Dear Friends,

I hope you will take a few minutes to look through this report, where we’ve tried to highlight some of CUAHSI’s accomplishments for 2019. We believe we are creating an organization that is both serving and helping lead the water-science community. Among our priorities for 2019 was increasing awareness of our services within the science community.

We recently completed a Diversity, Equity, and Inclusion (DEI) Strategic plan. The plan was developed by an ad hoc committee of the Board of Directors. Contributors included Board members Jeanne vanBriesen (chair), Alejandro Flores, Michael Gossett, Holly Michael, and Gretchen Miller; at-large members Sali Dymond (Assistant Professor, University of Minnesota Duluth), Teamrat Ghezzehei (Associate Professor, University of California, Merced), Kaylyn Goodman (Post-Doctoral Fellow, West Virginia University), Julia Guimond (Graduate Student, University of Delaware), Kevin Roche (Post-Doctoral Fellow, University of Notre Dame), Shandin Pete (Instructor, Salish Kootenai College), Marcelo Somos-Valenzuela (Assistant Professor, University of La Frontera, Chile), and Liz Tran (former CUAHSI staff).

CUAHSI is committed to ensuring that diversity, equity and inclusion are core values reflected in our internal culture and practices. Our vision is that CUAHSI’s commitment to DEI will strengthen interdisciplinary collaboration among water scientists by promoting the acceptance of diverse ideas and perspectives in the hydrologic sciences. The strategic plan seeks to align CUAHSI’s DEI strategy with our overall strategic planning process and to coordinate DEI analysis and actions throughout CUAHSI programming.

You can see the draft strategic plan at www.cuahsi.org/library/strategic-plans/. We plan to finalize this plan in early 2020, followed by the development of an implementation plan. We welcome your input on the strategic plan, as well as your thoughts on an implementation plan. Please send your comments to DEI@cuahsi.org.

This report describes some of our 2019 activities and accomplishments, but we already are planning for 2020. We hope you will attend the CUAHSI Town Hall at the 2019 AGU Fall Meeting. Our Town Hall is on Friday December 13, 12:30 – 1:30 p.m. We also encourage you to be on the lookout for announcements about the 2020 CUAHSI Biennial Colloquium. We already have confirmed an exciting set of sessions and keynote speakers, including the first Florence Bascom lecture recognizing the accomplishments of women hydrologists. We will offer at least eight training classes in 2020, and the CUAHSI Virtual University will offer a full slate of opportunities for this unique learning experience.

Let us hear from you on how we are doing.

All the best for a rewarding 2020.

Jerad Bales
President and Executive Director
ABOUT CUAHSI

The Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) is a non-profit organization that supports the advancement of interdisciplinary water science. CUAHSI fosters a diverse and dynamic water science community enabled by shared scientific infrastructure that facilitates the development of an integrated understanding of the interactions among water, earth, ecosystems, and society. CUAHSI’s programs and resources are available to everyone and have been used by students, educators, citizen scientists, outreach coordinators, environmental and watershed organizations, corporate entities, and more.

Although CUAHSI is a membership organization and attempts to be responsive to member needs, all who are involved in any aspect of water science, water-resources management or water-resources protection and enhancement are part of the CUAHSI community. CUAHSI’s programs and services are available to everyone to use - many free of charge - regardless of membership status. YOU are an integral part of CUAHSI and we hope you will take advantage of our many diverse programs and services.

In 2019...

10 TRAINING WORKSHOPS OFFERED
23 FELLOWSHIPS AND GRANTS AWARDED
2,105 DATASETS ADDED TO HYDROSHARE
422 PEOPLE PARTICIPATED IN A CUAHSI WORKSHOP, MEETING, OR EVENT
82 DATA SETS FORMALLY PUBLISHED WITH A DOI

CUAHSI collaborates with and provides expertise to partner organizations through letters of support, data management tools and services, community outreach, and much more. With a focus on interdisciplinary research and collaboration among universities and organizations, CUAHSI helps expand existing community projects and works with the community to support new endeavors.

CUAHSI is a formal collaborator on several projects, through which we support the community, advance water science, and enable new partnerships.
Internet of Water (IoW)

The Internet of Water (IoW) is about connecting water data to enhance data-driven decision-making for water sustainability. We envision a dynamic, inter-connected network in which water data are readily discoverable, easily accessible, of known quality, and used for data-driven decisions to ensure water sustainability. This grant will support the implementation of this vision to achieve the following outcomes: (1) Public data are more discoverable and accessible, (2) IoW hubs are connected in a community to realize the value of water data, (3) water data are put to use for decision-making and the value of those data are communicated, and (4) data producers, hubs, and users have a sustainable IoW for discovering, accessing, and using data for decision-making.

