2017 UCOWR/NIWR Annual Conference
"Water in a Changing Environment"



June 13-15, 2017
Colorado State University
Lory Student Center
Fort Collins, CO

UCOWR
UNIVERSITIES COUNCIL ON WATER RESOURCES

NIWR
THE NATIONAL INSTITUTES FOR WATER RESOURCES

Welcome from UCOWR President and Conference Chair

Dear Colleague,

We are excited to welcome you to beautiful Ft. Collins, Colorado and the Annual Water Resources Conference of the Universities Council on Water Resources and the National Institutes for Water Resources. During your time in Ft. Collins and on the Colorado State University campus, we hope you engage in some stimulating dialogue while enjoying the surroundings. We have an exciting and informative program planned, with four plenary sessions and 54 concurrent sessions. Tuesday morning's plenary session will feature two renowned experts, Anne Castle and Eric Kuhn, who will discuss connecting science and policy and regional water challenges and successes. The 2017 Warren Hall Medal Award recipients, Dr. John Labadie and Dr. Deborah Swackhamer, will speak Wednesday morning. At Wednesday afternoon's luncheon we ask Dr. William Alley and Rosemarie Allie and John Fleck, the authors of two recently-released water books, to tell us about their experiences writing their books and then what happens after the book is released. On Thursday, we explore the changing nature of water research funding with Peter Colohan, Ted Kowalski, James Jones, and Sally Rockey, representing NOAA, the Walton Family Foundation, NSF, and the Foundation for Food and Agriculture Research, respectively.

As always, beyond the excellent technical program, we will offer plenty of opportunities to network and socialize, including our welcome reception, the annual awards banquet, and Wednesday morning breakfast roundtable discussions. If you are able to stay a bit longer, we have an excellent post-conference field trip on Thursday to bring you closer to the natural environment that Colorado has to offer. We look forward to seeing you June 13-15, 2017 in picturesque Ft. Collins, Colorado!

Doug Parker
UCOWR President



Sharon Megdal
Conference Chair



UCOWR
UNIVERSITIES COUNCIL ON WATER RESOURCES

Universities Council on Water Resources (UCOWR) is an organization of universities, non-academic institutions, and international affiliates leading in water resources education, research, and public service. UCOWR institutional members and delegates are at the forefront of water resources related research and education. In addition to our annual national conference, UCOWR publishes *The Journal of Contemporary Water Research and Education*. For more information, please visit www.ucowr.org.

NIWR
The National Institutes for Water Resources

The National Institutes for Water Resources (NIWR) is comprised of the 54 university-based centers that were established by the Federal Water Resources Research Act. It is charged with arranging for research that addresses water problems or expands understanding of water and water-related phenomena, aiding the entry of new professionals into the water resources fields, helping to train future water scientists and engineers, and transmitting research results to water managers and the public. For more information about NIWR, visit: www.niwr.info.

Special thanks to Southern Illinois University for their ongoing support of UCOWR.

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Special Events

TUESDAY

UCOWR Delegate Business Luncheon (see pg. 6)
11:30 AM - 1:00 PM

Effective Science Communication (see pg. 33)
For students and early career professionals!
12:00 PM - 12:50 PM

Welcome Reception & Poster Session (see pg. 11)
5:30 PM - 7:00 PM

Water Quality Regulation Discussion (see pg. 13)
7:00 PM - 8:00 PM

Graduate Student Happy Hour (see pg. 33)
7:00 PM - 8:30 PM

WEDNESDAY

Breakfast Roundtable Discussions (see pg. 14)
7:30 AM - 8:30 AM

Authors' Plenary Luncheon Session (see pg. 18)
12:00 PM - 1:30 PM

Student Speed Networking Event (see pg. 33)
4:45 PM -5:45 PM

Awards Banquet (see pg. 34)
6:00 PM - 7:30 PM

THURSDAY

Mountain Whitewater Descents Rafting Trip (see pg. 25)
Must be pre-registered.
1:45 PM - 7:00 PM

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Monday, June 12

Early Registration
4:00 pm - 6:00 pm
(Lory Student Center, Level 300, Grand Ballroom Hallway)

