WWE

Wright Water Engineers, Inc.

NATALIE M. COLLAR, PH.D., CFM
SENIOR HYDROLOGIST

CURRENT

Surface water hydrologist with experience in statistical and machine learning-based analytical methods, disturbance hydrology, stormwater management, watershed mechanics, fluvial geomorphology, wetland science, hydrologic and hydraulic modeling, water quality monitoring, and floodplain management. Modeling applications include SWMM, HEC-RAS, HEC-HMS, and others. Proficient in R and ArcGIS.

EDUCATION

Ph.D., Civil and Environmental Engineering, 2022
Colorado School of Mines (CSM), GPA: 3.52
    Program: Environmental and Water Engineering
    Advisor: Terri Hogue
    Committee: Jeff Dozier (University of California Santa Barbara), Ashley Rust (CSM), John McCray (CSM), Adrianne Kroepsch (CSM)
    Dissertation: *Characterizing hydrologic response and recovery patterns of disturbed ecosystems from the burn scar to continental scale*

M.S., Water Resources Science, 2015
University of California Santa Barbara, GPA: 3.89
    Advisor: Steven Gaines
    Co-advisors: Thomas Dunne, Derek Boothe, Jeff Dozier
    Thesis: *Addressing sedimentation of Ecuador's Rio Chone Estuary: A watershed perspective*

B.S., Biological Science, 2009
University of California Santa Barbara, GPA: 3.51
    Dual focus: Ecology, Evolution, and Marine Biology; Molecular, Cellular, and Developmental Biology

REGISTRATION

Certified Floodplain Manager, 2016 (#US-16-09257)

Hydrologist-in-training, American Hydrology Institute, 2017 (#17-HIT-104)

Certificate in Permanent Stormwater Quality Best Management Practice Inspection and Maintenance, Colorado State University Stormwater Center, 2017 (#247)

38-Hour Army Corps of Engineers Wetland Delineation Training Program, 2016 (#7991). Denver, CO. Richard Chinn Environmental Training, Inc.

GENERAL REPRESENTATIVE PROJECTS

Confidential Post-fire Hydrologic and Geomorphic Hazard Risk Assessment in the Pacific Northwest. Evaluated numerous burned watersheds after active 2020 fire season in the Pacific Northwest for a confidential client. Characterized watershed condition including burn severity, vegetation status and structure, fire-induced changes to soil hydraulic properties; collected field data including soil infiltration rates using mini-disc infiltrometers and water drop penetration tests; identified location-specific values-at-risk (VARs) within and downgradient of burn scars; using watershed characterization observations and USGS debris flow probability estimates and other open access datasets, generated hazard risk rankings by VARs according to hazard type.

Confidential Missouri River Flooding Assessment. Evaluated flooding along the Missouri River mainstem for the United States Department of Justice (USDOJ) to evaluate impacts of reservoir operational changes and in-channel modifications carried out by the United States Army Corps of Engineers (USACE) following directives by Congress and the United States Fish and Wildlife Service (USFWS) to revitalize Missouri River riparian ecology. Conducted statistical hydrologic assessment of flow records pre- and post-modification and analysis of flood recurrence intervals.

Confidential Wetland Expert Witness Assignment. Co-managed a team to prepare expert testimony materials for the USDOJ for a confidential matter in Buffalo, New York relating to CWA section 402 and 404 violations. Tasks included data management and statistical water quality analysis, performance of a site visit, research on area drainage history, research on planned development, SWMM modeling input development and evapotranspiration calculations, analyzing ditch drawdown calculations, assessing relevance of 303d listings, and file organization. Prepared client for deposition of opposing expert witness team; attended depositions to aid attorneys in deposition of technical topics.