Collaborators: Duke University and Western States Water Council

HydroFrame

This project will utilize advances in computer science to transform CONUS-scale hydrologic simulation and data-driven discovery in the Hydrologic Sciences and beyond. Because decadal, national scale simulations are an unprecedented resource for both the hydrologic community and beyond the planned platform will provide novel approaches for users to interact with massive datasets and stakeholder outreach will propel the both the understanding of the hydrologic cycle. Project participants will engage with users from hydrologic modelers to scientists and will develop K-12 educational modules on different hydrologic systems.

Collaborators: Colorado School of Mines, University of Arizona, Boise State University, Utah State University, NCAAR, San Diego State University, and University of Colorado.

CZO - Hydroshare Integration

CUAHSI is assisting the Critical Zone Observatories (CZO) data managers, and National Office to migrate both the CZO centralized metadata catalog and most of the CZO data to HydroShare and is developing a modern and flexible website for hosting, sharing, and discovering science data. CUAHSI is building a CZO-branded search and discovery tool functioning within HydroShare and an entry and exiting interface to facilitate easy transfer of data and metadata to HydroShare now and in the future.

Collaborators: CZO projects and CZO National Office

Data Science & Analytics for Water

The Data Science for Analytics for Water (DSAW) project aims to develop (1) an advanced object data model that maps common water-related data types to performant data structures within the object-oriented Python language and analytical environment, and (2) new packages for the Python programming language that integrate these performant data structures with the powerful data science capabilities available in Python, as well as advanced data access, collaboration, and data archival capabilities of HydroShare.

Collaborators: Utah State University, U.S. Geological Survey, University of Louisiana Lafayette

Flood Apex Post-Doc

CUAHSI is partnering with the Department of Homeland Security to support a post-doc to advance flood science. The post-doc supports the CUAHSI summer Institute and DHS flood Apex activities in addition to conducting research on the post-doc’s area of interest in flood hydrology. The first post-doc successfully completed her activities in 2019, working with advisors from Columbia University and the University of Alabama, and we anticipate hiring a new person in late 2019 or early 2020.

Collaborator: Department of Homeland Security

HydroShare2 Project

This project will extend the capabilities of the HydroShare cyberinfrastructure (CI) to enhance support for scientific methods enabling systematic data and model analysis, hypothesis testing and collaborative research. HydroShare is being integrated with 3rd party consumer cloud storage systems and we have established an “App Nursery” to better engage an already growing community of hydrologic web application developers. Collectively, this functionality is providing a CI framework for transforming the practice of hydrologic science to leverage advances in data science and computation and accelerate discovery.

Collaborators: Utah State University, University of Virginia, University of Illinois, University of Washington, Tufts University, University of North Carolina, Brigham Young University

International Research Experience Summer Institute in El Salvador

This three-year project facilitates collaboration between U.S. students, scientists, and professionals and universities and governmental agencies in El Salvador to explore agricultural community adaptations to extreme hydrometeorological events in El Salvador’s “Dry Corridor.” The project will send 10 U.S. graduate students to communities in El Salvador to conduct hydrological and sociocultural research over an eight-week period in three years. Modeled after CUAHSI’s summer Institute, the goal of this project is to create opportunities where students from many universities can exchange ideas and advance concepts with project partners that help inform climate change adaptation interventions and research for subsequent cohorts.

Collaborators: Michigan Technological University, Lutheran World Relief Services, Universidad de El Salvador - Facultad Multidisciplinaria Paracentral

Facilitated Activities

During 2019, CUAHSI also facilitated a number of workshops that were separate from project-related workshops. Among these were:

- A workshop to enable increased data reuse, with Tufts University.
- A multi-agency, multi-partner workshop on integrated Hydro-Terrestrial Modeling, with NSF.
- A workshop to envision a terrestrial modeling system to encode and formalize the knowledge from WSC/INFWS projects, with Utah State University.
- A workshop on a Systems Approach to Managing the Urban Infrastructure Grid, with University of Cincinnati.