Tuesday, June 13

Registration 7:30 am - 3:30 pm *(Grand Ballroom Hallway)*

Breakfast
7:30 am - 8:30 am
(Grand Ballroom B)

Opening Plenary Session
8:30 am - 9:50 am *(Grand Ballroom C)*
Welcome by Conference Chair, Sharon Megdal
Eric Kuhn, General Manager of the Colorado River District
Anne Castle, Senior Fellow, Getches-Wilkinson Center for Natural Resources, Energy, & the Environment, University of Colorado



9:50 am - 10:10 am
(Grand Ballroom B)

Concurrent Technical Sessions
10:00 am - 11:30 am
Unnamed Events: A Look at the 2015-2016 Floods in Louisiana *(Room 324)*
Modeling I *(Room 300)*
Irrigation Aquifer Depletion and Challenges to Sustainability: Opening Session *(Room 312)*
Feasible Alternatives to Permanent Fallowing in the Colorado River Basin *(Room 304/306)*
Drought Early Warning and Drought Monitoring: Planning for Scarcity I *(Room 322)*
Advanced Analytical Technology: Avoiding Water Treatment Problems *(Room 308/310)*

11:30 am - 1:00 pm
UCOWR Delegate Business Luncheon
(Longs Peak Room)
All others - lunch on your own

12:00 pm - 12:50 pm
Effective Science Communication *(Room 306)*
For students and early career professionals! See pg 33.

Concurrent Technical Sessions
1:00 pm - 2:20 pm
Tribal Perspectives on Water Management Topics and Collaborative Engagement Approaches *(Room 324)*
Modeling II *(Room 300)*
Irrigation Aquifer Depletion and Challenges to Sustainability: Groundwater Modeling *(Room 312)*
Colorado's Alternative Water Transfer Mechanisms: Valuation and Problems *(Room 304/306)*
Drought Early Warning and Drought Monitoring: Planning for Scarcity II *(Room 322)*
Water Quality: Nutrients I *(Room 308/310)*



2:20 pm - 2:40 pm
(Grand Ballroom B)

Concurrent Technical Sessions
2:40 pm - 4:00 pm
Human Dimensions of Water Resources Management *(Room 324)*
Modeling III *(Room 300)*
Irrigation Aquifer Depletion and Challenges to Sustainability: Groundwater & Crop Modeling I *(Room 312)*
Water Conservation Strategies and Practices for Agriculture I *(Room 304/306)*
Adaptive Management *(Room 322)*
Water Quality: Nutrients II *(Room 308/310)*



4:00 pm - 4:10 pm
(Grand Ballroom B)

Concurrent Technical Sessions
4:10 pm - 5:10 pm
All Voices Matter: How to Draw Underrepresented Voices into Water Policy Decisions *(Room 324)*
Modeling IV *(Room 300)*
Irrigation Aquifer Depletion and Challenges to Sustainability: Groundwater & Crop Modeling II *(Room 312)*
Water Conservation Strategies and Practices for Agriculture II *(Room 304/306)*
Climate Disturbance Impacts and Extreme Shifts in Hydrology over the Western United States *(Room 322)*
Water Quality: Panel Discussion *(Room 308/310)*

5:30 pm - 7:00 pm
Welcome Reception & Poster Session
(Grand Ballroom B/C)

7:00 pm - 8:00 pm
Water Quality Regulation Discussion
(Room 322) See pg 13.

7:00 pm - 8:30 pm
Graduate Student Happy Hour
(Avogadro's Number) See pg 33.

Wednesday, June 14

Registration 7:30 am - 3:30 pm *(Grand Ballroom Hallway)*

7:30 am - 8:30 am
Breakfast & Roundtable Discussions
(Grand Ballroom B) See pg 14.

