of groundwater discharge directly into the creek itself were identified through radon surveys along select reaches of the creek. The most notable area of discharge was found to be in Kiln Meadow, where the stream traverses Quaternary alluvium in the valley of the watershed. This follows a trend of high radon activity within younger, alluvial surficial geologic formations and lower radon activity within older tertiary volcanic formations observed in all of the monitored groundwater sources in the watershed. The decreasing young water fraction represents the threat that drought poses to this riparian ecosystem; if there is not sufficient precipitation to recharge aquifers at a rate greater or equal to the rates of discharge throughout the watershed, eventually there will not be enough water to support the flow of the creek and springs.

Shallow Subsurface Artificial Groundwater Recharge (SSAGR) | By Samuel Hawley and Professor Cordie Qualle

Shallow Subsurface Artificial Groundwater Recharge (SSAGR) is a simple concept. We use leach lines to percolate recharge water in agricultural fields below the crop root zone. SSAGR utilizes the existing pump and filter infrastructure of a field's drip system to deliver water to the gravity-fed leach lines through a standpipe. The advantages of SSAGR are: 1) it is below the root zone, so it does not impact crop health and it does not leach residual chemicals and nutrients into the groundwater, 2) it does not impede access, or use of the field due to flooding, and 3) it delivers nearly 100-percent of the recharge water for percolation to the groundwater table. Our research will be successful if we can show that the cost per acre-foot for SSAGR is competitive with other forms of recharge which could open many acres of farmland for recharge where soil strata are appropriate. Our work is focused on researching the efficiency and cost of the SSAGR

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system in terms of acre-feet of water recharged as a function of the cost to recharge the water. A water balance is used to calculate the net water recharged and actual construction and operations costs are used to determine the cost to recharge the water. The poster presentation will illustrate the SSAGR system, its groundwater recharge performance, and operations costs.

Determining the phosphorus levels of streams in natural background | By Anna Herrera
Phosphorous is an essential nutrient for living organisms. Anthropogenic sources of phosphorous include but are not limited to water treatment plants, runoff from agriculture and fertilized lawns, failing septic systems, and animal manure storage runoff. Since phosphorous is considered a limiting nutrient, meaning the element is in the least quantity in and therefore limits growth in aquatic ecosystems, the element can be used as an ecological indicator to measure anthropogenic effects. In order to determine the appropriate phosphorus quantity for streams we need to define natural background in streams. Natural background is the condition of waters in the absence of human-induced alterations based on the best scientific information available. Determining natural background helps set water quality objectives by defining which phosphorus came from human sources and which is supplied naturally. Providing ability to not over or under protecting streams. Due to industrialization, pristine natural background water sites are almost nonexistent. Water quality monitoring was also infrequent prior to industrialization. Given the lack of reference sites undisturbed by anthropogenic effects, estimates of the natural ranges of nutrients in streams are needed. We developed a model to predict natural background total phosphorus (TP) concentrations from watershed environmental factors like geology and climate. Because the model includes temporally dynamic predictors of climate, it predicts TP concentrations for each individual stream segment throughout the continental United States from January 2000-December 2020. We also compare current measurements of TP in streams to predicted natural background TP to quantify anthropogenic inputs of phosphorus.

The Impact of Groundwater Pumping from the Cannabis Industry on Streamflow and the Necessity for Validating Analytical Stream Depletion Models in Humboldt County | By Andy Heise
As the California drought lengthens, an increasing number of cannabis growers are turning to groundwater as a solution to their water woes. The worsening drought is causing a reduction in streamflows, but now, as more and more farmers are turning to aquifers for their irrigation needs, streamflow depletion may be exacerbated. Humboldt County, as one of the tri-cities in the Emerald Triangle, is known worldwide for its ideal climate to grow cannabis. However, the crop that generates millions of dollars in taxable revenue for Humboldt County and the State of California might also be contributing to millions of gallons of water each year that is depleted from its streams. Stream depletion can lead to various problems for the populations of California Coho Salmon and several other aquatic species listed under the federal Endangered Species Act. Estimating stream flow depletion at a watershed or a regional level is difficult. In recent years water modelers have been turning to analytical models to estimate stream depletion since numerical models can require extensive data, can be time-consuming, and are expensive to develop.

However, to our knowledge, there is limited to no research done on validating analytical streamflow depletion models with field data. The objective of this research project is to estimate stream depletion in highly impacted watersheds in Humboldt County that have marijuana cultivation that uses groundwater pumping to irrigate crops. We will use published analytical models for depletion models and validate the model using field data. Collecting field data will consist of installing stream gages, installing observation wells, conducting pumping tests, stable oxygen isotope analysis, and installing meters on irrigation wells to measure water usage in real-time using a 4G wireless telemetry system. We expect to observe stream depletion to be caused by irrigation extraction in selected wells depending on the underlining geology, distance from the well to the stream, and the pumping flow rate at the well. We also expect to validate well-regarded analytical models as used for stream depletion estimation in the context of the selected watersheds in Humboldt County. We also hope to have a better idea of the amount of stream depletion that is occurring in Humboldt County in association with irrigation-based marijuana cultivation.

Root Holes to Water Conduits: Investigating Recharge Potential with Agricultural Management at the University Farm in Chico, CA | By Raymond Hess, Nick Riqueros Nicholas Edholm, Garrett Liles, and Nathaniel Bogie
Chronic drought, shifts in climate, and increased freshwater demand challenge water management agencies and agricultural stakeholders in California. As a result, groundwater is pumped to meet domestic, municipal, and agricultural demand. Groundwater overdraft can lead to permanent loss of subsurface storage, seawater intrusion, and water quality concerns. Land management practices can affect soil health, including subsurface hydraulic properties, and provide a useful tool in meeting the goals of agricultural managed aquifer recharge (AgMAR). We investigate links between land management practices, soil health, and deep percolation across an 800 acre multi-use farm near Chico, California. We collected 6 cm soil cores and made in situ permeameter measurements at 18 locations at a depth of 18 inches across conventional tillage, no-till (almond orchard), and organic vegetable cropping subsections of the site. We analyzed core samples for sediment texture using the hydrometer method, compared empirical estimates of hydraulic conductivity (from effective grain size) to direct measurements of saturated hydraulic conductivity (falling head method), and quantified moisture retention of soil over 8 day evaporation intervals. These data will be used to help characterize infiltration potential across the research site, along with information on the deeper sediments, surface conditions, and slope.

Global Interplay of Land Subsidence and Climate Extremes | By Laurie Huning, Charlotte A. Love, Hassan Anjileli, Farshid Vahedifard, Yunxia Zhao, Pedro L. B. Chaffe, Kevin Cooper, Aneseh Alborzi, Edward Pleitez, Alexandre Martinez, Samaneh Ashraf, Iman Mallakpour, Hamed Moftakhari, and Amir AghaKouchak
Land subsidence (LS) is a multi-faceted global issue that can lead to substantial infrastructure damage and economic losses. As global temperatures warm, climate change enhances the terrestrial water cycle and amplifies the severity and persistence of many extreme events (e.g., floods, droughts, and wildfires). Given this, it is ever important to investigate the effects of the interplay of LS, extreme events, and their impacts. Our study synthesizes such process-driven relationships and also examines both natural and anthropogenic drivers of LS, including natural compaction, permafrost degradation, peatland loss, urbanization, and natural resource extraction (e.g., groundwater pumping), and the corresponding LS rates around the world. We provide examples of the interplay of LS and extreme events which, among other things, can damage critical infrastructure (e.g., roadways and pipelines), increase vulnerability of large populations to natural hazards such as flooding, and enhance climate change as greenhouse gases are released from the ground into the atmosphere through permafrost thaw and microbial oxidation of soil organic matter and carbon. Improved insight into such processes is needed to develop and implement appropriate mitigation and adaptation strategies.

CropManage Application Supports Agricultural Water Resiliency in the Salinas Valley | By Lee Johnson and Michael Cahn
Cool-season vegetables are highly sensitive to water stress and tend to be heavily irrigated to reduce production risk. Improved efficiency of water application can support effective use of available water supplies, enhance drought resilience, and potentially reduce nitrate leaching to impaired groundwater basins. The CropManage (CM) web-application, developed and operated by U.C. Cooperative Extension (UCCE), promotes best-practices for specialty crop water and nutrient management. CM was originally implemented in lettuce about 10 years ago. Since then, UCCE and CSUMB have collaborated on a series of replicated field trials involving evapotranspiration (ET) based irrigation management to field-test CM and extend model reach to additional cool-season vegetables. The work was performed over a span of eight growing seasons at the USDA research farm near Salinas, and involved major Monterey County crops including head lettuce, romaine, cauliflower, celery, broccoli, cabbage, and artichoke. The main measurements were applied water, biomass production, and crop yield associated with water volumes ranging from 50%-150% of ET. Supporting observations included canopy cover, soil moisture, and nitrogen uptake. For this presentation, an overview of CM will be provided along with detailed results for romaine and cauliflower.