Pitkin County Post-fire Debris Flow Assessment. Coordinated with Colorado's Pitkin County to select seven drainage basins with meaningful Values-at-Risk (infrastructure, potential risk to human safety and/or welfare, etc.) to evaluate for a pre-event post-fire hydrologic hazard risk assessment. Modeled clearwater and bulked flow volumes and peak rates to represent the hydrologic change anticipated after a wildfire event. Assembled report and graphics for Pitkin County and presented results at local water-oriented conference.

No-Rise Certification Hydraulic Modeling on Big Dry Creek, Thornton, Colorado. Set up duplicate effective, corrected effective, existing conditions, and proposed conditions hydraulic models for the Big Dry Creek Pilot Project implementation for the City of Thornton. Work included all aspects of hydraulic modeling analysis using HEC-RAS, iterative work with design engineering firm Matrix, and submitting materials to the City of Thornton's floodplain administrator for a no-rise certification.

Mile High Flood District Colorado Stream Quantification Tool Assessment. Part of a project team assembled by Denver's Mile High Flood District (MHFD) to assess the USACE/United States Environmental Protection Agency (USEPA) Colorado Stream Quantification Tool (CoSQT), a regulatory tool rolled out in 2020 in Colorado to assess functional stream lift or loss on USACE Clean Water Act Section 404 permitted projects. Project team evaluated overall tool effectiveness, functionality, and repeatability, and provided detailed comments to USACE/USEPA during multiple in-person meetings.

Base Flood Elevation Determination for CLOMR-F/LOMR-F on Blue River, Silverthorne, Colorado. Project engineer for a CLOMR-F/LOMR-F certification along the Blue River for a private developer. Determined 100-year floodplain Base Flood Elevations (BFEs) from Federal Emergency Management Agency (FEMA) current effective hydraulic model and Flood Insurance Study (FIS) flood profiles. Stewarded client through floodplain development permitting process.

Confidential Post-fire Debris Flow Assessment in Southern California. Evaluating debris flow initiating rainfall, assessing post-fire hydrology including modeling sediment production from sheetflow processes, evaluating debris flow hydraulic controlling factors, including the effects of bridges and other channel constrictions/obstructions, performing a multi-day site visit to evaluate upper and lower watershed including entire length of the thalweg, and general testimony support role for fatal debris flow in Montecito, California following 2017/18 southern California Thomas Fire. Similar evaluation for post-fire pre-debris flow Woolsey Fire area in Malibu, California.

Confidential Hurricane Flooding Evaluation in Houston, Texas. Co-managed a team of WWE staff and adjunct peer reviewers to evaluate impacts of USACE reservoir operations in the Houston, Texas metropolitan area for the USDOJ during August 2017's Hurricane Harvey. Site visit and meetings with USACE officials, assessment of hydrologic methods for estimating design storm runoff, assessment of floodplain hydraulics, and general testimony support role.

Confidential Fluvial Geomorphologic Assessment of the Bad River, Wisconsin. Part of a project team overseeing a pipeline owner's engineering consultant who is actively assessing the potential of a meandering alluvial channel to avulse during high flows and/or gradually migrate during typical baseflow conditions to expose a buried pipeline at the neck of an oxbow.

Confidential Industrial Stormwater Permitting Assignment in Martha's Vineyard, Massachusetts. Co-managed preparation of expert witness testimony materials for work with the USDOJ, including attendance of defendant's deposition, site visit with the USDOJ and USEPA, stormwater BMP cost assessment, and preparation of expert witness report, appendices, and exhibits. Case related to alleged Clean Water Act Section 402 violations pertaining to the discharge of stormwater under the National Pollutant Discharge Elimination's (NPDES) Multi-Sector General Permit.

Confidential Pipeline Environmental Impact Statement Assessment. Assessing adequacy of a United States Department of State's Environmental Impact Statement for a controversial proposed pipeline in terms of impacts to water resources. Site visit to meet with stakeholders and assess proposed pipeline corridor, review of Environmental Impact Statement and associated materials, and preparation of letter report for client representing a Native American tribe.