Plenary Session: Warren A. Hall Medal Recipients
8:30 am - 9:15 am *(Grand Ballroom C)*
Deborah L. Swackhamer, Professor Emerita, University of Minnesota, Humphrey School of Public Affairs
John W. Labadie, Professor of Civil and Environmental Engineering, Colorado State University



9:15 am - 9:30 am
(Grand Ballroom B)

Concurrent Technical Sessions
9:30 AM - 10:50 AM

Challenges of Interdisciplinary Graduate and Undergraduate Programs in Water Resources *(Room 324)*
Groundwater Management in a Changing Environment *(Room 300)*
Irrigation Aquifer Depletion and Challenges to Sustainability: Innovative Solutions (Practices, Crops) *(Room 312)*
Are Voluntary Conservation Programs Effective? *(Room 304/306)*
Understanding the Transition towards Sustainable Urban Water Systems *(Room 322)*
Quantifying the Water Quality Outcomes of Watershed-scale Conservation Projects I *(Room 308/310)*



10:50 AM - 11:00 AM
(Grand Ballroom B)

Concurrent Technical Sessions
11:00 AM - 12:00 PM

Water Resources Education: Roles of Commercial Projects and Field Stations *(Room 324)*
Coupling Surface and Near Surface Hydrologic Processes in Mountain Front Hydrology *(Room 300)*
Irrigation Aquifer Depletion and Challenges to Sustainability: Innovative Solutions (Irr. Systems) *(Room 312)*
Water Markets *(Room 304/306)*
Stretching Our Water Supplies: Planning and Implementing Reuse I *(Room 322)*
Quantifying the Water Quality Outcomes of Watershed-scale Conservation Projects II *(Room 308/310)*

12:00 PM - 1:30 PM
Authors' Plenary Luncheon Session
(Ballroom D)
Must be pre-registered and bring ticket.
See pg 18.
All others - lunch on your own

Concurrent Technical Sessions
1:30 PM - 2:50 PM

Water Resources Education: Training Tools and Outreach *(Room 324)*
The U.S.-Mexico Transboundary Aquifer Assessment Program: Accomplishments to Date *(Room 300)*
Irrigation Aquifer Depletion and Challenges to Sustainability: Innovative Solutions (Scheduling) *(Room 312)*
Economic Implications of AG and Municipal Water Management in the Southwestern U.S. *(Room 304/306)*
Stretching Our Water Supplies: Planning and Implementing Reuse II *(Room 322)*
Quantifying the Water Quality Outcomes of Watershed-scale Conservation Projects III *(Room 308/310)*



2:50 PM - 3:10 PM
(Grand Ballroom B)

Concurrent Technical Sessions
3:10 PM - 4:30 PM

Integrating Science and Management in a Decision-Making Framework *(Room 324)*
The U.S.-Mexico Transboundary Aquifer Assessment Program: Ongoing Work and Future Directions *(Room 300)*
Irrigation Aquifer Depletion and Challenges to Sustainability: Innovative Solutions (Policies) *(Room 312)*
Arizona Programs and Projects to Address Future Colorado River Shortages *(Room 304/306)*
Aquifer Recharge & Cloud Seeding *(Room 322)*
Quantifying the Water Quality Outcomes of Watershed-scale Conservation Projects IV *(Room 308/310)*

4:45 PM - 5:45 PM
Student Speed Networking Event
(Room 306) See pg 33.

6:00 PM - 7:30 PM
Awards Banquet
(Grand Ballroom C/D)
Must be pre-registered and bring ticket.

Thursday, June 15

Registration 7:30 AM - 11:00 AM *(Grand Ballroom Hallway)*

Breakfast
7:30 AM - 8:30 AM
(Grand Ballroom B)

Plenary Session: Expanding Funding and Partnership Opportunities in a Changing Environment
8:30 AM - 9:50 AM *(Grand Ballroom C)*

Peter Colohan, Director of Service Innovation and Partnership, Office of Water Prediction, NOAA
Ted Kowalski, Senior Program Officer, leading the Walton Family Foundation's Colorado River Initiative
James W. Jones, Program Director, NSF, INFEWS Initiative in the Engineering Directorate (CBET Division)
Sally Rockey, Executive Director of the Foundation for Food and Agriculture



9:50 AM - 10:10 AM
(Grand Ballroom B)