POSTER ABSTRACTS

Dynamics of Microbial Remediation of Imidacloprid in a Research Bioreactor System | By Nathaniel Jue, Connie Machuca, Mary Snook, Adam Dean, and Isabel Hernandez-Viera

Imidacloprid is a widely applied, water soluble pesticide that can negatively impact wildlife and ecosystems. Runoff from agricultural fields in the Salinas river valley carries this and other pesticides into freshwater ecosystems and the Monterey Bay National Marine Sanctuary. We examined microbial bioremediation of imidacloprid in an above-ground bioreactor system in the Salinas Valley, supplied with locally-isolated microbes that are known to metabolize pesticides and known quantities of imidacloprid. We collected microbe samples from the sediment and water layers of the bioreactor system at regular intervals after supplying pesticide, and at different water-flow rates. We generated microbial profiles of these samples using 16S sequencing and tracked pesticide concentrations within the bioreactor to examine microbial community composition in the context of known pesticide concentrations in order to assess the relationship between microbe community dynamics and pesticide metabolism. This project will help us better understand how microbial bioremediation can be optimized to ensure effective removal of imidacloprid and similar pesticides, and help provide an experimental framework to assess effective bioremediation of other pollutants.

Assessment of Water Resources and Community Engagement for Inland Empire Region | By Swatantra Kethireddy and Seyed Mahmood Nikbakht

California is facing extreme water deficits because of the prevailing drought conditions in the region. The purpose of the current project is to assess the water resources' quality and quantity and develop partnerships across the inland empire water districts such as San Bernardino (SB) water district and CSU-SB water resource professionals. Per the SB community indicators 2020, the average consumption of water in the county is higher than the state average in July 2020 (San Bernardino County). It is anticipated that water shortages and drought prevail as consumption will increase. Therefore, the current work helps to collect and assess water resources data and regional climatic variables at community and secondary sources to seek answers to the prevailing conditions in the region. Community engagement and partnerships are crucial in this research to improve water resources and positive student educational outcomes.

Identification and Quantification of OH Formation Potential in Constructed Wetlands Treating Wastewater for the Removal of Pharmaceuticals | By Marty King and Tesfa Yacob

Currently, the EPA does not regulate concentrations of pharmaceuticals and personal care products (PPCPs) in wastewater effluent; however, some PPCPs are known to cause adverse effects to the environment so presence of PPCPs in effluent is of worthwhile concern. Wetland natural treatment systems offer a sustainable alternative to traditional wastewater treatment systems. Constructed wetlands, such as those incorporated in the Arcata Wastewater Treatment Facility (AWWTF) in northern California, provide interaction between dissolved organic carbon (DOC) in the wastewater and sunlight, promoting photochemical reactions and producing reactive oxygen species (ROS). ROS, particularly hydroxyl radical (OH), have been shown to react with PPCPs, leading to transformation/removal. Characterization of DOC is an ideal first step in assessing conditions for formation of OH within wetlands. The AWWTF treatment train includes oxidation (OX) ponds, followed by treatment wetlands (TW), and enhancement wetlands (EW).

The hypothesis: OH production at AWWTF changes throughout the treatment process with respect to plant matter and sunlight exposure. Biological, phyto, physical, and other mechanisms transform the DOC within the wastewater, altering its potential to photo react and produce OH which then transforms/removes PPCPs. Wastewater samples were collected at locations along the treatment train of AWWTF. Samples were analyzed for water quality: DOC, BOD , and pH. Fluorescence excitation emission spectra (EEMs) were collected and used to construct parallel factor analysis (PARAFAC) models to identify the contribution of different organic groups comprising the fluorescence signal of the wastewater.

Experiments are being conducted on wastewater samples using a solar simulator to quantify OH production potential and assess how it changes along the treatment train. Initial DOC characterization at AWWTF suggests that DOC increases along the treatment train, even though BOD decreases. Additionally, EEMs show a larger fulvic peak in TW effluent compared to OX pond effluent. This correlates the increased plant matter concentrations in the TW with increased OH production potential. On the other hand, the EEMs also show the emergence of a humic peak in the TW, which has been known to quench OH production. The humic peak was smaller than the fulvic acid peak suggesting an increase in OH production potential as the wastewater leaves OX ponds and flows through the TW.

Occurrence and Distribution of Per- and Polyfluoroalkyl Substances in California's Water | By Sudarshan Kurwadkar

Per- and polyfluoroalkyl substances (PFAS) are ubiquitous in the environment due to their widespread use in consumer and industrial operations. These compounds have been dubbed 'forever chemicals' because of their long persistence and stability towards biotic and abiotic degradation. Recent reports suggest exposure to PFAS has serious human health implications, including the onset of cancer. Although some PFAS are phased out, past usages of these compounds have led to their widespread occurrence in various environmental matrices. Although health advisories exist, the lack of enforcement mechanisms has worsened the situation, leading to their occurrence in drinking water. In this study, an attempt is made to map the occurrence of PFAS in California's environment using a variety of datasets currently available in the public domain. Evolving regulatory mechanisms and analytical quantitation of these compounds are also presented to comprehensively understand the occurrence, distribution, and human health implications due to the occurrence of these compounds in California's environment.

Agricultural Runoff in the San Joaquin Valley Creates Drinking Water Crisis for Socially Vulnerable Communities By Evelyn La

In the agricultural heart of Central California, residents of the San Joaquin Valley have had to bear the brunt of the consequences created by agricultural runoff for decades. Agricultural runoff from nearby fields has rendered their supply of water undrinkable due to the high levels of nitrates and other contaminants present. Their fight for clean drinking water has become a human rights, and social justice crisis. This research focuses on the stakeholders of San Joaquin Valley and examines the shortcomings of progress in policy made. Potential solutions to improve water quality in the future are explored.

Thermal Energy Storage: A Viable Application for Desalination Concentrate
By Reza Baghaei Lakeh, Rozina Nalbandian, and Tihamer Engel

In this effort, two major issues facing water and energy industries (i.e., desalination concentrate disposal and low-cost thermal energy storage) are tackled simultaneously. Water desalination industry currently battles the ongoing issue of desalination concentrate disposal. If improperly disposed, desalination concentrate has known adverse environment effects on coastal water and soil salinity. Repurposed desalination salt is demonstrated as a medium for thermal energy storage using grants from Bureau of Reclamation.

In this paper, a combination of computational fluid dynamics (CFD), lab-scale experimentation, and techno-economic analysis are presented that show technical and economic feasibility of repurposing desalination salt as a low-cost Thermal Energy Storage medium. A lab-scale demonstration of the repurposed desalination salt as a low-cost thermal energy storage system is developed and tested. A detailed techno-economic analysis showed that using unseparated and minimally processed concentrate salt reduces the cost of thermal energy storage below the U.S. Department of Energy's cost target of $15/kWh. A computational model was to analyze the heat transfer behavior of the concentrate salt as it undergoes charging and discharging cycles. The desalination salt compositions were obtained with analytical chemistry data combined with thermodynamic software to predict the precipitation of salt species out of a simulated aqueous solution. Three concentrate samples were analyzed to find the ionic composition. The dominant anions were chlorides, carbonates, bicarbonates, sulfates, and hydroxides for all samples and the dominant cations were sodium, calcium, magnesium, and potassium. The ionic composition was then used in the OLI Studio: Stream Analyzer software to calculate the expected salt species using water chemistry techniques.

POSTER ABSTRACTS

Technical Assistance Program to Support Disadvantaged Communities (DACs) with Drinking Water and Wastewater Projects | By Randy Marx
OWP is a nonprofit, self-supporting unit within University Enterprises, Inc. (UEI), an auxiliary of California State University, Sacramento (CSUS). OWP's internal staff consists of more than 35 employees, including engineers, scientists, GIS specialists, technical editors, graphic designers, computer programmers, and administrative and IT support. I will discuss OWP's work assisting disadvantaged communities (DACs) with water and wastewater projects. OWP is a current Technical Assistance (TA) Provider to the State Water Resources Control Board (SWRCB) under three Agreements, including Proposition 1, Groundwater and Safe and Affordable Drinking Water Fund (SAFER), to offer technical assistance to DACs on drinking water, groundwater, and wastewater issues. The current value of these 3 Agreements with the SWRCB is approximately $42,000,000. OWP has been a TA Provider to the DFA since September 2016, implementing 139 TA Requests. I would describe our overall body of our engineering and environmental work and in particular highlight 4 or 5 projects we are doing in the Monterey area. For all Work Plans, OWP project managers establish a contact list of project stakeholders, including representatives from local community organizations, and invite them to monthly calls to update them on project progress, obtain input, and involve them in project decisions. OWP's consultants in the field also attend various local community meetings, such as city council meetings, TA Applicant Board of Director meetings, and community outreach meetings, to engage community members. We have 7 of us OWP Project Managers leading these projects, with my role as the overall Program Manager. These projects are resulting in improvements to DAC drinking water systems throughout California.

Sulfur Burner Reservoir Water Treatment Effect on Microalgae Chlorella Vulgaris | By Sarah Marks
An experiment was conducted in which water from four different Cal Poly holding reservoirs was spiked with microalgae and observed daily. The four reservoirs had been subject to varying levels of sulfur dioxide treatment, a water quality treatment that is accepted to cause short term decrease in biological life. However, little is known about the long term effects of the sulfur treatment. This experiment was conducted at least a month after the sulfur treatment ended at all the reservoirs. Results showed that after enough time, there is no lingering effect from the sulfur treatment preventing further algae growth.

Using Smart Meters to Improve the Management of Water Distribution Systems | By Jorge Pesantez
This seminar shows the results of forecasting water demand to improve water distribution systems management based on data-driven methods. The forecast model predicts water demand using hourly data from smart meters and three machine-learning methods. Demands are predicted using lagged demand, seasonality, weather, and household characteristics. Time-series clustering is applied to delineate data based on the time of day and day of the week, which improves model performance. Accurate predictions of hourly demands can be used to update operational decisions, identify post-meter leaks, and improve decisions to mitigate leaks and water quality incidents. The applications of using smart metered data as part of a portfolio of modeling tools provide opportunities for researchers and practitioners to improve the management of water systems in the digital era.