CUAHSI also supported the U.S. State Department’s activities in the Mekong River Basin through participation in collaborative meetings with the Mekong River Commission (MRC) in Laos, Vietnam, and in Washington, D.C. In 2019, the U.S. State Department established a data-management system (MekongWater.org) for the MRC that is essentially an instance of HydroShare. CUAHSI is providing training to basin Nations in late 2019.
CUAHSI HELPS WITH THE ENTIRE DATA LIFE CYCLE

CUAHSI can help manage all aspects of the data management life cycle, from collecting, storing, and analyzing data, to sharing, publishing, and citing data, thereby enabling reproducibility in the water sciences.

**Discovery & Planning:**
- Search thousands of hydrologic, biogeochemical, and geographic data sets available for immediate download.
- Obtain training on CUAHSI’s data management resources.

**Collection:**
- Add additional field sites to graduate research with CUAHSI fellowship support (see Pathfinder Fellowships on Page 16).
- Learn new data collection techniques or instrumentation with hands-on training and Instrumentation Discovery Travel Grants (see Trainings and Workshops Page 12 and Instrumentation Discovery Travel Grants Page 17).

**Documentation & Processing:**
- Describe data sets using CUAHSI’s standard metadata templates.
- Receive metadata training and guidance from CUAHSI Staff.

**Analysis & Modeling:**
- Collaborate with partners by publicly or privately sharing data and analyses.
- Use Jupyter Notebooks or MATLAB to analyze data stored with CUAHSI.

**Publication:**
- Credit collaborators with shared authorship.
- Obtain a permanent DOI to cite data resources in literature.

**Maintenance & Storage:**
- Increase project sustainability by archiving your data and models with CUAHSI.
- Maintain data sets with long-term infrastructure care provided by CUAHSI.

**Sharing:**
- Share your data publicly so that it is searchable through applications such as Google datasets search and others.
- Promote and disseminate your work through activities like cyberseminars (See Page 15), scientific conferences (See Page 15), and training workshops (See Page 12).
- Develop education and outreach activities with CUAHSI resources to teach your students and community about the impacts of your research.

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VISIT www.cuahsi.data-models or contact help@cuahsi.org to learn more about how CUAHSI’s data tools and resources can be implemented to meet your needs.
CUAHSI’s HydroShare (hydroshare.org) is on the forefront of archiving scientific data and enabling reproducible science. This year, the HydroShare team developed new solutions for managing data, collaborating with colleagues, and accessing computational resources. Early in 2019, the U.S. State Department adopted HydroShare to fulfill its data management and collaboration needs for the Lower Mekong Initiative (lowermekong.org). The adoption of HydroShare at this high level of the U.S. Government is further validation of the value of HydroShare to the global water-resources community.

CUAHSI’s Hydrologic Information System (HIS) (data.cuahsi.org) continues to be a global standard for time-series data discovery, retrieval, and publication. CUAHSI’s HIS provides access to nearly 100 data sources, including over 3.5 million unique time series, from federal agencies, university researchers, and citizen science groups through a single map interface. Six new data sources were made available for public access this year including the National Ecological Observatory Network (NEON) and streamflow data from Andrews Forest made available through the Cloud Observatory. CUAHSI’s HIS provides access to nearly 100 data sources, including over 3.5 million unique time series, from federal agencies, university researchers, and citizen science groups through a single map interface. Six new data sources were made available for public access this year including the National Ecological Observatory Network (NEON) and streamflow data from Andrews Forest made available through the Long-Term Ecological Research Program.

Modeling and Compute Services

A common challenge for researchers is finding the right data for their research and, once found, finding software to process it for meaningful analysis. Software must be accessible and easy to use for researchers, educators, and students to use it, teach it, and share their results with colleagues over the life of their project and beyond. CUAHSI actively develops and maintains web-based software to support research and education around hydrologic modeling applications. The backbone of these services are scalable compute servers hosted at RENCI, Google, and Amazon which are used for executing scientific workflows in the cloud using Jupyter and MATLAB software. Our compute architecture can support 25–50 concurrent users, depending on the service, and all capabilities are provided to the community free of cost. The primary goal of these services is to support community workshops, classroom exercises, and general research around hydrologic data and modeling. All CUAHSI’s compute services are integrated with data repositories to support data collection and analysis, scientific data publication, and research replication.