Concurrent Technical Sessions
10:10 AM - 11:50 AM

Students, Fellows, and Feds: Training the Next Generation of Water Resource Professionals *(Room 324)*
Groundwater in the Southwest and its Role and Limitations in Mitigating Climate Change Impacts *(Room 300)*
Advancing AG Water Security and Resilience Under Uncertainty: Roles of Blue, Green, & Grey Water *(Room 312)*
Integrated Forest Planning to Build Fire Resilient Watersheds *(Room 304/306)*
Water Sustainability in the South Platte River Basin *(Room 322)*
Gold King Mine Spill: Impacts of Legacy Mines on Watersheds *(Room 308/310)*

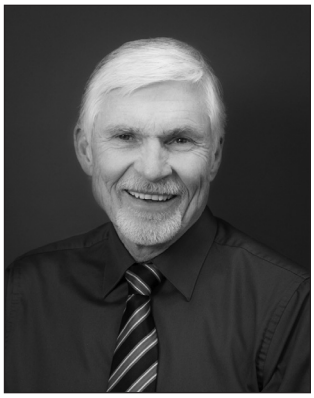
Field Trip
1:45 PM - 7:00 PM
Whitewater Rafting Trip
(Meet in Hilton Hotel Lobby) See pg 25.
Must be pre-registered and bring ticket.

Tuesday, June 13

8:30 am - 9:50 am
Opening Plenary Session
(Grand Ballroom C)

Moderator - Sharon Megdal, University of Arizona Water Resources Research Center

Challenges for the Next Generation of Colorado River Water Managers



Eric Kuhn is the General Manager of the Colorado River District, a position he has held since 1996. He earned his Bachelor's Degree in Engineering from the University of New Mexico and a Master's Degree in Business Administration from Pepperdine University in California. Prior to working for the Colorado River District, he served as an engineer officer aboard nuclear submarines in the U.S. Navy and worked as start-up engineer for Bechtel Power Corp. Eric started employment with the Colorado River District in 1981 as Assistant Secretary-Engineer. He has served on the Engineering Advisory Committee of the Upper Colorado River Compact Commission since 1981. From 1994-2001, he served on the Colorado Water Conservation Board representing the Colorado River mainstem. In 2006, Eric was appointed by Governor Owens as an at-large representative on the Colorado Interbasin Compact Committee, a position he continues to hold.

A Nudge in the Right Direction - Connecting Science to Water Policy



Anne Castle is a senior fellow at the Getches-Wilkinson Center for Natural Resources, Energy, and the Environment at the University of Colorado, focusing on western water issues. From 2009 to 2014, she was Assistant Secretary for Water and Science at the U.S. Department of the Interior where she oversaw water and science policy for the Department and had responsibility for the U.S. Bureau of Reclamation and the U.S. Geological Survey.

While at Interior, Castle spearheaded the Department's WaterSMART program, which although not an entirely original name despite best intentions and multiple trademark searches, provides federal leadership on the path toward sustainable water supplies. She was the driving force behind the 2010 federal MOU addressing sustainable hydropower, the largest, least respected, and most vilified form of renewable energy in the country. Castle also instituted the federal Open Water Data Initiative in an attempt to make the fragmented world of water data more integrated and accessible.

As a counterbalance to the somewhat old school and traditional culture of water management, she entered the arena of space policy and was a champion for the USGS Landsat Program, the nation's longest sequential moderate-resolution satellite imaging system. She joined the cadre of victims of Landsat love, populated by earth scientists, western water managers, and Google Earth aficionados. Castle also provided hands-on leadership on Colorado River issues and was the Chair of the Glen Canyon Dam Adaptive Management Work Group and a champion of Minute 319 between the U.S. and Mexico. The fact that the Colorado River descended further and further into drought during her tenure is generally believed not to be her fault.

Castle is a recovering lawyer, having practiced water law for 28 years with the Rocky Mountain law firm of Holland & Hart. She was the Landreth Visiting Fellow at the Stanford Woods Institute for the Environment for the Spring 2015 quarter, and is now working with the Getches-Wilkinson Center on projects relating to implementation of the State of Colorado's Water Plan and Colorado River management policy. She received a Bachelor of Science degree in applied mathematics, with honors, from the University of Colorado, College of Engineering, in 1973, primarily to demonstrate to her father that girls could be good at math. Her J.D. in 1981 was also from the University of Colorado, qualifying her as a Double Buff.