Investigating the Capabilities of Fluorescence Spectroscopy for High-Frequency and Real-Time Water Quality Monitoring in Urban Water Systems | By Kenisha Shipley, Natalie Mladenov, and Alicia Kinoshita
Monitoring water quality in urban waters is an essential component of maintaining the health and safety of the surrounding communities. However, real-time detection of microbial pollutants and contaminants is difficult to achieve, given field site and instrument limitations. Previous work involving stormwater analyses has demonstrated that fluorescence spectroscopy from a benchtop fluorometer, specifically tryptophan-like fluorescence intensity, can be used to detect certain markers of anthropogenic, microbial pollution which can be correlated to total aerobic bacteria counts and total coliforms in source waters. The use of in situ fluorescence sensors is a viable option for real-time water quality monitoring, and although field studies are limited, recent work testing the detection of wastewater in laboratory experiments is promising. Installation of a sensor platform is underway at the Alvarado Creek, an urban, channelized headwater stream that feeds into the San Diego River and will be equipped with a submersible fluorometer and dissolved oxygen sensor with telemetry and data-logging capabilities, which will allow real-time water quality monitoring. Capturing meaningful real-time fluorescence data in riverine environments is essential to understanding the extent that tryptophan-like fluorescence can track the temporal variability in water quality and detect the frequency of pollution events. Continuous collection of fluorescence and water quality data will also aid in understanding the hydrologic and biogeochemical processes underlying episodic, diel, and long-term dynamics of fecal indicator bacteria in urban streams. Due to the many environmental and technological variables associated with long-term instrument deployments, a significant portion of the project will establish best practices for sensor calibrations, sensor maintenance, and deployment strategies to ensure data quality and consistency. Ultimately, the results of this work will provide valuable data on the submersible fluorometer capabilities for real-time detection of anthropogenic pollutants. The methods and strategies developed here for an urban, headwater stream could be applied to additional sites to provide local communities with effective resources to rapidly detect water contamination. Initial results from previous analysis demonstrate negative trend between land elevation and the high-water levels across our three study locations. These results are constant with Lidar differencing analysis results which show large regions of subsidence with a larger proportion of levees affected by negative vertical movement along San Joaquin River compared to the Sacramento River. Applying these findings to our locations, Venice Island experienced higher rates of subsidence compared to Antioch and Benicia and thus the levees at these locations are likely at higher risk of future failure. This example demonstrates how our results can guide decisions about levee improvement priority. While our analysis focuses on a smaller number of specific Delta sites, the methodology employed, and knowledge gained provide a valuable framework which could assist to determine levee upgrade prioritization across the entire Delta.

Production of Agricultural Water and Nutrients from Saline Water Sources | By William Wright and Enrique Alameda
The overarching goal of the research is to move towards sustainable water and nutrient management in the Southwestern US by efficient use and reuse of local water and nutrient resources. It is necessary to utilize nontraditional water sources (brackish waters) where fresh water sources are limited, non-sustainable, or nonexistent. The approach is to develop a water treatment system that combines advanced membrane and ion exchange processing to extract both phytotoxic constituents and nutrients from brackish water, while minimizing waste. The recovered nutrient products would be used locally for fertigation systems and water for irrigation and other uses, resulting in reduced dependence on imported nutrients, thereby reducing energy use and greenhouse gas emissions. Salinity in both water and soil would be reduced.

Intergenerational democracy for sustainable water allocation | By Jung Sook You
I ask how different institutional rules and voter composition from different generations lead individuals to conserve resources like surface water, leaving enough to provide for the next generation. My questions are two-folds: (1) whether a democratic decision-making system promotes sustainable water allocations over multiple generations (2) whether a representation of the future generations in the group decision-making system promotes sustainable water allocations. To answer the questions, I extend the intergenerational good game framework and design online experiments for understanding possible intergenerational cooperation among overlapping generations.

ATTENDEES

Drake Abrahamsson
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Drake Abrahamsson is 23 years old, and from San Clemente, California. He's a graduate student at Cal Poly SLO pursuing my Masters Degree in Civil & Environmental Engineering. He completed his undergraduate degree in Civil Engineering at Cal Poly SLO as well. He focused primarily on hydrology in his undergraduate degree, but also has interest in the wastewater treatment area of water resources engineering. In his graduate degree he has been able to learn more about coastal engineering which is really exciting for him. He teaches a hands-on water resources laboratory where students perform experiments with topics from pipe flow to hydraulic jumps in a lab setting. He also teaches a surfboard shaping class at Cal Poly. He has been shaping surfboards since he was 16 and his summer job for the last few years has been shaping surfboards at a professional level for one of Southern California's largest longboard manufacturers, as well as custom orders for his own clients. In his free time, he like to care for rare cacti and succulents, as well as hand-make all the pots for the plants in his collection. He is an active member of the Central Coast Cactus and Succulent Society. After he complete his graduate degree he is planning on traveling with the main goals of surfing an "endless summer" in the winter in the Southern hemisphere before starting work in the field of hydrology or coastal engineering.

Enrique Alameda Jr
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Production of agricultural water and nutrients from saline water sources. Utilize nontraditional water sources (brackish water) where fresh water sources are limited, non-sustainable, or nonexistent. They aim to develop a water treatment system that combines advanced membrane and ion exchange processes to extract both phytotoxic constituents and nutrients from brackish water, minimizing waste.

Jennifer Alford
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Dr. Alford is an Associate Professor and Interim Chair for the Department of Geography and Environmental Studies at CSU San Bernardino. She has worked with CSU WATER for over 4 years on multiple CA Department of Water Resources Disadvantaged Community grants, often partnering with other CSU campuses. Dr. Alford assumed the role as the Associate Director of Research for CSU Water in Fall 2022 and is actively working to develop and implement CSU Faculty-Student-Community research cohorts across the CSU system as well as University-Community partnerships that promote student learning through inquiry field research experiences.

Kian Bagheri
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Kian Bagheri is a Joint Doctoral Student with San Diego State and UC San Diego. Her research broadly encompasses the interactions between stormwater and aquatic ecosystems.

Elijah Banda
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Elijah Banda is a Project Coordinator for the California Water Institute at Fresno State and CSU-WATER. He is a recent graduate from Fresno State with a Bachelors in City and Regional Planning with a Minor in Geography. Since being hired he has had a chance to work on numerous projects and help with stakeholder engagement.

Sankha Banerjee
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Sankha Banerjee, Ph.D. is an Associate Professor and the Graduate Program Coordinator in the Department of Mechanical Engineering at Fresno State. He has extensive experience in the interdisciplinary areas of materials fabrication, plasma processing, and characterization. He founded the Energy Devices and Plasma Applications Laboratory at Fresno State in 2016 which is partially funded by the Department of Defense and Southern California Edison. Dr. Banerjee has also worked in the Princeton Plasma Physics Laboratory (a national laboratory at Princeton University) on the synthesis and surface modification of nanomaterials using thermal and micro-discharge plasmas. Before that he earned his M.S. and Ph.D. in Mechanical and Aerospace Engineering from Rutgers University. He has over 38 refereed journal publications and over 50 presentations in national/international conferences and technical meetings. He has also received several grants from federal (DoD, NIST, USDA), state (DWR), local agencies (City of Fresno, and F3), and private industry (Qualcomm, Southern California Edison). He actively collaborates with UC Merced and the State University of New York, Buffalo State in developing lead-free ferroelectric perovskite oxides and halides for biomedical and structural health monitoring applications. He also works on active filtration and desalination devices for wastewater treatment and purification.

Nicholas Banuelos
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Nicholas Banuelos is an undergraduate student at California State University, Long Beach studying Environmental Science and minoring in Biology and Geology. His research interests involve creating cleaner, more efficient wastewater treatments to combat microplastics for a healthier and more sustainable environment in developing communities, but also for wildlife. This ties into his other interests in coastal ecology, studying ways to sustain marine life in drastically changing environments due to climate change. He has contributed to research involving the biohealing of construction materials, biocementation, and chemical micropollutants (pollutants of emerging concern) coupled with microplastics removal in water and wastewater.

Nadine Barton
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Barton is a senior mechanical engineering student at California State University, Fresno and will be graduating in Spring, 2023. He is attending with his senior design team. They are integrating two water treatment systems.

Steve Blumenshine
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Dr. Blumenshine is the Interim Executive Director of CSU-WATER. CSU-WATER (Water Advocacy Towards Education and Research) which develops and strengthens water research and scholarship in the CSU System and throughout CA in collaboration with external partners and other water stakeholders. These efforts focus on including faculty and students throughout the 23 campus CSU system to address critical water resource issues and agricultural, urban, and environmental water allocations. More recently he was the Director of the Research & Education Division of the California Water Institute at Fresno State. Dr. Blumenshine served 20 years in the Fresno State Biology Department where he taught and operated a very active research lab with external collaborators and students. Blumenshine's International water research experience includes two U.S. Fulbright Awards, and engagement in Thailand, Germany, Israel, Switzerland, China, Australia, and Spain. His degrees include a PhD from the University of Notre Dame, MS from George Mason University, and BS at the University of Wisconsin.