Confidential Colorado Wetland Delineations. Performing comprehensive wetland delineations for United States Army Corps of Engineers Clean Water Act Section 404 jurisdictional determination purposes, including assessment of hydrology, vegetation, and soils. Running pre-application meetings with project stakeholders, performance of field work, GIS mapping, and report preparation. Performance of desktop evaluations when necessary for potential waters of the U.S.

Confidential Stormwater Expert Witness Assignment in Maryland. Review of literature related to stormwater management using low impact development and green infrastructure principles, agricultural best management practices, and stream restoration. Managing preparation of expert witness report on stormwater management and impact of urbanization and farming on receiving waters in terms of hydrology, water quality, stream biota response, and channel geometry. Review of various aquatic biota integrity metrics.

Keep It Clean Partnership Annual Water Quality Report. Preparation of annual water quality report for City of Boulder, Boulder County, City of Longmont, City of Lafayette, City of Louisville, and Town of Superior, Colorado. Included compilation and analysis of water quality data and data interpretation to aid participating entities in attaining numeric water quality standards and Total Maximum Daily Load regulatory thresholds.

Risk Assessment Review in Southern California. Review of a surface water toxicity risk assessment performed for a confidential site in California, including assessment's thoroughness, completeness, methodology, and accuracy.

Tiger River Run Floodplain Analysis. Performed hydraulic calculations to determine how fill placed in a floodway would change stage elevations.

Myers and Summit Farms Water Rights. Field work and data compilation related to wells for water rights analysis for a potato farm.

MHFD Water Rights Modeling. Reviewed documentation for SWMM modeling for the Mile High Flood l District (MHFD). Ran model scenarios and interpreted model output.

MHFD Clear Creek CLOMR. Graphed discharges at Clear Creek stream gages for Conditional Letter of Map Revision for MHFD.

OTHER EXPERIENCE

United States Geological Survey (USGS), **Analysis and Prediction Branch** (Water Mission Area), Lakewood, Colorado. *Student Contractor* (March 2021-March 2022). Investigating post-wildfire effects on water availability in the Upper Colorado River basin under the USGS WAIEE program. Running the USGS SSEBop algorithm in Google Earth Engine to generate 30-meter actual evapotranspiration rasters; analyzing USGS stream gage data to identify statistically significant post-fire flow regime shifts; explicitly linking post-fire evapotranspiration with streamflow shifts and additional watershed attributes by developing statistical and machine learning models.

The Nature Conservancy, Boulder, Colorado. *Intern* (August 2015–December 2015). Performed a fluvial geomorphologic GIS/remote sensing assessment of a disturbed Yampa River stream corridor, assessing change over time including occurrence/extent of sand bars, sinuosity, and total riparian area using NAIP imagery.

National Snow and Ice Data Center, Boulder, Colorado. *Research Intern* (August 2015–December 2015). Data integration for CyberNABO's data partners into user-friendly data portal, and general cyber-infrastructure conceptualizing for usability of archaeological dataset portal. Provided Web-Atlas support using a Nunaliit platform for ELOKA.

Goleta Water District, Santa Barbara, California. *Intern* (January 2015–July 2015). Authored portions of the 2015/16 annual Sustainability Plan Progress Report, RFPs, and internal technical documents. Determined water usage statistics for each of the District's customer classes. Participated in drought contingency planning and produced customer outreach materials.

UCSB Earth Research Institute (ERI), Santa Barbara, California. *Graduate Student Researcher* (January 2014–August 2015). Assessed the efficiency of remote sensing products using surface reflectance data from MODIS and Landsat satellite imagery by comparing snow-cloud discrimination algorithms for improved snow-water equivalent (SWE) mapping.

UCSB Master's Thesis Group Project, Santa Barbara, California (June 2014–June 2015). Identified the major sources of sediment production in Ecuador's Rio Chone Watershed and the effect changing land use could have on reducing erosion rates, which was incorporated into a comprehensive watershed management plan. Also served as primary editor for all written materials and lead modeler for the employment of Stanford's Natural Capital Project InVEST Sediment Retention model, including pre- and post-data processing in *R* and ArcGIS.

