

2020 CUAHSI Board of Director Candidates



Auroop Ganguly

Bio-Sketch: Auroop Ratan Ganguly is a Professor of Civil and Environmental Engineering and an Affiliate Professor of Computer Science as well as Public Policy and Urban Affairs and Global Resilience Institute at Northeastern University in Boston, USA, where he directs their Sustainability and Data Sciences Laboratory. He is a co-founder and the chief scientific adviser at the Boston-based climate analytics startup risQ, and NSF-funded startup which is now embedded within the Intercontinental Exchange. Ganguly is a Fellow of the American Society of Civil Engineers (ASCE) and a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE). He has prior experience at Oracle Corporation, USA, and the US DOE's Oak Ridge National Laboratory. His research areas include water sustainability, climate risks, infrastructural resilience, nonlinear dynamics and machine learning. He has published in journals such as Nature, PNAS and Nature Climate Change, disciplinary papers in hydrology, climate, transportation, data sciences, nonlinear dynamics and operational research, and won best paper awards at highly selective Artificial Intelligence (AI) and Machine Learning conferences, and authored books titled Critical Infrastructures Resilience and Knowledge Discovery from Sensor Data. His work has been highlighted in Nature, Nature Climate Change, National Science Foundation news, and other scientific venues, while he has been quoted or cited by the national and global media, as well as in United Nations reports such as those by the Intergovernmental Panel on Climate Change (IPCC) and United Nations Environment Programme (UNEP), besides US national reports such as the National Climate Assessments. He was the lead author of the AI section of sustained US national scale climate assessment report which later evolved into a translational climate adaptation network. His former students and postdocs include a CEO of a startup, scientists at NASA and DOE Labs, professors at universities, as well as in the private sector in risk analytics and machine learning. Ganguly has a PhD from the Massachusetts Institute of Technology, USA, in surface hydrology, and MS from the University of Toledo in OH, USA, and a B.Tech. (Hons.) from the Indian Institute of Technology, Kharagpur. He is currently on the editorial board of PLOS ONE and Nature's Scientific Reports, besides being the specialty chief editor of the Water and Built Environment section of the Frontiers in Water journal. He has been an associate editor for the Water Resources Research journal published by the American Geophysical Union (AGU) and the ASCE Journal of Computing in Civil Engineering and has been an elected member of the the Artificial Intelligence committee of the American Meteorological Society (AMS).

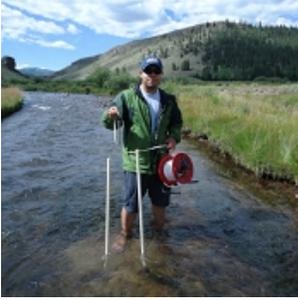
Vision: Hydrology, which over the last several decades has transformed to a science-driven discipline, is poised to move to the next stage with new advances in data-intensive sciences as well as integration of physics and biogeochemistry along with earth sciences and complex systems science with machine learning, nonlinear dynamics and stakeholder-driven participatory models. Dr. Ganguly's vision would be to position CUAHSI to further enable and enhance this transition, which in turn can help ensure that the hydrologic sciences remain relevant to societal challenges of this century and beyond. One of his focus areas has been in integrating physics and data science methods in the context of hydrology, hydrometeorology and hydroclimate science. His PhD work in quantitative precipitation forecasting attempted to bring together numerical weather prediction model simulations and weather radar observations through a combination of higher-resolution physics with statistical and neural network methods. He led a special edition of the journal *Nonlinear Processes in Geophysics* focused on physics-guided data mining for climate and weather extremes, where our editorial perspective article and other contributions illustrated the concepts. Eventually, Ganguly worked with computer scientists to further develop the concept of theory- or science- guided machine learning, concepts which over time are becoming mainstream not just in earth system science and computer science but also in several other areas. The science of hydrology, as well as the connections thereof with both earth systems sciences and water resources engineering, stands to benefit significantly in the coming decades through such developments.