Nathaniel Bogie
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There group studies movement of water through the saturated and unsaturated zones as well as how plants use this water. There current projects include looking at how agricultural practices influence deep drainage (recharge) of groundwater. Additionally, they study how the traditional practice of intercropping with deep rooted native shrubs in the West African Sahel that can serve as pumps to transfer water from deep, moist soil layers to shallow-rooted food crops growing nearby during extreme drought. There other work involves studying how deficit and drip irrigation and management of cover crops can affect crop growth, water use, and carbon cycling in California's Central Valley.

Danielle Bram
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Danielle Bram is a GIS professional and project manager with over 22 years of experience in the higher education, geospatial consulting, and public agency sectors. Her applied research interests and experience cover a variety of areas. However, she is most engaged with water and natural resource GIS projects. Danielle is currently director of the Center for Geospatial Science and Technology at CSU, Northridge.

Luis Cabrales
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Luis Edgar Cabrales Arriaga was born in Tampico, Mexico. He received a BS in Chemical Engineering at the Instituto de Estudios Superiores de Tamaulipas in Altamira, Mexico. He gained experience working as an engineer at M&G Polymers, one of the largest polyester producers in the world. Afterwards, he went on to earn an MS in Chemical Engineering at Texas Tech University (TTU) working on research projects related to polymer science. Then, he joined the Fiber and Biopolymer Research Institute (FBRI) at TTU as a research associate. While working at the Institute, he earned a Ph.D. with specialization in Fibers and Biopolymers from TTU in 2011. Currently, he is the Chair and Professor of the Department of Physics and Engineering at California State University-Bakersfield. His research interests are in the areas of water treatment technologies such as electroxidation and membrane distillation. In specific, he has been working on the treatment of produced water from oilfields. He is also interested in the study of modification of polymeric surfaces to impart oleophobic properties, cellulose materials, and the synthesis of polyesters from renewable resources.

Marco Ceja
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California is the largest producer of agricultural products in the United States and holds almost all of the nation's top ten agricultural counties according to the Census of Agriculture by the USDA. In particular, the Central Valley of California is one of the world's most productive agricultural regions and many Valley's counties (e.g. Tulare, Fresno, Kern) are at the top of the nation's agriculture producing counties. Accordingly, California generates more than 20 million dry tons of agricultural residues per year and the Valley has the highest concentration of agricultural wastes (e.g. orchard and vineyard pruning, crop residues, animal manure). However, traditional treatment methods such as land application, burning, and biological conversion still generate some concerns (e.g. parasite, air pollution, non-stabilized byproducts). In addition, the Valley is home to the largest concentration of dairies in California. Tulare County is the largest milk producer in the United States, accounting for about $1.6 billion in 2016. The City of Tulare established a large industrial wastewater treatment facility for treating regional dairy

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wastewater. Treating high-strength wastewater such as dairy wastewater is still challenging and has a higher cost compared to municipal wastewater. Hence, new solutions to sustainable and synergistic treatment of regional agricultural wastes and dairy wastewater are highly needed. Steam hydrogasification reaction (SHR) is an advanced and self-sustainable technology that can convert agriculture-derived waste streams (typically high moisture content) into renewable energy and fuels without costly drying process. The Department of Energy National Energy Technology Laboratory has performed an in-depth techno-economic analysis of the SHR-based process and confirmed that the SHR-based process has the potential for 12% higher efficiency at 18% lower capital costs compared to other state-of-the-art gasification technologies. In this study, the SHR-based process was used to synergistically treat the commingled agricultural wastes (e.g. dairy wastewater, orchard prunings) for the first time. The preliminary experimental data showed that SHR-based process led to high carbon conversion and desired syngas composition for further downstream upgrading such as water gas shift (WGS) reaction. When WGS is integrated with SHR, the final product is renewable fuel, synthetic natural gas (SNG).

Anita Chaudhry
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Her teaching and research is in the field of environmental and natural resource economics, focusing on the two-way links between people's access and use of natural resources and economic outcomes. For more detail on her background, visit her webpage: https://sites.google.com/site/stateofanita/home

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Ben Chou is a project manager for the Center for Geospatial Science and Technology at California State University, Northridge, where his work focuses primarily on natural resources management, vulnerable and underserved communities, and local government. He has more than a decade of experience in water resources policy and geographic information systems (GIS) and has worked previously for The Walt Disney Company, the Natural Resources Defense Council, and the Arizona Department of Environmental Quality. He holds a bachelor's degree in geography from the University of South Carolina, a master's degree in climate change studies from Columbia University, and a master's degree in GIS from Pennsylvania State University.

Molly Clemons
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Molly Clemons is a senior at Sonoma State University. She wanted to learn more about careers in water policy and monitoring. The class she's enrolled in with Professor Jacquelyn Guilford has been helpful. She learned how to take water samples and data. Being in her class allowed me to meet people who work in Santa Rosa Water. She gained a better understanding of what city planners do to monitor the water and write regulations for the environment. By being at the water symposium she hope to network with other people in water research. She want to learn about water equity and environmental justice. The conference will be a wonderful opportunity to exchange ideas with people.

Heidy Contreras
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Dra. Heidy L. Contreras, born in Guatemala City, Guatemala, received her undergraduate and MSc. In Biology from CSU San Bernardino and her Ph.D. in Ecology and Evolutionary Biology from the University of California Irvine. She worked as a Postdoctoral Research Associate at the University of Arizona and was an Associate Professor at the University of La Verne in Southern California. As an immigrant and first-generation college student, Dra. Contreras has a deep commitment in providing access to underrepresented students in STEM. Her research interests in STEM Education focus on leveraging Latinx student "conociminetos" (assets) to improve student success in biology. Trained as a comparative physiologist, in her research she aims to understand the physiology, ecology and behavior of animals specifically working with aquatic invertebrates.

Luis Cordova
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Cordova is a senior mechanical engineer attending fresno state. He is attending this conference to present the water treatment system that his team and himself have been working on.

Brian Currier
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Brian is a senior research engineer with the Office of Water Programs at California State University, Sacramento. He holds B.S. and M.S. degrees in Environmental Engineering from the University of California, Davis, and is a licensed Professional Engineer.

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Hassan Davani is an Assistant Professor at the SDSU Department of Civil, Construction and Environmental Engineering, specialized in water resources and climate change forecasting, who is an NSF CAREER awardee for his research on these topics. All his experience in academia and industry has focused on application of advanced computational techniques to explore emerging climatic stressors and flooding challenges on the civil infrastructure. He has earned his BS degree in Civil Engineering from the Power & Water University of Technology in Tehran, Iran (2009); his MS degree in Civil Engineering from the University of Tehran, Iran (2012); and his PhD degree in Civil & Environmental Engineering from the University of Utah, Salt Lake City, UT (2016).He is the Primary Investigator of several federally funded research projects, including the National Science Foundation, National Oceanic and Atmospheric Administration, and U.S. Department of Transportation. He has over 20 peer-reviewed journal publications to date, and has collaborated internationally between the US and Europe. He serves as a member for two committees of the American Society of Civil Engineers: International Participation Committee, and Urban Water Resources Council. https://www.hassanh2o.com/

Zoi Dokou
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Dr. Zoi Dokou is Assistant Professor at the Civil Engineering Department, California State University, Sacramento. Dr. Dokou received her B.Eng. degree in Environmental Engineering from the Technical University of Crete, Greece, and her Ph.D. in Civil and Environmental Engineering from the University of Vermont, USA. Dr. Dokou has published 37 peer-reviewed journal articles, 3 book chapters, and 54 conference presentations in the fields of hydrogeology, contaminant hydrology, food and water security, and water resources management. She is associate editor for the Journal of Hydrology and reviewer for numerous journals in the area of hydrology. Dr. Dokou's main research focus is on the area of water resources engineering. She believes that sustainable management of water resources necessitates an integrated strategy that requires the combined effort of multiple disciplines and takes into consideration the needs of the end-users. Such a strategy requires knowledge of physical processes, the combination of modeling, field and laboratory investigations, and their integration with newly available technology. Her specific areas of expertise include groundwater flow modeling under unsaturated and saturated conditions, managed aquifer recharge (MAR), stormwater management, saltwater intrusion in coastal and island aquifer systems, seasonal forecasting to improve food and water security in emerging regions, and transport of perfluoroalkyl substances (PFAS) in the subsurface.

Roomina Esmaeili
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Roomina Esmaeili is thrilled to be attending the CSU-Water Conference poster competition. She is a Mechanical Engineering major in her senior year at Cal Poly Pomona. As part of her senior project, she's been working on the TESuROC (Thermal energy storage using Desalination wasted salt) during the last two semesters. In addition to her studies, she works as a project engineer at American Renolit and she's interning at JPL (Jet Propulsion Laboratory) in the integration and test department, where she contributing to the development of the "Roman Space Telescope". She's passionate about engineering, particularly in the field of reusable energy, and she's excited to share the results of their research on the TESuROC project at the conference. When she's not working, she enjoy reading books, playing squash, playing piano, and working on her little garden. She's looking forward to meeting and learning from other professionals in the field at the CSU-Water Conference!

Hailey Elson
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Elson is a senior at Sonoma State University, she is majoring in Environmental Science, Geography, and Management with a focus in Environmental Policy and Management and a Minor in Geology. She is interested in water policy and water resource management because of the classes she has taken as well as an internship she did through her University about invasive species in water channels. She wants to learn more about watershed management in creeks and rivers, plus the conservation of these habitats, and is hoping to purse a career in something similar.

Athena Everson
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Everson is a senior at Sonoma State majoring in Environmental Science. She became interested in water policy during her internship with Sonoma Water, where she worked in the Water Resources Planning division. As a result of the hydrology class she is currently taking, she is considering pursuing a career in watershed management.