CUAHSI JupyterHub

The CUAHSI JupyterHub is a web-based software platform that combines interactive notebooks with the HydroShare data repository. This enables users to develop, execute, and share web-based scientific notebooks that span technologies (e.g., Python and R) and code libraries. Recent work has extended this functionality to provide fully customized compute environments for executing scientific analysis to align with reproducible science initiatives. Our services are designed to support (1) computationally intensive research, (2) data intensive research, (3) education and the dissemination of knowledge, and (4) reproducible science. These goals are achieved through the development of data transfer mechanisms that seamlessly move data between HydroShare and the modeling environment. CUAHSI is currently looking for community testers to provide feedback on this work which can be found at jupyter.cuahsi.org.

MATLAB Online

CUAHSI has teamed up with MathWorks to offer a full-featured community modeling platform using MATLAB software. MathWorks develops mathematical computing and system simulation software, MATLAB and Simulink. These tools and their 100 add-ons are used by 5,000 universities worldwide and across industries for a range of applications from climate analysis to medical device development. Together, CUAHSI and MathWorks aim to support practical quantitative thinking and exploration in water science research and education.

CUAHSI MATLAB Online is connected to the HydroShare repository to provide access to data and code, and leverages the MATLAB compute environment for analyzing data and reproducing research findings interactively or programmatically using MATLAB Live Scripts for writing computational code narratives. It provides a convenient and freely accessible mechanism for data discovery, collaboration, and reproducibility. It is relevant to a wide range of water data users, as the methods taught can serve as an ideal platform for teaching water science using real-world data, as well as disseminating published research findings. CUAHSI is actively looking for user testers as well as faculty interested in using this service for undergraduate and/or graduate curriculum. This service can be found at matlab.cuahsi.org.

CONUS Subsetting

Large scale surface water and groundwater models are essential tools for improving our understanding of the dynamic interaction between the water cycle and human activity. Due to the computational-scale of these models, they often require specialized computing hardware and large amounts of domain and forcing data. CUAHSI has collaborated with community researchers to develop a service for extracting continental-scale models that improves the accessibility of domain data to encourage research and intellectual contributions to the physics, configuration, and validation of continental-scale models. We believe that this is essential to improving the usefulness and adoption of large-scale models within the academic community. Lowering the barrier of entry for using and applying these models will effectively engage a wide variety of scientists and a diverse spectrum of expertise. The CONUS subetter can be used with other CUAHSI compute services to run hydrologic model simulations of the National Water Model and ParFlow in the cloud. This service can be found at subset.cuahsi.org.
**CUAHSI offers travel grants to graduate students to help defray the cost of attending a workshop. For more information about student travel grants for workshops and trainings, email Julia Masterman at jmasterman@cuahsi.org.**

The training program is one of CUAHSI’s most popular resources and continues to grow every year. One hundred and eighty-one institution. Along with building new skills, CUAHSI’s training courses that provide interdisciplinary perspectives on specific technologies or topics that may not be available through any one institution. Along with building new skills, CUAHSI’s training program creates opportunities for community collaboration and networking with those who can help to develop a sensor for a particular function.*

“CUAHSI provides continual learning opportunities for researchers and practitioners at every career stage by facilitating programs and services beneficial to students, early career scientists, and advanced career professionals alike.”

**Training Workshops and Short Courses**

One of the best ways to master a new method or instrumentation technique is immersion in the field with experts in the technology. CUAHSI facilitates hands-on training workshops and short courses that provide interdisciplinary perspectives on specific technologies or topics that may not be available through any one institution. Along with building new skills, CUAHSI’s training program creates opportunities for community collaboration and relationship building between participants and instructors from different institutions.

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**2019 Training Activities**

**Snow Measurement Field School**
Matthew Strum, University of Alaska Fairbanks

**Master Class: Advance Techniques in Watershed Science**
Richard Hopper, Tufts University

**Master Class: Food, Energy, and Water Systems in a Global Economy**
Benjamin Ruddell, Northern Arizona University
Megan Konar, University of Illinois at Urbana-Champaign

**Short Course: The Science and Practice of Operational Ensemble Hydrological Prediction**
Andy Wood, NCAR
Martyn Clark, NCAR

**Short Course: Integrated Simulation of Watershed Systems Using ParFlow**
Reed Maxwell, Colorado School of Mines
Laura Condon, University of Arizona
Nick Engdahl, Washington State University