9:50 am - 10:10 am
Break (Grand Ballroom B)

10:10 AM - 11:30 AM

Concurrent Technical Sessions

*Student presenter in oral presentation competition

Session 1 — Unnamed Events: A Look at the 2015-2016 Floods in Louisiana — Room 324

Moderator - Stacia Davis, LSU AgCenter

10:10 AM **Rainfall variability and its impacts on irrigation in Louisiana** - Stacia Davis, LSU AgCenter

10:30 AM **Flooding impacts to row crop agriculture in Northeast Louisiana** - Bruce Garner, LSU AgCenter (co-author: S. Davis)

10:50 AM **Drainage and water quality of Upper Ward Creek in Baton Rouge, Louisiana** - Jeffrey Beasley, LSU AgCenter (co-authors: J. Kuehny (1st author), R. Keim, W. Kron, B. Breaux, J. Beasley)

11:10 AM **Correcting HAZUS general building stock structural replacement cost data for single-family residences to improve flood mitigation analyses** - Steven Shultz, University of Nebraska

Session 2 — Modeling I — Room 300

Moderator - Laurent Ahiablame, South Dakota State University

10:10 AM ***Estimation of the changing land surface environment in the Rocky Mountains with a spatiotemporally enhanced land cover product** - Nicolas Rodriguez-Jeangros, Colorado School of Mines (co-authors: A. Hering, T. Kaiser, J. McCray)

10:30 AM **Space-based monitoring of land-use/land-cover in the Upper Rio Grande Basin: An opportunity for understanding urbanization trends in a water-scarce transboundary river basin** - Stanley Mubako, University of Texas at El Paso (co-authors: W. Hargrove, J. Heyman, C. Reyes)

10:50 AM **Streamflow response to potential land use and climate changes in the James River watershed, Upper Midwest United States** - Laurent Ahiablame, South Dakota State University (co-authors: T. Sinha, M. Paul, J. Ji, A. Rajib)

11:10 AM ***America's water: Frequency of low flow violations: Spatio-temporal variability of stream dry days across the conterminous United States** - Maryam Pournasiri, University of Colorado Denver (co-authors: I. Pal, U. Lall)

Session 3 — Irrigation Aquifer Depletion and Challenges to Sustainability: Opening Session — Room 312

Moderator - Kevin Wagner, Texas A&M University

10:10 AM **Some results of a 50-state groundwater survey and groundwater utilization trends by Central Arizona agriculture** Sharon Megdal, University of Arizona Water Resources Research Center

10:30 AM **Ogallala Aquifer depletion: Sustaining the resource** - Daniel Devlin, Kansas State University

10:50 AM **Ogallala Aquifer Program: A catalysis for research and education to sustain the Ogallala Aquifer on the Southern High Plains (2003-2017)** - David Brauer, CPRL-ARS-USDA (co-authors: D. Devlin, K. Wagner, M. Ballou, D. Hawkins, R. Lascano)

11:10 AM **USDA-NIFA's Water for Food Production Systems: A mechanism to fund a broader portfolio in the sustainability of groundwater derived irrigation** - James Dobrowolski, USDA National Institute of Food and Agriculture

Session 4 — Feasible Alternatives to Permanent Fallowing in the Colorado River Basin — Room 304/306

Moderator - Perry Cabot, Colorado State University

10:10 AM **Deficit irrigation, crop switching, rotational fallowing, irrigation efficiency and water conservation: Can they save water?** - Brad Udall, Colorado Water Institute, Colorado State University (co-author: G. Peterson)

10:30 AM ***"Conservation for whom and for what?" Multi-stakeholder collaboration around agricultural water in the Colorado River Basin** - Kelsea MacIlroy, Colorado Water Institute (co-author: P.L. Taylor (1st author))

10:50 AM **A farmer-led initiative to quantify and demonstrate irrigation efficiencies at farm-scales in the Lower Gunnison Basin** - Perry Cabot, Colorado State University (co-authors: C. Denison, D. Kanzer, A. Derwingson, J. Harold)

11:10 AM **Farmer perspectives on agricultural water conservation in the Upper Colorado River Basin** - Paul Kehmeier, Orchard Ranch Ditch Company