Emily Everton
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Emily Everton is a Junior in Environmental Science at Chico State with a Minor in Chemistry. She is the vice-president of the Associated Environmental and Geological Students (AGES) club and works as Supplemental Instruction leader in Chemistry. Her research experience includes boundary-layer turbulence modeling with LiDAR and urban storm runoff remediation. She will present on her experience with the 2022 Big Chico Creek Watershed Tour.

Rama Ewing
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Ewing is a recent graduate of environmental science and he loves to work in an interdisciplinary field in which he can connect environmental and ecological science with Geographic Information System (GIS) technology and utilize this powerful program for more accurate spatial, data, and temporal analysis with the purpose of better management plans. He is interested in understanding how different factors can impact each other and natural ecosystems over time and his favorite field is mountains, rivers, and in general higher elevations.

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Kieran Fara
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Fara is a senior at Sonoma State majoring in Environmental Studies. Classes she has taken previously have made her interested in water policy and now she hope to pursue a career in water policy.

Daniel Fernandez
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Dr. Fernandez has been involved in research in fog and fog water collection for the past 15+ years. He has a large array of standard fog collectors located both on and near the campus of CSUMB. He actively participates with determining both the characteristics of fog and the potential to extract water from fog as a function of regional location.

Julian Fulton
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Julian Fulton is an Associate Professor of Environmental Studies at California State University Sacramento, where he teaches and conducts research on issues related to water and energy sustainability. His current research focuses on urban water resilience and the role of citizen science in storm water management.

Kelley Giron
Student, CSU San Bernardino
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Current graduate student at Cal State San Bernardino conducting research on how wildfires impact surface water chemistry in the San Bernardino National Forest. Other interests include understanding how wildfires impact aquatic species and soil properties.

Sean Gleavy
Student, CSU Monterey Bay
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Gleavy is a third-year undergraduate student pursuing a bachelor's in Agricultural, Plant, and Soil Science. During the 2022-23 academic year, he worked alongside Dr. Arun Jani to address nitrogen loading and groundwater leachate contamination concerns resulting from Salinas Valley's leafy greens production system. Th have been experimenting with Carbon Nanoparticle (CNP) application rates in soil types commonly found in the Salinas Valley to analyze their effect on nitrate leaching and plant nitrogen uptake, of leafy greens. This research is vital in proposing methods for reducing groundwater contamination, for which local agriculture is 90% responsible. As well as upcoming nitrogen loading mandates, like AG Order 4.0.

Laraine Goto
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Retired-Staff person

Emilio Grande
Faculty, CSU East Bay
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I am is a Assistant Professor of Hydrology at CSUEB. He study's how rainfall becomes runoff. The pathways water takes through landscapes and the biogeochemical implications of these pathways from headwater catchments to the coastal ocean. He is interested in integrating field and quantitative analyses to investigate rainfall-runoff relationships and surface water- groundwater exchanges across a broad range of spatial and temporal scales and environmental settings.

Jackie Guilford
Faculty, CSU Sonoma
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Guilford is a lecturer at Sonoma State. In collaboration with Sonoma Water and the City of Santa Rosa, he works with a small group of students each year on projects related to watershed management and water quality. In previous years, they have explored the effectiveness of a Ludwigia removal project. This year, they are trying to determine the impact of homeless activity near urban creeks in Santa Rosa on water quality in those creeks.

James Guilinger
Faculty, CSU Monterey Bay
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Dr. Jimmy Guilinger is a new Assistant Professor and director of the Watershed Geology Lab in the Department of Applied Environmental Science at CSU Monterey Bay. Following undergraduate and master's degrees in geology at Boise State University and Idaho State University, Jimmy received his PhD from UC-Riverside in Environmental Science. He currently teaches undergraduate and graduate level courses in geomorphology, watershed hydrology, and environmental management. The focus of his research is on understanding the hydro-geomorphic dimensions of landscape disturbances, such as wildfire, and their resultant impacts on human communities and freshwater resources. He is new to the Central Coast and is excited to kickstart projects within the realm of physical watershed science in the region and elsewhere in California.

Emily Handy
Student, CSU East Bay/Humboldt
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Handy was a Environmental Resources Engineering undergraduate student at Cal Poly Humboldt and she now admitted to University of Nevada, Reno where she will study geosciences in the fall. Some of her greatest interests are: geochemistry; water resources; responsible resource extraction, use, and reuse; and the protection and remediation of the environment to protect biodiversity and climate resilience.

Ylla Hartman
Student, CSU Sonoma
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Hartman is a GEP (Geography Environment and Planning) major at SSU, she has been working at the city of Santa Rosa in the Water dept. and has been taking courses to shape my career path towards sustainable watershed development. She is very excited to attend and learn what my fellow colleagues are doing in this realm.

Sam Hawley
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The California Water Institute focuses on all aspects of sustainable water resource management solutions through outreach, entrepreneurship, education, testing, and interdisciplinary research. Through hands-on learning and research opportunities fostered by the Institute, students are prepared to enter the workforce as well-trained graduates. At the same time, water stakeholders are an important resource to help CWI and Fresno State develop the next generation of professionals through our partnerships. CWI's collaborative and comprehensive approach to water management solutions is a prime example of what we can accomplish when the University and the community work together to address and solve current and future water issues. CWI provides all stakeholders with convenient access to Fresno State's extensive water research and development programs and services. The institute positions Fresno State as a leader in water research and sustainability by engaging the campus community and academic experts from all disciplines to address the most challenging water issues of our time. The California Water Institute has three divisions: the Center for Irrigation Technology; the Research and Education Division; and the Water, Energy and Technology Center.

Andy Heise
Student, CSU Humboldt
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Andy has been living in Arcata, California for the past 6 years and has been Californian his whole life. He is currently pursuing an M.S. in Environmental Systems from Cal Poly Humboldt. He also obtained his B.S. in Environmental Resources Engineering from Cal Poly Humboldt with a double minor in Geology and Geospatial Analysis. He is an EIT but has been working as a Geologist for the past year at a local consulting firm called LACO Associates where he is a team member on a drought task force. His thesis is also drought-related and the working title is "Field Validation of Analytical Stream Depletion Functions for use in Estimating Stream Depletion due to Groundwater Pumping from Cannabis Irrigation Wells in Humboldt County, California. When he graduates, he hopes to work as a water resources or restoration engineer and use his skills and knowledge to help humans, nature, and the environment in which we live. Some of his favorite classes throughout his academic career have been: Groundwater Hydrology, River Hydraulics, Applied Hydraulics, Engineering Geology, Advanced Geospatial Modeling, Sedimentology, and Wastewater Treatment Engineering... to name a few. He is a very social person and loves talking to people, he likes trying to solve hard problems, and he loves being in the field, and getting his hands dirty in the name of science. He is very grateful for all his professors, his current supervisor at LACO, friends, and family for all the positive influence and mentorship he has received over the years. He is looking forward to attending the CSU Water Conference and he is excited to meet all of you.

Anna Herrera
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Phosphorous is an essential nutrient for living organisms. Anthropogenic sources of phosphorousinclude but are not limited to water treatment plants, runoff from agriculture and fertilized lawns,failing septic systems, and animal manure storage runoff. Since phosphorous is often a limitingnutrient, meaning the element is in the least quantity in and therefore limits growth in aquaticecosystems, the element can be used as an ecological indicator to measure anthropogenic effects.In order to determine the appropriate phosphorus quantity for streams we need to define naturalbackground in streams. Natural background is the condition of waters in the absence of human-induced alterations based on the best scientific information available. Determining naturalbackground helps set water quality objectives by defining how much phosphorus came fromhuman sources and how much is supplied naturally. This helps set water quality objectives thatdo not over or under protect streams.Due to industrialization, pristine natural background water sites are almost nonexistent. Waterquality monitoring was also infrequent prior to industrialization. Given the lack of reference sitesundisturbed by anthropogenic effects, estimates of the natural ranges of nutrients in streams areneeded. We developed a model to predict natural background total phosphorus (TP)concentrations from watershed environmental factors like geology and climate. Because themodel includes temporally dynamic predictors of climate, it predicts monthly TP concentrationsfor each individual stream segment throughout the continental United States from January 2000-December 2020. This model explained 63% of the variation in natural background concentrations.We also compare current measurements of TP in streams to predicted natural background TP toquantify anthropogenic inputs of phosphorus.

Kelly Hollman
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Second year Civil Engineering master's thesis student with a focus on microplastics and water quality.

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Emmanuel Iyiegbuniwe
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Emmanuel Iyiegbuniwe is an Associate Professor of Environmental & Occupational Health, Department of Public Health at California State University San Marcos (CSUSM). He earned both MSPH and PhD degrees in Environmental & Occupational Health Sciences from the School of Public Health, University of Illinois at Chicago (UIC). Additionally, he earned a Master of Business Administration (MBA) from Western Kentucky University (WKU). Prof. Iyiegbuniwe has over 30 years of academic, administrative, and consulting experience in public health in Canada, Nigeria, and USA. Previously, he served for three years as the inaugural Director of Public Health at CSUSM where he provided vision, direction, and leadership for CSUSM's MPH program with concentrations in Global Health and Health Promotion & Education. Currently, he teaches graduate courses and conducts various research studies on public health topics related to environmental and social determinants of health. He has received numerous awards/honors including Harvard University School of Public Health's Lee Kum Kee Family Foundation Fellowship, California State University Chancellor's International Partnership Programs Fellowship, Kentucky Public Health Association's William 'Bill' Patton Environmental Service Award, Western Kentucky University, College of Health and Human Services' Outstanding Faculty for Research and Creativity Award, and United States Agency for International Development (USAID) & Thomas Jefferson Leadership and Advanced Skills Fellowship (1992-94).