**Training Workshop: The Community WRF-Hydro Modeling System**
David Gochis, NCAR

**Open Source Urban Hydrology Sensor Bootcamp**
Branko Kerkez, University of Michigan

**DIY Water Monitoring, Data Portals, and Watershed Modeling**
Scott Ensign, Stroud Water Research Center
Shannon Hicks, Stroud Water Research Center
David Arscott, Stroud Water Research Center
Chet Udell, Oregon State University

**Advanced Short Course: Integrated Simulation of Watershed Systems Using ParFlow**
Laura Condon, University of Arizona
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**Visit cuahsi.org/education/training/ to learn about CUAHSI’s training offers for 2020!**

\*This was an extremely worthwhile class for me as someone who has not had the opportunity for field-based snow education. It was very meaningful to experience snow with my senses rather than just reading about it in literature, and it will be extremely important as I move forward with my research (passive microwave snow remote sensing).*

– Snow Measurement Field School Participant

\*I found that [...] everyone was able to take something away from it, whether that was some background in DIY sensors, connecting to online portals, tools for field deployment and waterproofing, or networking with those who can help to develop a sensor for a particular function.*

– DIY Water Monitoring Workshop participant

\*It was a great learning experience and all the topics discussed were well explained [...] I was also able to talk with different people about their research work and how they are using smart sensors for urban hydrology.*

– Open Source Urban Hydrology Bootcamp participant

CUAHSI Virtual University

CUAHSI Virtual University is an inter-university online course designed to enhance the depth and breadth of graduate course offerings, increase the uptake of new research, and facilitate collaboration within the water science community. Thirteen universities and 165 students have participated in the program since its founding.

The unique format of the Virtual University enables students to receive course credit through their home university for participating in specialized online hydrology course modules taught by leading faculty at universities across the country.

The next Virtual University will be held in Fall 2020.

**University Faculty:** Consider applying to Teach a Virtual University Module in 2021!

Teaching in the Virtual University not only enables the opportunity to engage with a diverse and motivated group of students, but also allows students at your university to participate and earn course credit through the Virtual University. Students can only participate in the Virtual University if a faculty member at their home institution teaches a module.

**Are you interested in organizing a training?**

CUAHSI provides funds to seed workshop development and assists with organizing, advertising, and executing workshops. We are accepting proposals for trainings that take place in 2021 through August 1, 2020. Contact Julia Masterman at jmasterman@cuahsi.org for more information.

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**Education & Training**
The NWC-SI 2019 themes and theme leaders were:

- **The ‘Scaling of Hydrologic Processes’ theme** led by Fred Ogden of University Corporation for Atmospheric Research (UCAR)/National Water Center, and Hilary McMillan of San Diego State University.

- The ‘Hydroinformatics’ theme, led by David Blodgett of the United States Geological Survey (USGS) and Kyle Mandl of Columbia University. Additional technical support was provided by Nels Frazier of the National Water Center (NWC).

- Additional information, including application details and a technical report that highlights 2019 student projects can be found at cuahsi.org/education/summerinstitute/.

### 2019 CUAHSI HYDROINFORMATICS CONFERENCE

The 2019 CUAHSI Conference on Hydroinformatics gathered 120 individuals on the campus of Brigham Young University for uniquely focused sessions on data science and technology for water resources and hydrology.

The conference featured the following Keynote Speakers:

- Nien Chen, University of Central Florida
- Tyler Erickson, Google Earth Engine and Google Earth Outreach
- Sara Larsen, Western States Water Council Water Data Exchange
- Marshali Parikh, National Science Foundation
- Gene Shiao, Central Utah Water Conservancy District
- Chaopeng Shen, Pennsylvania State University

We would like to recognize and thank the members of our conference program committee for their participation in organizing the conference theme, sessions, and workshops:

- Daniel Arries (Brigham Young University)
- Emilio Mayorga (University of Washington)
- Daniel Ames (Brigham Young University)
- Dwane Young (U.S. Environmental Protection Agency)
- Lauren Patterson (Duke University)
- Jordan Read (U.S. Geological Survey)
- Devane Young (U.S. Environmental Protection Agency)

A big thank you to all who attended, presented, and instructed workshops to make this event a tremendous success! This year’s edition had the most workshops of any CUAHSI Hydroinformatics Conference in addition to a town hall where we learned about community needs for cyberinfrastructure. Hydroinformatics Conference resources are available on HydroShare at https://www.hydroshare.org/group/129.