Tuesday, June 13

Session 5	Drought Early Warning and Drought Monitoring: Planning for Scarcity I Moderator - Caitriana Steele, New Mexico State University	Room 322
10:10 AM	**The Evaporative Demand Drought Index (EDDI): A new drought monitoring and early warning tool** - Mike Hobbins, NOAA - Physical Sciences Division (co-authors: D. McEvoy, A. Wood, J. Huntington)	
10:30 AM	***Assessment of historical and projected drought variability in the Great Plains** - Zach Zambreski, Kansas State University (co-author: X. Lin)	
10:50 AM	**Using state and transition models as a drought adaptation tool on southwestern rangelands** - Amber Wyndham, USDA-NRCS (co-authors: A. Rango, E. Elias, C. Steele, J. Brown)	
11:10 AM	***Insights on drought and long-term climatic trends: Retrospective analyses of RMA cause of loss data** - Julian Reyes, USDA SW Climate Hub (co-authors: A. Eischens, M. Shilts, E. Elias, R. Steele)	

Session 6	Advanced Analytical Technology: Avoiding Water Treatment Problems Moderator - David Burnett, Texas A&M University-GPRI	Room 308/310
10:10 AM	**Development of natural resources in environmentally sensitive areas; public perceptions, public acceptance** - David Burnett, Texas A&M University-GPRI, and Marian Higgins, CMGC Foundation (co-authors: U. Kreuter, R. Haut)	
10:30 AM	**Total organic carbon (TOC) a key water quality analysis -** Gary Erickson, GE Analytical Instruments	
10:50 AM	**Confirming water quality and improving environmental monitoring: Appraisal and utilization of an enhanced portable instrument for wet-chemistry analysis** - L. Keith McLeroy, Global Petroleum Research Institute, Texas A&M University, and Leslie Merrill, RETEGO Labs	
11:10 AM	**Microbial control in oil field waters: Modeling economics of prevention** - Alan Shepstone, Texas A&M Petroleum Engineering (co-author: L. Keith McLeroy)	

11:30 AM - 1:00 PM Lunch

UCOWR Delegate Business Luncheon (Longs Peak Room)

Must be pre-registered and bring ticket.

What does it mean to be a UCOWR delegate? How can you become more engaged?
These questions and more will be discussed over lunch.
This also serves as the Annual UCOWR Business Meeting.
*** Are you currently not a delegate, but interested in finding out more?
See the registration desk or contact Karl Williard at williard@siu.edu ***

ALL OTHERS - LUNCH ON YOUR OWN

See page 37 for restaurants within walking distance.

For students and early career professionals!

12:00 PM - 12:50 PM

Effective Science Communication (Room 322)

Eat a quick bite in the Student Center or pick up to-go lunch and join us!
See page 33 for further details.

1:00 PM - 2:20 PM
Concurrent Technical Sessions

*Student presenter in oral presentation competition

Session 7 — Tribal Perspectives on Water Management Topics and Collaborative Engagement Approaches — Room 324

Moderator - Karletta Chief, University of Arizona

1:00 PM **Engaging southwestern tribes in sustainable water resources topics** - Karletta Chief, University of Arizona (co-authors: A. Meadow, K. Whyte)

1:20 PM **Emerging contaminants on Tribal lands** - Otakuye Conroy-Ben, Arizona State University

1:40 PM **Taking back the responsibilities to protect our water** - John Doyle, Little Big Horn College (co-authors: M. Eggers, C. Martin)

2:00 PM **Land cover and climate change impacts on streamflow and implications for indigenous peoples in the southeastern U.S. Coastal Plain** - Ryan Emanuel, North Carolina State University (co-authors: N. Singh, J. Painter, J. Vose, D. Wear, K. Martin, J. Sikes)

Session 8 — Modeling II — Room 300

Moderator - Stanley Mubako, University of Texas at El Paso

1:00 PM ***Evapotranspiration and partitioning of the hydrologic cycle in fragmented landscapes in the Western United States** - William K. Blount, Colorado School of Mines, Department of Hydrologic Science and Engineering (co-authors: T.S. Hogue, K.J. Franz, K.R. Knipper)