Arun Jani
Faculty, CSU Monterey Bay
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Jani is an Assistant Professor of Crop Management at CSU-Monterey Bay. His research focuses on developing crop and soil management strategies that optimize nitrogen recovery to protect ground and surface water resources. He collaborate with the private sector, non-profit organizations, and federal agencies is his work.

Lee Johnson
Staff, CSU Monterey Bay
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Lee Johnson is a senior research scientist in the College of Science at CSU Monterey Bay, and is a member of the Cooperative for Research in Earth Science and Technology at NASA Ames Research Center. Lee has served as Principal- or Co-Investigator for research grants from NASA's Applied Sciences Program, California Dept. Water Resources, California Dept. Food & Agriculture, and USDA. He is interested in agricultural applications of remote sensing, with emphasis on estimation of crop evapotranspiration. He has authored/co-authored over 40 peer-reviewed journal articles and has led or contributed to development of four refereed technical book chapters. Lee is recipient/co-recipient of professional awards from NASA, the Federal Laboratory Consortium for Technology Transfer, and the American Society of Agricultural and Biological Engineers.

Nathaniel Jue
Faculty, CSU Monterey Bay
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Jue's expertise are in bioinformatics, genetics, and functional/evolutionary/ecological genomics. They use genomics technologies to study a wide range of topics in his lab include the development of pesticide bioremediation technologies.

Krista Kamer
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Dr. Krista Kamer has led the development of COAST since its inception in 2008, and has served as the program's director since 2011. As the Director she oversees all of COAST's activities with emphasis on implementing programmatic initiatives to serve CSU faculty members and students, increasing student success, developing st rategic partnerships and engaging stakeholders, and pursuing extramural funding. Krista joined the CSU in 2003 and initially helped coordinate two large, multi-year, multi-million dollar ocean observing programs in California. She is currently a member of the California Water Quality Monitoring Council, Southern California Coastal Ocean Observing System Board of Governors, and Aquarium of the Pacific Marine Conservation Research Institute Board of Directors. Prior to her work with the CSU, she was a project scientist at the Southern California Coastal Water Research Project. Krista has a strong background in marine ecology, field work and experimental design. She earned her PhD in biology from the University of California, Los Angeles and a BA in biology from Connecticut College.

Ghazaleh Karimi Moghaddam
Student, CSU Pomona
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Ghazaleh Karimi Moghaddam is a senior mechanical engineering student at Cal Poly Pomona. Her passion is to work on renewable energy field and implement innovative solutions to complex problems using academic knowledge of engineering. In fulfillment of her senior project requirements, she started working with TESuROC (Thermal energy storage using Desalination wasted salt) team starting summer 2022, as a member of Lab Demo Committee and contributed on modeling, data analysis, fabrication, and test of TES 2.0. She used to work at Heat Exchanger Design company which focuses on fabrication of high pressure/temperature unites along with hair pines and shell & tube heat exchangers. She has strong commitment to promoting renewable energy initiatives and she's so excited to share their findings on TES development and what makes it an exceptional fit not only in sustainable energy scope but also, ecological solution in terms of decreasing the impact of industrial waste on environment and lowering the air pollution level by harnessing the heat energy stored at TES system. She's looking forward to meeting and learn from other professionals in the field at the CSU-Water Conference!

Maureen Kerner
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Maureen is a research engineer for OWP at Sacramento State &the Associate Director of OWP's Environmental Finance Center (EFC). The EFC supports state agencies and small communities in building technical, managerial, & financial capacity for drinking water, waste water, and stormwater project & programs. Maureen also provides consultation for stormwater management.

Swat Kethireddy
Faculty, CSU San Bernardino
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Swat Kethireddy is an Environmental health scientist and educator, currently serves at California State University-San Bernardino, CA as an Assistant professor of Environmental Health Sciences in the Department of Health Science and Human Ecology. Between 2015-2022, he was an assistant professor and coordinator for Environmental Health programs and received tenure at Mississippi Valley State University, Itta Bena, MS. He conducts research on public health and environmental monitoring and mapping applying Geographical Information Systems and Statistical tools. His current research focuses on water resources exploration and public health aspects for Southern California and received an internal grant from CSUSB. He enjoys teaching courses for graduate and undergraduate students in Master of Public Health, Health Sciences, Environmental health, Nutrition, Biology and Chemistry. Swat believes that education is a powerful tool to create the change that cultivates future societies. He holds a Ph.D. degree in Environmental Science from Jackson State University, received a Master of Science degree in Environmental biotechnology in 2008 and a Bachelor of Science in microbiology, biochemistry, and chemistry in 2006 from India. He serves for various scientific journals and educational communities as a reviewer. He is passionate about helping his students and followers to succeed in their life. He strongly believes in taking challenges to improve and succeed in life, without which one can not develop the career. He would like to see himself as a leader in the environmental politics and public health policy.

Leila Khatib
Faculty, CSU San Jose
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Dr. Leila Khatib has worked both in academics and industry consulting. She has over 15 years of experience in water resource and water quality issues. She has served as a technical advisor for CV-SALTS and conducted numerous due diligence reports related to water. As a faculty member at SJSU, she is currently developing a new virology laboratory that relates to water issues.

Nathan Martin King
Student, CSU Humboldt
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Nathan Martin King goes by Marty King. He is a junior in the Environmental Resources Engineering program at Cal Poly Humboldt, focusing on water resources. Originally from the midwest, he's lived most of my life in Flagstaff, Arizona. When he graduate he wants to work toward increase water equity for underserved communities around the world.

Sudarshan Kurwadkar
Faculty, CSU Fullerton
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Dr. Sudarshan Kurwadkar is a Professor in the Civil and Environmental Engineering Department at CSU, Fullerton. He received M.S. (Civil Engineering) from the Indian Institute of Technology, New Delhi. John and Susan Mathes graduate fellowship in Environmental Engineering enabled him to earn a Doctoral degree from the Missouri University of Science and Technology. He is a licensed Professional Engineer and a Board-Certified Environmental Engineer. His research focuses on the fate and transport of organic and inorganic pollutants in the environment, particularly the emerging contaminants of concern. He has published nearly 50 journal articles in highly reputed peer-reviewed journals. Throughout his academic career, he has received numerous awards, scholarships, and fellowships, a testimony to his outstanding work in academia. He won the 2018 Teaching Excellence Award, the 2019 Excellence in Scholarly and Creative Activities Award, and the 2020 L. Donald Shield Award for Excellence in Scholarly and Creative Activities. He was awarded numerous summer faculty fellowships at the Los Alamos National Laboratory, Pacific Northwest National Laboratory, and the Air Force Research Laboratory. He received the National Academies of Sciences, Engineering, and Medicine fellowship and worked at the U. S. Environmental Protection Agency for a year. Besides teaching and research, he enjoys traveling and outdoor activities.

Evelyn La
Student, CSU Monterey Bay
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Evelyn La is a junior at California State Monterey Bay pursuing a bachelor's degree in Environmental Studies with a concentration in Education/Outreach and a minor in Environmental Science. Her research specializes in agricultural runoff in the Central Valley and its effects on rural communities.

Reza Lakeh
Faculty, CSU Pomona
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Dr. Reza Baghaei Lakeh is an associate professor and graduate program coordinator in the mechanical engineering department at Cal Poly Pomona. Dr. Lakeh's primary research is energy storage and desalination concentrate management.

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Serena Lee
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Lee is a physical oceanographer with experience monitoring and modelling coastal and estuarine environments. Her past research addressed a range of topics including constituent transport (sediments dissolved and particulate contaminants, stormwater runoff) in estuarine environments, overland flooding due to extreme weather events, feedbacks between sea level rise and tidal dynamics, and coastal monitoring and management challenges arising from climate change. She is currently working with Dr Talke, from Cal Poly's Dept of Engineering and Environment, investigating the impacts of sea level rise and vertical land motion in the San Francisco Bay/Delta.

Yize Li
Faculty, CSU Bakersfield
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Dr. Yize Stephanie Li completed her B.S. from Peking University and achieved her Ph.D. from the University of Virginia, both in physics. She joined CSUB faculty as an Assistant Professor in Fall 2015, and is currently an Associate Professor of Physics. Her areas of research include low-dimensional electronic and photonic materials and devices, topological materials, and materials and devices for sensing and energy applications. Dr. Li has published 16 articles in high-impact peer-reviewed journals with international reputation. She has mentored 69 CSUB undergraduates, including 19 women and 40 URM, from six different majors.

Her research mentees won research awards, received scholarships, coauthored in her publications and presentations, and/or presented their research in national/regional conferences. Moreover, Dr. Li has been awarded a research grant from NSF (as the PI), an equipment grant from USDA (as a co-PI), two CSU system-wide research grants (as the PI), and six CSUB internal grants (as the PI), all of which support/supported undergraduate research.

Anna Lichterman
Student, CSU Sonoma
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Lichterman is a student at Sonoma State majoring in Environmental Science, Geography & Management and minoring in Geology. She first became interested in water issues in California when she read a book called "Cadillac Desert" by Marc Reisner which is a history of water in the west. At Sonoma State she have taken as many classes as she can on water related topics including a water research training class, a hydrology & watershed management class, and a class on atmospheric rivers. She is particularly interested in extreme events such as droughts and floods and changes in the frequency of extreme events related to climate change.