Priorities: If given the privilege to serve on the CUAHSI Board of Directors, Dr. Ganguly's priorities for ensuring the success of the organization will be:

(a) To promote the long-term benefits of integrating hydrological sciences, including physics, chemistry, biology and biogeochemistry, with data-driven methods that can leverage novel methods in machine learning and nonlinear dynamics based on observations such as from remote and in-situ sensors along with archived computer-based simulations. CUAHSI can play an important and relatively unique role in data gathering, archiving and management, besides engaging stakeholders in the process.

(b) To develop collaboratories which can bring together data-driven and integrated physics-data methods, enhanced data and model products, as well as benchmarks which can lay the foundation for collaboration and productive competition among scientists and engineers in both hydrology or earth systems sciences and engineering along with computer and data scientists and engineers, in a way that brings together stakeholders and partners to enable co-production of knowledge.

(c) To improve diversity, equity and inclusiveness, by encouraging CUAHSI to embed social scientists, private and public sector partners, policy experts and federal/state/local government or agency stakeholders, citizen scientists through crowdsourcing, besides promoting the role of CAHSI role to a diverse community of national and international partners interested in water. Broadening water and environmental security and sustainability through wider participation in CUAHSI of national and international stakeholders and citizens will ensure societal benefits while simultaneously enhancing global cooperation and lessons learned leading to significant benefits for hydrologic sciences and water resources engineering.



Jesus Gomez-Velez

Jesus Gomez-Velez is an assistant professor in the Department of Civil and Environmental Engineering. His research combines numerical and analytical modeling, data mining and assimilation, and field and laboratory observations to gain a deeper understanding of how water, solutes, and energy move through landscapes and river systems and the implications of these transport processes for humans and ecosystems. Currently, most of his work focuses on the interactions between surface water and groundwater at multiple spatial and temporal scales, ranging from small river bedforms and reaches to continents.

Jesus holds a Ph.D. in Hydrology from New Mexico Tech. He also received a B.S. in Civil Engineering from the National University of Colombia at Medellin and M.S. degrees in Applied Mathematics and Hydrology from New Mexico Tech. Before joining Vanderbilt University, he was an assistant professor of hydrology at New Mexico Tech (2015-2018) and a National Research Program postdoctoral fellow at the U.S. Geological Survey (2013-2015).

Jesus is an active member of the Hydrologic Sciences community. He serves on the board of directors for the Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) and the Standing Committee on Informatics. Jesus also plays an active role in the American Geophysical Union (AGU) and the Geological Society of America (GSA) and has organized several sessions on Regional Groundwater Flow and Groundwater-Surface Water Interactions. He is a member of the National Groundwater Association (NGWA), the American Water Resources Association (AWRA), and the Society for Industrial and Applied Mathematics (SIAM).



Safeeq Khan

Dr. Safeeq Khan is a Cooperative Extension specialist in water and watershed sciences at University of California Division of Agriculture and Natural Resources (UC ANR) and an adjunct professor in the Department of Civil & Environmental Engineering at University of California, Merced. His research broadly focuses on understanding interactions between climate, regolith, and terrestrial ecosystem in the Earth's critical zone. Dr. Khan's research relies heavily on field experiments and data-driven numerical models as research tools to inform land and water management. He works with state and federal land managers, water agencies, non-governmental organizations, and other stakeholders on co-producing climate adaptation research and management solutions. Dr. Khan co-chairs the UC ANR's statewide water program team focused on delivering practical scientific solutions in California and providing researchers with opportunities to network, share, and learn. He is currently an associate editor for *Hydrological Processes* and a guest editor for the *Journal of Atmosphere*. Dr. Khan received 2016 Editors' citation for excellence in refereeing award for the Eos Transactions, American Geophysical Union.