Global Student Embassy, Bahia de Caraquez, Ecuador. *Graduate Student Researcher* (July 2014–August 2014). Performed reforestation work, identified sources of funding for non-profit, restructured business logistics, and volunteered with local schools to teach children about environmental awareness.

UC Natural Reserve System, Santa Barbara, California. *Habitat Restoration Intern* (January 2014–July 2014). Collected data on phenology of specific reserve species and spatial species compositions on burned vs. non-burned transects, installed drip irrigation systems, maintained general greenhouse, and propagated native seed bank. Performed restoration planting.

UCSB Department of Molecular, Cellular, and Developmental Biology, Santa Barbara, California. *Teaching Assistant* (August 2013–December 2013). Physiology. Taught five sections each week, attended lectures, and ran review sessions for a class of 300 students.

Global Energy Network Institute, San Diego, California. *Research Associate* (July 2011–July 2013). Authored a comprehensive report on the implications of climate change on California's water supply, published online at www.geni.org, and served as a climate change specialist during month-long annual energy-water nexus conference.

UCSB Page-Dugan Lab, Marine Science Research Institute, Santa Barbara, California. *Laboratory Technician* (January 2008–January 2009). Collected field data on intertidal marine macroinvertebrate kelp holdfast species compositions and beach ecological community compositions as affected by diminished beach detritus from seawalls.

Santa Barbara City College, Department of Biological Science, Santa Barbara, California. *Teaching Assistant* (August 2007–July 2010). Under professors Larry Friesen and Robert Cummings, Department of Biological Sciences, graded all coursework material and held office hours for Cellular Biology, Plant Biology, and Introduction to Evolution.

AWARDS

2021-2022 Babbitt Center Dissertation Fellowship, Lincoln Institute of Land Policy recipient. For students at U.S. universities whose research builds on, and contributes to, the integration of land and water policy to advance water sustainability and resilience, particularly in the West.

2021 CASFM Annual Research Grant recipient. For research that contributes to the fields of floodplain and stormwater management, water quality, flood hazard mitigation, or public research; awarded for the student's third PhD dissertation chapter which quantifies post-fire ET change in the Colorado Rocky Mountains and links ET shifts to streamflow response.

Remote Sensing Technical Committee Outstanding Presentation Award recipient at the American Geophysical Union (AGU) 2020 conference. Presentation title: *Investigation of Post-fire Evapotranspiration Rate Changes and Recovery.*

2020-2021 American Water Works Association Rocky Mountain Section's James B. Warner Scholarship recipient. For a young professional seeking higher education in the water-related field; awarded for doctoral work at Colorado School of Mines in post-fire hydrologic response research.

2020-2021 Water Environment Federation's Rocky Mountain Water Environment Association Tony Campman Educational Grant recipient. For a student of a 4-year Colorado, Wyoming, or New Mexico university or college or a resident of the above-mentioned states pursuing study at a 4-year university or college in the water environment profession; awarded for doctoral work at Colorado School of Mines in post-fire hydrologic response research.

2020-2021 Colorado School of Mines Sister-to-Sister Scholarship recipient. For a female at CSM exhibiting exemplary leadership and community service with particular emphasis on girls and women-related issues, personal and professional accomplishments, financial need, past academic performance, special circumstances, and quality of essay submission; awarded for doctoral work at Colorado School of Mines in post-fire hydrologic response research.

2019-2020 Pitkin County Healthy Rivers Grant recipient, dually submitted by Natalie Collar on behalf of Wright Water Engineers, Inc. and the Colorado School of Mines for work on post-fire best management practice research as part of doctoral dissertation research. Proposal presented to grant board of directors and defended to Colorado's Pitkin County Board of County Commissioners after grant board voted to recommend funding. County Commissioners vote in favor of funding was unanimous.