Juan M. Lim
Student, CSU Pomona
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Juan Miguel Lim is a senior at Cal Poly Pomona studying Mechanical Engineering. He has been studying engineering since high school and has developed an interest in thermal and stress analysis. He is currently part of a thermal energy storage research project, TeSuROC, that is analyzing whether or not desalination wastewater is a viable heat storage medium. He takes his studies seriously, but he also finds time to enjoy the outdoors. Ever since coming to Cal Poly he has gained the hobbys of rock climbing and going on camping trips. He has competed on the collegiate level for rock climbing to represent Cal Poly Pomona, and he is also employed within ASI as a supervisor within my school's recreational facility. His role as a supervisor is to manage our climbing wall and our gear rental center program. This program allows students to rent any outdoor equipment necessary for camping and backpacking for a subsidized rate.

Sami Maalouf
Faculty, CSU Northridge
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Sami Maalouf's research interests are centered on environmental fluid mechanics (water quality models, turbulence, transport phenomena, stratified flow, surface and groundwater flow and contamination) and sustainable development (heat disposal, alternative energy systems, hydroelectric power and energy conservation). Current research focuses on modeling the fate and transport of contaminants around coastal zones and in groundwater. Ongoing work deals with 1. Brine effluent from SWRO desalination plants and its effects on the coastal environment and 2. Dead-end pores in groundwater. Besides coastal and environmental matters, he is interested in researching engineering education, finding ways to enhance and optimize the teaching/learning experience and building a bridge between fundamental engineering disciplines and practical applications in civil engineering.Since June 1990, Dr. Maalouf has been working in the field of Civil Engineering. His experience in the industry includes working for a major water-resources/ environmental engineering firm (Montgomery-Watson-Harza–now part of Stantec), a local municipality (City of Los Angeles), and an international non-profit organization (United Nations Development Programme). He became licensed as a Professional Engineer (Civil) in the State of California in 1995. Between 1998 and 2002, he started up (along with two other partners) and worked at a construction firm. After leaving the firm, he helped found a small consulting firm where he still works part-time. The work involves analyzing and designing (along with rehabilitating) coastal and retaining structures, designing stormwater and wastewater conveyance systems, preparing stormwater Best Management Practice (BMP) plans, and performing hydraulic and hydrologic studies. Over the last 17 years, he has assisted in hiring five former California State University engineering students and trained them as junior engineers. Additionally, he has helped recruit six assistant professors in the last eight years. Presently, four of these professors are working with him and others in the same department at California State University, Northridge.

Sandrine Matiasek
Faculty, CSU Chico
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Dr. Sandrine Matiasek is an Associate Professor in the Department of Earth and Environmental Sciences at California State University, Chico. She completed her PhD in Hydrological Sciences at the University of California, Davis, where she studied organic matter cycling in an irrigated watershed. At Chico State, she advises undergraduate and graduate student researchers and teaches Soils, Pollution Science, and Natural Water Systems classes. Her research team studies how land use impacts the chemical composition of terrestrial waters, with particular focus on urban storm runoff and fires at the wildland-urban interface.

Claudia Mayo
Student, CSU Sonoma
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Mayo is a 4th year student at Sonoma State majoring in Environmental Science and Management. She became interested in water policy during her internship with CA Sea Grant Russian River Salmon and Steelhead Monitoring, when she learned about the regulations of fish hatcheries. As a result of the hydrology class she is currently taking, she is considering pursuing a career in watershed management.

Phoolendra Mishra
Faculty, CSU Fullerton
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Mishra does research and teaching in water resources engineering area. This conference provides opportunity to network and develop collaborative relationship with other CSU campuses.

Jean Moran
Faculty, CSU East Bay
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Dr. Jean Moran is a professor in the Department of Earth and Environmental Science at CSU East Bay. Her research focuses on using naturally-occurring and introduced isotopes to examine geochemical and transport processes in groundwater. Over the last 20 years, she has led numerous projects on groundwater vulnerability, fate and transport of nitrate, and groundwater transport near artificial recharge areas under the Groundwater Ambient Monitoring and Assessment project sponsored by the California State Water Resources Control Board, and was a member of the team that prepared the Groundwater Sustainability Plan for the East Bay Plain. She was the Outstanding Researcher (tenured) at CSU East Bay in 2016.

Melissa Moreno
Student, CSU Pomona
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Moreno graduated from Cal Poly Pomona with a BSCE. She then went to work as a Project Manager and later Program Manager for CSU WRPI for 3 years. She is currently attending Cal Poly Pomona's Masters Program in Civil Engineering for Water Resources and Environmental Engineering.

Claudia Muldoon
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Financial Assistant for the Associate Director of CSU-Water (previously WRPI) at CSUSB. Provides administrative, budget and operational support for grants: West Basin and Ventura County DACIP Programs.

Jorge Pesantez
Faculty, CSU Fresno
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Dr. Pesantez joined the California State University Fresno Department of Civil and Geomatics Engineering in August 2022. He graduated with a B.S. in Civil Engineering at the University of Cuenca, Ecuador (2010), and obtained a Master's in Construction Management at the University of the Armed Forces (ESPE), Ecuador (2014). He holds an M.S. (2017) and a Ph.D. (2021) in Civil Engineering from North Carolina State University. Before joining Fresno State, Dr. Pesantez worked as a Postdoctoral Research Associate at the Civil and Environmental Engineering Department of the University of Illinois Urbana-Champaign.Dr. Pesantez teaches water resources engineering- and management-related courses, including Hydraulics, Hydraulics Lab, and Engineering Construction I. His scientific contributions have been recognized as the Editor's Choice of the Month by the American Society of Civil Engineers Journal of Water Resources Planning and Management.

Erik Porse
Faculty, CSU Sacramento
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Erik Porse is the Director of the California Institute for Water Resources and an Associate Cooperative Extension Specialist within the University of California Division of Agriculture and Natural Resources (UC ANR). Erik is an engineer, environmental scientist, and policy analyst who focuses on water and environmental management.

Roxanne Reimer
Staff, Community Water Center
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Roxanne Reimer is the Watsonville-based Community Solutions Manager for Community Water Center. In this position she manages

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various projects working towards long-term drinking water solutions in low-income communities in the Central Coast.

Much of Roxanne's academic and professional career has been focused on the intersection of community development work and small water systems. Roxanne has a B.A. in Mathematical Sciences from Bethel College KS as well as a M.S. in Environmental Engineering and Certificate in Engineering for Developing Communities from the University of Colorado, Boulder.

Lily Roberts
Student, CSU Sonoma
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Roberts is a senior at Sonoma State majoring in Geography, Environment and Planning, with an emphasis in Environmental Systems. She became interested in water policy and management last semester when she enrolled in a Water Research Training course that allows her the opportunity to get hands on experience conducting water quality testing in an urban setting and work alongside city employees to examine the effects of poor water quality. On top of that, she was enrolled in two other courses related to water that led her to want to pursue a career in watershed management and/or related environmental planning fields.

Laura Ramos
Associate Director, CSU-WATER
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Laura Ramos is the Associate Director for Administration for CSU-WATER and Associate Director of Research and Education at the California Water Institute, located at California State University, Fresno. With over 20 years of experience in water resource management, Laura has played an integral role in various water initiatives and programs since joining the Fresno State community in 2001.

In her current role, Laura manages multiple programs and oversees the Research and Education Division of the California Water Institute. Her primary goal is to elevate the water IQ of the community by engaging stakeholders throughout the San Joaquin Valley in pursuit of sustainable water resource management solutions. This includes working closely with Fresno State faculty, staff, students, and researchers to identify and address the water resource management needs of California's agriculture, urban, environment, and disadvantaged communities.

Connor Rudmann
Student, CSU Pomona
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Rudmann is a second-year master's student studying landscape architecture and regenerative systems. He is fascinated by the interface between natural and engineered systems, in particular--channelized rivers, constructed wetlands, urban stormwater infrastructure, and lakefront development. This summer, he will be joining the water resources engineering firm, Craftwater, as a Watershed Analyst Intern.

Danielle Salt
Staff, CSU Pomona
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Danielle Salt is a Research Engineer with the Office of Water Programs at California State University, Sacramento (OWP). She is a licensed Professional Engineer and holds a Master's degree in Civil Engineering (Water Resources Engineering emphasis) from California State University, Sacramento and a Bachelor's degree in Civil Engineering from the University of California, Davis. Her professional interests include hydraulic and hydrologic modeling, data analysis and visualization, stormwater and water resources policy and management, and GIS mapping and analysis. In her day-to-day work, she provides support for various state agencies across a number of water-related realms including dam breach modeling and analysis, technical assistance for stormwater compliance, TMDL evaluation and modeling, EAP development and support, stormwater quality tool development, and BMP performance assessments.

Christine Seeger
Student, CSU San Bernardino
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Graduate Student researching headwater stream resiliency within the San Bernardino National Forest.

Maryam Shafahi
Faculty, CSU Pomona
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Maryam Shafahi is a professor in Mechanical Engineering Department in California State Polytechnic University, Pomona. Her research includes water filtration, water conservation and sustainability.

Ali Sharbat
Faculty, CSU Pomona
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Ali Sharbat is a Professor of Civil Engineering at California State Polytechnic University, Pomona. His research focuses on water quality engineering. His work involves development of desalination technologies for saline and brackish waters, and has patented ideas for improving the efficiency of desalination technologies. He has experience in water purification technologies and selectiuve removal of constituents from water. He holds a PhD in Civil and Environmental Engineering from University of Nevada Las Vegas. He is a registered professional civil engineer.