Dr. Khan feels honored that CUAHSI has nominated him as a candidate to run in the 2020 CUAHSI Board of Directors Election. He has been actively promoting CUAHSI's mission through various activities, including UC Merced's representative to CUAHSI, disseminating CUAHSI-HIS/HydroShare for water decision making at various user forums, and through participating in CUAHSI workshops/meetings to envision the future of water science. If elected, his priorities for serving the CUAHSI member institutions and the broader water science community will be:

- a) To increase shared knowledge, infrastructure, and data collaborations to tackle most pressing water challenges using novel methods and technologies like AI, IoT, and big data.
- b) To further foster and facilitate strategic outreach of actionable hydrologic science research and data services for decision-making. CUAHSI has an important role to play in translating water science research and data into action through strong and sustained water science extension and education across public, private, and nonprofit sectors.
- c) To promote and foster a diverse, equitable, and inclusive culture within CUAHSI and CUAHSI-affiliated hydrologic communities.



Sarah Ledford

I am an assistant professor in the Department of Geosciences at Georgia State University, in downtown Atlanta, GA. My research focuses on urban hydrology and water chemistry, answering questions about water movement in cities and subsequent impacts on the chemistry, especially nutrients. Currently, this involves projects investigating the potential for mycofiltration to help with surface water *E. coli* contamination; the impact of urban beaver dams on hydrologic retention and nutrient cycling; drivers and sources of urban baseflow; and the relationship between urban land use and baseflow and storm water quality in DeKalb County, an area with major sewer system failures. My work is supported by funding from the National Science Foundation and the United States Geological Survey. GSU is a minority-serving institution, graduating students with a B.S. and M.S., so my work also focuses on removing barriers, addressing structural racism, and reducing harm for minoritized groups in geosciences. Prior to joining GSU, I completed a post-doctoral fellowship at Temple University investigating the impacts of wastewater treatment plant discharge on stream metabolism and nutrient cycling in suburban streams and a Ph.D. at Syracuse University investigating the role of surface water-groundwater interactions on nutrients and road salt in a suburban stream.

I am especially interested in helping CUAHSI meet its mission to promote education in water science at all education levels, but especially working to expand opportunities for undergraduate and M.S. students. My students are strong researchers, many of whom may not stay in academia, and I want to join the board of directors to make sure we are supporting those students. In addition, I want to help CUAHSI make action plans on how it can address equity and justice in the hydrological sciences. I especially want to contribute to CUAHSI's strategic Goal 2, expanding the outreach and education opportunities to be accessible to all interested in hydrology. CUAHSI has been a wonderful networking tool for me, helping to expose me to the wide-range of hydrologic research being done and to connect me to mentors to help me with career, along with providing a data repository for open sharing of data. I feel like my perspective and background will bring a unique view to the CUAHSI board of directors, helping to promote equity and justice and ensure CUAHSI's hard work is reaching all hydrologic scientists.

You can find out more about me, my research, and my students on my website:
<https://sarahlledford.weebly.com/>



Ben Livneh

Assistant Professor, Department of Civil, Environmental, and Architectural Engineering

Fellow, Cooperative Institute for Research in Environmental Sciences

University of Colorado Boulder

<https://ciresgroups.colorado.edu/livneh/>

Dr. Ben Livneh is an Assistant Professor in the department of Civil, Environmental, and Architectural Engineering (CEAE) and a Fellow of the Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado Boulder. He is a physical hydrologist with primary research interests in improving understanding of drought, quantifying climate change impacts on hydrology, as well as developing community tools and hydrologic datasets. He is a recipient of the NASA New Investigator Award, the Oak Ridge Association of Universities Ralph E. Power Junior Faculty Enhancement Award, and the CEAE Young Researcher Award. Dr. Livneh serves on the editorial board of the Nature journal *Scientific Data*, as an associate editor at the AMS *Journal of Hydrometeorology*, a guest associate editor and lead-organizer of a special issue at the AGU journal *Earth's Future*, and a former associate editor at the *Journal of the American Water Resources Association*. He currently leads the NOAA-funded CMIP6 Task Force and serves on the AGU Ecohydrology technical committee. Dr. Livneh teaches classes in hydrology and hydrologic-modeling, and has a long track record of mentoring younger colleagues including those from under-represented minorities.