2019-2020 Ben Urbonas CASFM (Colorado Association of Stormwater and Floodplain Managers) Graduate Scholarship recipient. For a student enrolled in a hydrology, hydraulics, watershed management, floodplain management, stormwater management, stormwater quality, meteorology, or climatology graduate program closely related to CASFM's goal of reducing the loss of human life and property from flood and storm damage; awarded for doctoral work at Colorado School of Mines in post-fire hydrologic response research.

2019-2020 WateReuse Martha Hahn Memorial Scholarship recipient. For a student with sincere interest in pursuing/currently employed in a professional career related to water reclamation, water reuse, and/or desalination; awarded for doctoral work at Colorado School of Mines in post-fire hydrologic response research.

2019-2020 Rocky Mountain Water Quality Analysts Association Graduate Scholarship recipient. For a student pursuing an education and career in the water quality field; awarded for doctoral work at Colorado School of Mines in post-fire hydrologic response research.

2019-2020 John Fetcher Upper Yampa Water Conservancy District Scholarship through Colorado Water Center, Colorado State University recipient. For a student in a water-related degree program; awarded for doctoral work at Colorado School of Mines in post-fire hydrologic response research.

2019-2020 Colorado School of Mines Hydrological Science and Engineering Fellow.

PUBLICATIONS

Collar, Natalie M., Brian A. Ebel, Samuel Saxe, Ashley J. Rust, Terri S. Hogue (IN REVIEW). *Implications of fire-induced evapotranspiration shifts for runoff generation and groundwater recharge in the western United States.* **Water Resources Research.**

Collar, Natalie M., Samuel Saxe, Brian A. Ebel, Katherine S. Boden, Ashley J. Rust, Terri S. Hogue (July 2022). *Linking post-fire evapotranspiration shifts to streamflow magnitude and timing in the western United States.* **Journal of Hydrology**, Volume 612 Part B. https://doi.org/10.1016/j.jhydrol.2022.128242

Collar, Natalie M., Samuel Saxe, Ashley J. Rust, and Terri S. Hogue (December 2021). *A CONUS-scale study of wildfire and evapotranspiration: Spatial and temporal response and controlling factors.* **Journal of Hydrology**, Volume 603 Part D. https://doi.org/10.1016/j.jhydrol.2021.127162

Stillinger, T., D.A. Roberts, N.M. Collar, and J. Dozier (2019). *Cloud masking for Landsat 8 and MODIS terra over snow-covered terrain: Error analysis and spectral similarity between snow and cloud*. **Water Resources Research**, 55. https://doi.org/10.1029/2019WR024932

Wenk, William, Jonathan Jones and Natalie (Collar) Phares (2018). *Opening the LID: 20 years of integrating function and aesthetics at a national stormwater demonstration site in Colorado*. **Landscape Architecture Magazine**.

Jones, Jonathan, Natalie (Collar) Phares, William Wenk, Jorge Figueroa, Melissa Figurski, and Emily Barnes (2018). *20 year engineering assessment of LID facility in Boulder, Colorado*. **Stormwater Magazine**. January/February.

(Collar) Phares, Natalie, Francesca de Leon, Steven Johnson, and Jacob Marcon (June 2015). *Addressing sedimentation of Ecuador's Rio Chone Estuary: A watershed perspective*. University of California, Santa Barbara. **Master's Thesis**.

(Collar) Phares, Natalie and Peter Meisen (April 2011)*. Impacts of climate change on California's water supply*. Global Energy Network Institute. **GENI.org**.

TEACHING AND PRESENTATION ACTIVITIES

Identifying post-fire debris flow hazards in a pre-fire context for the state of Colorado (Presenter, Co-author). Oral presentation at the Geological Society of America's 2022 Annual Meeting (Denver, CO), October 9-12, 2022. Session: *Advances in the Science of Wildfire-related Earth-surface Processes.*

Topical session convener/session chair, Geological Society of America 2022 Annual Meeting (Denver, CO), October 9-12, 2022. Session: *Advances in the science of wildfire-related earth-surface processes.* Co-conveners: James J. Guilinger, Francis K. Rengers, Luke A. McGuire, Ann M. Youberg.