Participants in our upcoming 2020 Cyberseminars by registering on our website at cuahsi.org/education/cyberseminars.
CUAHSI supports activities to extend your research and develop new products. All programs accept proposals once per year, so be sure to sign up for CUAHSI’s newsletter to hear about deadlines as they approach or visit cuahsi.org/funding-opportunities to learn more.

**Hydroinformatics Innovation Fellowship**

The first ever CUAHSI Hydroinformatics Innovation Fellowships were awarded in late 2018 to support projects that result in products that are useful to the CUAHSI community. Two proposals were chosen for funding from a pool of strong applications:

**Advancing CUAHSI’s Data Management Platform with a Machine Learning and Test-Based Automated Quality Control Web Application**

*Chao Chen*: Boise State University

A web application that provides tools for configuring and running quality control tests on sensor data.

**Improvements to Event-based Analysis of High-Frequency Turbidity and Suspended Sediment Monitoring Data** - *Scott Hamshaw (University of Vermont)*: Leverages open data services and existing cuahsi.org/funding-opportunities to learn more.

**Pathfinder Fellowship**

The Pathfinder Fellowship program supports graduate students in adding a new component – like a comparative field site or interdisciplinary collaboration – to their existing research. It has become a unique and important resource available to students in our community for adding new dimensions to their work that otherwise may not be possible. The career successes of the first several cohorts of Pathfinder Fellows are the true testament to this program. Many Pathfinder Fellows have now progressed to exciting appointments with universities, federal agencies, and more! Applications accepted every Fall.

Ten awards were made this year:

**James Berglund**: Temple University

Rare Earth Elements as Natural Source Mixing Tracers for Karst Springs during Storm Flow

**Charles Scaife**: University of Virginia

Assessing the impacts of drought disturbance on long-term catchment-scale streamflow

**Max Barczok**: Kent State University

Iron-bound phosphorus bioavailability in an arctic ecosystem as function of hydrology and redox regime

**Aaron Potkey**: Rutgers University

Developing a Whole-Plant Hydraulics Model along Soil-Root-Senst-Leaf-Atmosphere Continuum

**Charlotte Haberstroh**: University of South Florida

Effects of monsoonal-driven flood dynamics on (micro)plastics transport in the Mekong river floodplain in Cambodia

**Corrie Nypial**: University of Minnesota

Evaluating effects of stream thermal regime on chironomid longevity and fecundity

**Joseph Wasswa**: Syracuse University

Linking occurrence patterns of chemicals of emerging concerns in the urban streams with hydrologic processes: A comparison between Syracuse and Kampala.

**Kimberley Bitterwolf**: University of California, Santa Cruz

Isotopic Co-variability during Silicate vs. Carbonate Weathering: A Case Study in the Fraser River, Canada

**Eric Barefoot**: Rice University

Experimental investigation of short-duration, high-amplitude hydrologic perturbations, and the impacts on fluvial environments

**Jewell Lund**: University of Utah

A two-pronged field campaign in the Intermountain West to explore Synthetic Aperture Radar (SAR) signals of snowpack ripening and melt-refreeze cycles

**Instrumentation Discovery Travel Grant**

The Instrumentation Discovery Travel Grant program provides funding for scientists to learn the details of hydrologic instrument installation, operation, maintenance, and data processing by visiting experts or scheduling reverse site visits. These grants minimize the financial risk for awardees while enabling them to acquire expert knowledge. Applications are accepted each Spring.

Five awards were made this year:

**Han Tseng**: University of Hawaii

Laser raindrop disdrometer workshop and field installation demonstration

**James Knighton**: Cornell University

Analysis of Soil and Stem Stable Water Isotopes with OA Integrated Cavity Output Spectroscopy

**Matt Trentrman**: University of Notre Dame

Using the Seabird Scientific HydroCycle PO4 sensor to measure diel phosphorus patterns

**Laura Rosales-Lagarde**: Nevada State College

Learning to build instruments to monitor water resources in Nevada

**Emily Santos**: Humboldt State University

Investigation of the Critical Zone: Center for Stable Isotope Biogeochemistry (CSIB) Instrumentation Visit

**Let’s Talk About Water**

CUAHSI awarded six Let’s Talk About Water grants this year to promote water and earth science education. Awardees use film and panel discussions to engage audiences and encourage critical thinking around water issues like climate change and energy production.