Dr. Livneh seeks to join the CUASHI Board of Directors to support the CUASHI mission of advancing water science in the contexts of interdisciplinary research, infrastructure, and education. He has published more than 50 manuscripts on water science, including several in high profile journals like *Science* and *Nature Climate Change*. His passion for interdisciplinary research was demonstrated in a paper he coauthored titled "Overcoming Early Career Barriers to Interdisciplinary Climate Change Research" which appeared in the *Wiley Interdisciplinary Reviews Climate Change* journal in 2018. He served as a faculty advisor at the CUASHI Summer Institute, which led to his involvement with CUASHI and becoming a representative for the University of Colorado.

Dr. Livneh seeks to help make a difference by contributing to the CUASHI Board of Directors, to exchange ideas with other board members and with the larger CUASHI community to help lead the direction of the field of hydrology in the United States. Overall, he is excited at the prospect of providing leadership to help align CUASHI with innovative scientific, professional, and educational ideas.



Tom Meixner

Tom Meixner grew up in Maryland playing in streams and digging in the garden. He has matured to the point where he now gets paid to occasionally play in streams and still gardens on his own time. Tom got a BS in Soils and a BA in the History of Science at the University of Maryland. He then matriculated at the University of Arizona as a PhD student in hydrology and Water Resources. He received his PhD in 1999 with work focused on Alpine Biogeochemistry. He then took a job as an Assistant Professor at the University of California Riverside in the Department of Environmental Sciences. After 6 years there transforming himself to a biogeochemical modeler working on alpine and semi-arid systems he was hired at the University of Arizona as an associate professor in Hydrology and Water Resources. He continues to focus his research on the dynamic links between hydrologic transport and biogeochemistry.

Expertise: Watershed hydrology and biogeochemistry hydrologic controls on water quality, GIS, remote sensing, hydrochemical modeling, atmospheric chemistry, aqueous geochemistry, water quality modeling, sensitivity analysis, automatic parameter estimation, semi-arid hydrology, riparian sustainability, climate change impacts on water resources, and multi-criteria analysis.



Margaret Zimmer

I am an Assistant Professor and Watershed Hydrologist in the Department of Earth and Planetary Sciences at the University of California, Santa Cruz (Go Banana Slugs!). My research focuses on streamflow generation processes, surface water-groundwater interactions, and coastal hydro-biogeochemistry and I employ a combination of empirical data collection, analysis, and modelling. Current funding sources for this research include NSF, DOE, California Institute for Water Resources, and SeaGrant. I received my PhD in Earth and Ocean Sciences from Duke University (Go Blue Devils!), MS in Earth Sciences at Syracuse University (Go Orange!), and BA in Environmental Studies at Oberlin College (Go Yeomen and Yeowomen!).

The CUAHSI Strategic Plan is ambitious, visionary, and goal-oriented, and it outlines steps necessary to advance the hydrologic sciences through education and community-building activities, data services, and embracing interdisciplinary and collaborative efforts. My goal as a CUAHSI Board member is to advance CUAHSI's agenda and leverage my own experiences and position to: (1) expand CUAHSI membership to be more inclusive of teaching-focused colleges and universities, minority-serving institutions, and institutions with smaller hydrologic science communities, (2) build the connections between data services and educational resources to help prepare students for 21st century careers in the hydrologic sciences, and (3) help communicate the value of CUAHSI data services to other aquatic communities not traditionally represented in the hydrologic sciences, including ecology and the social sciences.

During my graduate experiences, I benefited from CUAHSI Biennial Meetings, technical workshops, social mixers at conferences, and webinars. Thus, I petitioned for UC Santa Cruz to become a CUAHSI member in 2020. UC Santa Cruz is a Hispanic-Serving Institution with a small, but mighty freshwater community. I believe CUAHSI membership will open new doors for students to enhance their graduate experiences by providing them with opportunities to take more water courses outside their institution and to connect to the larger community of hydrologists, including graduate students at other institutions. I seek to extend such opportunities to more graduate students through petitioning for tiered membership options or other financial mechanisms that remove barriers for institution membership.

It would truly be an honor to serve as a Board member and continue CUAHSI's advancements in the hydrologic sciences and educational and community-building activities. Thank you!