Challenges of and strategies for quantifying the effect of land disturbance on hydrologic fluxes in the intermountain West (Presenter). Oral presentation at AGU Chapman 2022 special topics conference on Solving Water Availability Challenges through an Interdisciplinary Framework (Golden, CO), September 12-16, 2022.

Challenges of and strategies for quantifying the effect of land disturbance on hydrologic fluxes in the intermountain West (Presenter). Oral presentation at annual CASFM conference (Steamboat, CO), September 13-16, 2022.

Characterizing hydrologic response and recovery patterns of disturbed ecosystems from the burn scar to continental scale (Presenter). 3-hour oral doctoral dissertation defense presentation to Ph.D. committee and public at the Colorado School of Mines campus on April 6, 2022. Unanimous passing committee votes.

Linking fire-induced evapotranspiration shifts to streamflow signals in the western United States (Presenter). Presentation at the AGU 2021 annual conference of methodology and preliminary findings of PhD dissertation research.

Industry expert for Red Rocks City College (Denver, CO) class *Engineering Design 140,* fall semester 2021. Provided external guidance to a team of students on their semester-long Capstone project related to mitigation of wild-fire induced reservoir sedimentation. Class instructor: Jeremy Beard, P.E.

Post-fire hydrologic hazards and mitigation strategies for communities in Colorado (co-presenter). Webinar prepared with Wright Water Engineers, Inc. for the Colorado Intergovernmental Risk Sharing Agency (CIRSA) (April 2, 2021).

Investigation of post-fire evapotranspiration rate changes and recovery using remotely-sensed SSEBop data at the CONUS scale (Presenter). Presentation at the AGU 2020 annual conference of methodology and preliminary findings of PhD dissertation research. Presentation won the Remote Sensing Technical Committee Award for *Best Student Presentation*.

Proactive planning for post-fire hazards in Pitkin County, Colorado (Presenter). Presentation at CASFM 2020 West Slope Conference Lunch-n-Learn seminar series summarizing WWE's work on pre-event post-fire hydrological modeling of seven study basins in Pitkin County using CUHP and HEC-HMS with a focus on bulked flows and volumes. Work performed for Pitkin County's Planning and Development department.

Proactive planning for post-fire hazards in Pitkin County, Colorado (Co-author on material presented at November 2019 annual International Erosion Control Association [IECA] conference). Presentation, given by WWE's Dr. Andrew Earles and Haley Rogers and Pitkin County's Catherine Berg Christoff, provided a summary of WWE's work on pre-event post-fire hydrological modeling of seven study basins in Pitkin County using CUHP and HEC-HMS with a focus on bulked flows and volumes. Work performed for Pitkin County's Planning and Development department.

Natural rivers, urban streams, and working waterways – using context to inform restoration (Technical presentation, November 2017 at annual IECA conference). Co-presented with WWE's Dr. Andrew Earles

about the need to consider stream context when designing and planning stream corridor restoration efforts and stream management objectives.

Considerations for evaluations of relatively permanent waters (Poster session at annual USEPA Region 8 Wetlands conference, October 2017). Co-hosted a poster with WWE's Noah Greenberg during the annual USEPA Region 8 wetlands conference in Boulder, Colorado, on WWE's experience evaluating connectivity between a wetland or other water feature and the nearest downstream traditional navigable water (Scalia waters) and how this evaluation interplays with the Trump administration's February 2017 E.O. 13778.

Floodplain 101, Annual Colorado Association of State Floodplain Managers Conference (CASFM) (Class instructor, September 2017). Taught a class on engineering components (Units 3 and 4) of the National Flood Insurance Program's Certified Floodplain Manager program at the CASFM 2017 annual conference in Breckenridge, Colorado.