**Lauren Lowman**: Wake Forest University

Lost Waterways of Winston-Salem

**Kaitlin Perkins**: University of Montana

Let’s Talk About Water Montana

**Martina Caretta**: West Virginia University

Highlighting women and water in West Virginia during women’s History month

**Duncan Elkins**: University of Georgia

An Evening Exploring the Hidden Rivers of the Southeast

**Rachel Collier**: University of Georgia

Who Owns the Water? A Film Showing

**Michelle Gilmore**: University of California, Merced

Beyond the Bink: A film and discussion about California’s water

**CITATION**

Consortium of Universities for the Advancement of Hydrologic Science, Inc.
CUAHSI’s membership includes over 140 U.S. universities, non-profit organizations, and international affiliates who recognize the need for interdisciplinary collaboration and innovative thinking to advance water science and solve society’s most pressing water issues. Both undergraduate and graduate students, early career faculty members, tenured academic professionals, and other water professionals all find a place within CUAHSI’s diverse community.

Through CUAHSI’s membership, your institution can:

- Support the growing national and international water science community;
- Contribute to innovations in water science and education;
- Designate representatives for your organization to participate in community governance;
- Receive registration discounts on CUAHSI events and workshops. Anyone affiliated with a CUAHSI member organization is eligible for the member discount.

Welcome to the CUAHSI community.

BECOME A CUAHSI MEMBER

Learn more online at www.cuahsi.org/about/membership or contact Amy Lee Brown at abrown@cuahsi.org.

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- Stroud Water Research Center

Ready to Become a CUAHSI Member in 2019?

A special welcome to new CUAHSI Members of 2019:

- Universidad de El Salvador - Facultad Multidisciplinaria Paracental & University of Houston
- University of Maryland - College Park
- University of Massachusetts - Boston
- University of Memphis
- University of Miami
- University of Minnesota
- University of Montana
- University of Nebraska - Lincoln
- University of Nevada - La Vegas
- University of Nevada - Reno
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- University of Notre Dame
- University of Oklahoma
- University of Pennsylvania
- University of Pittsburgh
- University of South Carolina
- University of South Florida
- University of Tennessee
- University of Texas - Arlington
- University of Texas - Austin
- University of Texas - El Paso
- Utah State University
- Vanderbilt University
- Virginia Tech
- Washington State University
- West Virginia University
- Woods Hole Oceanographic Institution
- Yale University

Consortium of Universities for the Advancement of Hydrologic Science, Inc
CUAHSI is governed by a Board of Directors elected by and from CUAHSI member institutions. The Executive Committee consists of the Chair, Immediate Past Chair, Incoming Chair, and two at-large members.

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SAVE THE DATE:
2020 CUAHSI BIENNIAL SCIENCE COLLOQUIUM
Converging Ideas and Expanding Approaches in the Hydrologic Sciences
July 26 – July 29, 2020
National Conservation Training Center
Shepherdstown, West Virginia

CUAHSI’s Biennial Colloquium offers a unique opportunity and a casual environment for participants to discuss ideas, share work, participate in workshops, network with colleagues, and build new relationships. Students are especially encouraged to attend and present posters.

We are pleased to announce the 2020 Biennial keynote speakers:
Heidi Nepf (Massachusetts Institute of Technology)
Fred Phillips (New Mexico Tech)
Nicole Gasparini (Tulane University)

Travel funding is available to graduate students who attend and present posters!

Key Support
The National Science Foundation provides the core funding for CUAHSI services through a cooperative agreement. During the current project year for the two cooperative agreements with NSF, a total of $3.4M was awarded and it is estimated that $3.4M will be spent by December 31, 2019. CUAHSI received additional funding from other sources, which include the National Weather Service for the Summer Institute, the Department of Homeland Security for CUAHSI’s Postdoctoral Researcher, and the Moore Foundation for "Implementing the Internet of Water."

Membership Funds
CUAHSI collects initiation fees and annual dues from members to provide critically needed unrestricted funds. These funds are used for costs that cannot be charged to federal grants, such as the cost of elections, some CUAHSI community events, and maintaining membership rolls. They provide a buffer for cash flow and in case federal funding is interrupted. This buffer has steadily grown since the initiation of annual dues for U.S.-based members in 2012, 2019 expenses are estimated to be $28,000.
Photos provided by: Emily Clark (CUAHSI), Peter Regier (University of New Mexico), McKenzie Skiles (University of Utah), Eric Sproles (Montana State University), Elizabeth Tran (CUAHSI), Joseph Wasswa (Syracuse University), and Briana Whitehead (Montana State University).