Kenisha Shipley
Faculty, CSU San Diego
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Shipley is a Postdoctoral fellow in the environmental engineering department in the Water Innovation and Reuse Lab. His research is focused on the detection and impacts of pollutants in urban waters.

Jasbir Sidhu
Staff, CSU Fresno
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Irrigation impact on family farms.

Cailie Smith
Student, CSU Fresno
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Smith is a senior at California State University, Fresno. She will be graduating in May 2023 with a B.S. in Business Administration with an emphasis in marketing, a minor in Recreation Administration, and a Special Event Planning Certificate. She has worked with the CSU-WATER and California Water Institute since October 2019 as a student employee, and she has earned herself the title of Marketing and Events Coordinator for both institutes. Her primary duty in this role is to increase water education through outreach events and marketing materials. Her most recent projects include coordinating the annual conference, managing social media, and producing the annual reports. Cailie is currently looking for an event planning position for after graduation.

Garrett Struckhoff
Faculty, CSU Fullerton
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Dr. Struckhoff's research interests include algal biofuels, the combination of solar electricity generation and greenroofs, and phytoremediation. He received his undergraduate and masters from the Missouri University of Science and Technology, and his doctorate from the University of Iowa. Prior to joining CSU-Fullerton, he held a post-doctoral position at the Air Force Institute of Technology.

Stefan Talke
Faculty, CSU San Luis Obispo
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Dr. Talke's research focuses on hydrodynamic processes and climate change effects in estuaries, rivers, and the ocean, using a combination of field research, data analysis, and modeling. Talke uses numerical simulations and recently re-discovered archival data extending back to the 1820s to obtain a better understanding of how estuaries, rivers, and coastal regions function, and how they are changing over time due to anthropogenic interventions and sea-level rise. The past is preview: Understanding long term trends in water levels (tides, storm surge, sea-level, and river flow) and water quality (temperature, salinity), and discerning their local or climate-related causes, can help coastal and inland regions plan for the future.

Chihhao Wang
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Our Geography and City and Regional Planning programs are designed to train students so they can be equipped with theoretical knowledge and practical experience needed to be competitive in the global market and have a successful career as an urban and regional planner, GIS analyst, data and mapping consultant, information specialist, climatologist, natural and resources specialist, environmental consultant state/local public health/social services administrator, diplomat, teacher and economic researcher.

Matthew Weingarten
Faculty, CSU San Diego
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Matthew Weingarten's research in hydrogeology includes numerical modeling and optimization techniques in the analysis of groundwater flow. One of his research aims to better understand future water resource estimates as well as understand how fractures and faults effect groundwater flow.

William Wright
Faculty, CSU Fresno
wfwright@csufresno.edu

Dr. William Wright began his career with Black & Veatch Consulting Engineers in 1986 after earning a BS degree in Civil Engineering at UC Berkeley, obtained a license to practice Civil Engineering (CA), and then earned MS and PhD degrees in Civil and Environmental Engineering at UC Davis in 1995 and 2000, respectively. Dr. Wright joined the Civil Engineering faculty at Fresno State in 1999 his responsibilities include instruction in civil and environmental engineering and administration of the graduate program. His research interests include water and wastewater treatment, salinity management, conversion of food wastes to marketable products (e.g., bioplastics and activated carbon), manure management, digestion/ fermentation, and biofiltration. Recent work has focused on the production of water and fertigation nutrients from nontraditional water sources using ion exchange and membrane technologies.

Tesfayohanes Yacob
Faculty, CSU Humboldt
yacob@humboldt.edu

Tesfayohanes Yacob is an assistant professor of environmental engineering who is passionate about access to clean water and a hygienic and safe living environment for all communities regardless of economic status. Currently he is researching the removal of pharmaceutical compounds from wastewater through the use of treatment wetlands. Moreover, he has active research projects

ATTENDEES

on wildfire-related air quality monitoring and management, and on sustainable supply of water in a rapidly urbanizing developing country cities. In his previous research and service work, he has focused on thermochemical treatment of fecal sludge and biomass, the development of innovative point-of-use drinking water treatment technologies, and industrial and mining wastewater treatment. He has researched treatment technologies such as filtration, adsorption, coagulation/precipitation, ligand complexation, biological, and thermo-chemical. Sources of wastewater studied included: mine waste rock drainage, flowback from hydraulic fracturing, and domestic sewage. His teaching experience includes senior capstone design, water and wastewater treatment, groundwater hydrology, hazardous waste and air pollution management, environmental transport processes, fluid mechanics, computational methods, appropriate technology for developing communities, and engineering statics. He enjoys hiking, taking long walks, reading, and listening to audiobooks. He has a B.Sc. in Chemical Engineering from Addis Ababa University and a Ph.D. in Civil and Environmental Engineering from the University of Colorado at Boulder.

Jung You
Faculty, CSU East Bay
jung.you@csueastbay.edu

Her main research interests include: 1) designing sustainable resource allocation and pricing schemes; 2) electricity and energy market analysis; and 3) development of performance metrics applicable to business practices and social justice. To conduct research projects, she Stilize game-theoretic approach and empirical analysis. She also conducts experimental investigations as well as surveys. As a faculty in the Economics Department, she regularly teaches environmental economics, public economics, game theory, and econometrics. She enjoys teaching those courses since her students choose diverse topics in social and economic issues and present their short-term research projects in my courses.

Yolonda Youngs
Faculty, CSU San Bernardino
yyoungs@csusb.edu

Dr. Yolonda Youngs is an Associate Professor in the Department of Geography and Environmental Studies at California State University San Bernardino. She specializes in environmental and cultural geography, environmental policy and management, national parks and protected areas, public lands, environmental justice, cultural landscapes, and GIS. She has active and ongoing water resources projects in the Santa Ana River Watershed, San Bernardino Mountains, Colorado River (Arizona, Grand Canyon NP), Upper Snake River (Grand Teton NP, Wyoming), Yellowstone Lake (Wyoming). She also has interests in coastal and marine resource protection and conservation.

Julissa Zavala
Staff, CSU Fresno
julissaz@mail.fresnostate.edu

Julissa Zavala is the Grants and Contracts Facilitator with the California Water Institute and CSU-WATER. Ms. Zavala helps with researching, drafting, and submitting proposals that help the organizations receive grant funding. This funding advances CWI's mission to engage the San Joaquin Valley, California, and the world with Fresno State's faculty, staff, and students to pursue current and sustainable water resource management solutions through education, collaboration and research.

Kyle Zoldoske
Student, San Joaquin College of Law
kyle.zoldoske@student.sjcl.edu

Kyle Zoldoske is a 3rd year law student at the San Joaquin College of Law. He previously graduated from Fresno State with a Bachelor of Arts Degree in Communication. During his time at Fresno State, he competed on the Barking Bulldog Policy Debate Team where he won the University of North Las Vegas and CSU Fullerton tournaments in 2018-2019; served as Fresno State's student body Associated Students Inc. (ASI) Senator for Sustainability; served in the Cal State Student Association (CSSA) during his time in ASI; and held an officer position in Fresno State's student Sustainability Club. Kyle has a passion for sustainability, the environment, and water in California. Upon graduating law school, he plans to take his career to Sacramento where he can advocate and create policies for water law.

14TH ANNUAL
CSU-WATER
CONFERENCE

ADVISORY NETWORK

Campus Representatives

CSU-WATER Campus Representatives have been established to foster bilateral communication of CSU-WATER relevant information, opportunities, and goals to and from their campus community. A first order of business will be updating the 'Campus Expert' list that can be shared throughout the CSU as well as with external partners and stakeholders.


Archana Anand
San Francisco


Hakob Avetisyan
Fullerton


Jessica Bremner
LA


James Guilinger
Monterey


Christopher Halle
Sonoma


Scott Hauswirth
Northdrige

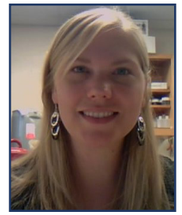

Laurie Huning
Long Beach

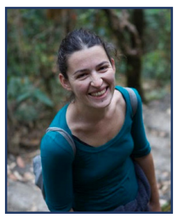

Andres Jauregui
Fresno


Swat Kethireddy
San Bernardino


Simeng Li
Pomona


Bwalya Malama
San Luis Obispo


Rae McNeish
Bakersfield


Costanza Rampini
San Jose


Zhi Wang
Fresno


Jackson P Webster
Chico


Tesfayohanes Yacob
Humbolt


Zoi Dokou
Sacramento

Not Pictured: Simeng Li, Pomona; Stephen G Osborn, Pomona; Arezoo Khodayari, LA

Interim Working Group

Implementing the new goals and directions for CSU-WATER has and will greatly benefit from feedback of faculty leaders in the CSU during this interim period. Working group members continue to provide advice and opinions on how to best engage CSU students, faculty, administrators, and institutes on collaborations that mutually support our CSU-WATER goals.


Jennifer Alford
San Bernardino


Trent Biggs
San Diego


Danielle Bram
Northridge


Erin Bray
San Francisco


Anita Chaudhry
Chico


Katherine Cushing
San Jose


Emmanuel Iyiegbuniwe
San Marcos


Jamie Kneitel
Sacramento


Rea McNeish
Bakersfield


John Olson
Monterey Bay


Stefan Talke
San Luis Obispo