20 year engineering assessment of LID facility in Boulder, Colorado (Technical presentation, September 2017 at annual CASFM conference). Co-presented with WWE's Jonathan Jones and Wenk Associates' William Wenk on engineering components and lessons learned from a 20-year old stormwater management low-impact development retrofit at a commercial site in Boulder, Colorado. Presentation at the CASFM 2017 annual conference in Breckenridge, Colorado.

Clean Water Act Section 404, WWE Attorney Water Field Seminar (Class instructor, June 2017). Taught a class on CWA 404 wetland delineation and permitting considerations during WWE's 2017 attorney water field seminar in Golden, Colorado.

ADDITIONAL QUALIFICATIONS

Mile High Flood District's *Stream Academy* graduate, 2017/2018. 72-hour class taught by David Rosgen, PhD, Ben Urbonas, PhD, Holly Piza, P.E.(MHFD), Barbara Chongtoua, P.E. (MHFD), Shea Thomas, P.E. (MHFD), Will Harman, P.G. (Stream Mechanics), Julia McCarthy (USEPA), Aaron Eilers (USACE), Andrew Earles, P.E., PhD (WWE), Jim Wulliman, P.E. (Muller Engineering), and others.

Haley & Aldrich, Inc. 8-hour Certified Professional in Erosion and Sediment Control™/Certified Erosion, Sediment, & Stormwater Inspectors (CPESC/CESSWI) Course.

Avalanche Hazard Management Training (January 2018) 32-hour. American Institute for Avalanche Research and Education.

PADI Open Water Diver

AIARE Avalanche Level 1

American Association of Snowboard Instructors (AASI) Level 1

RELEVANT COURSEWORK

Statistics
Advanced Statistics
Remote Sensing
Analytical Hydrology
Snow Hydrology
Fluid Mechanics
Fate and Transport of Pollutants
River Restoration
Large River Systems
Watershed Analysis

Aquatic Ecosystems
Earth Systems Science
Groundwater Engineering
Environmental Modeling
Biological Waste Treatment
Engineering Statics
Engineering Dynamics
Physics
Calculus
Aqueous Chemistry
Organic Chemistry
General Chemistry
Biogeochemistry
Vertebrate Evolutionary Morphology
Invertebrate Zoology
Neural Biology
Evolutionary Biology
Plant Biology
Cellular Biology
Cellular Physiology
Eukaryotic Genetics
Prokaryotic Genetics
Population Genetics
Macroevolution

RELEVANT VOLUNTEER ACTIVITIES

STEMBlazers volunteer, co-led a 4-hour walking tour of the South Platte River through Denver's Carpio Sanguinette Park with local high school women interested in STEM. Conducted water quality testing and discussed general aspects of water resources science and engineering in urban waterways. Event facilitated by Wendy Merchant of STEMBlazers (April 30, 2022).

Committee member, EWRI Hydraulics and Waterways Council, River Restoration Committee. The EWRI committee meets biweekly to discuss stream functional assessment tools currently in use in the United States. Committee leader: Professor John Schwarz, University of Tennessee Knoxville, (January 2022, ongoing).

Judge, Red Rocks Community College (Lakewood, CO) and Front Range Community College (Westminster, CO) Engineering Design Competition (May 2021).

PROFESSIONAL & HONORARY SOCIETIES

Liaison, American Council of Engineering Companies of Colorado (ACEC)
Member, Association of State Floodplain Managers
Member, American Institute of Hydrology
Member, American Geophysical Union (AGU)
Member, American Water Resources Association (AWRA)
Member, American Water Works Association (AWWA)
Member, Association of Environmental Professionals (AEP)
Member, Groundwater Resources Association (GRA)
Member, Rocky Mountain Water Quality Analysts Association
Member, Water Environment Federation (WEF)
Member, Women in Science and Engineering (WiSE)

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