1:20 PM ***Time scales of hydrologic control on agro-eco-hydrologic variability in intensively managed watersheds** - Muhammad Ukasha, Colorado State University (co-author: J. Ramirez)

1:40 PM ***Evaluating weather generators data in hydrological modeling** - Abdullah Alodah, University of Ottawa (co-author: O. Seidou)

2:00 PM **Water balance analysis for agricultural area using SWAT model in the Rincon Valley, New Mexico** - So-Ra Ahn, Texas A&M AgriLife Research Center (co-authors: S. Abudu, Z. Sheng)

Session 9 — Irrigation Aquifer Depletion and Challenges to Sustainability: Groundwater Modeling — Room 312

Moderator - Meagan Schipanski, Colorado State University

1:00 PM **Changes in agricultural-water climate extremes in the Ogallala Aquifer Region** - Xiaomao Lin, Kansas State University (co-authors: P. Gowda, J. Harrington Jr., I. Ciampitti, R. Aiken, R. Bailey, I. Kisekka, D. Brown)

1:20 PM **Assessment of changes in terrestrial water storage using land surface modeling data in the U.S. Great Plains** - Yongjun Zhang, Kansas State University (co-authors: X. Lin, P. Gowda, Z. Zambreski, S. Kutikoff)

1:40 PM **Considerations on the estimates of groundwater actually available in the Ogallala Aquifer as opposed to predictions using current (2016) methodology** - Robert DeOtte, West Texas A&M University (co-author: G. Green)

2:00 PM **Improving Regional Groundwater flow models for the Texas portion of the Ogallala Aquifer** - Sreeram Singaraju, Texas Tech University (co-authors: V. Uddameri, P. Gowda, R. Bailey)

Session 10 — Colorado's Alternative Water Transfer Mechanisms: Valuation and Problems — Room 304/306

Moderator - John Wiener, University of Colorado

1:00 PM **Why ATMs? And why not much yet? Issues for irrigators -** John Wiener, University of Colorado

1:20 PM **Ironing out inefficiencies and remedies for water markets** - Charles Howe and *John Wiener, University of Colorado (*presenter)

1:40 PM **ATMs need a buyer - Municipal water sources on the Colorado Front Range** - Brett Bovee, WestWater Research, LLC

2:00 PM **What if they had a market, and nobody came: Lessor attitudes towards ATMs** - Mark Smith, Colorado College

Tuesday, June 13

Session 11 — **Drought Early Warning and Drought Monitoring: Planning for Scarcity II** — **Room 322**

Moderator - Emile Elias, USDA-ARS, Jornada Experimental Range, SW Climate Hub

1:00 PM **How historical drought data can inform the future adaptive capacity of agricultural systems** - Caitriana Steele, New Mexico State University (co-authors: E. Elias, A. Rango)

1:20 PM **A dynamic statewide water budget for New Mexico** - Joshua Randall, New Mexico Water Resources Research Institute (co-authors: K. Peterson, J. Roach, B. Thomson)

1:40 PM **Added benefits of the Healthy Watershed Approach: Increased drought resiliency for the Upper Llano River, Texas** - Tyson Broad, Llano River Field Station - Texas Tech University (co-authors: T. Arsuffi, K. Wagner)

2:00 PM **Preserving Lake Kinneret (the Sea of Galilee) as a strategic water resource for the state of Israel** - Doron Markel, Israel Water Authority

Session 12 — **Water Quality: Nutrients I** — **Room 308/310**

Moderator - Brian Haggard, Arkansas Water Resources Center

1:00 PM **Surface water quality criteria for nitrogen and phosphorus throughout the United States: A changing status with implications** - Michael Kuitu, Texas A&M AgriLife Extension Service (co-authors: J. Mowrer, D. Gholson, J. Cary, W. Ling)

1:20 PM **The Illinois River Watershed - The convergence of science, lawsuits and collaboration** - Brian Haggard, Arkansas Water Resources Center (co-authors: X. Lin, P. Gowda, Z. Zambreski, S. Kutikoff)

1:40 PM **Distribution of wastewater constituents in a heavily pumped, urban groundwater system** - Madeline Gotkowitz, Wisconsin Geological Survey

2:00 PM **Impact of management practices on bacteria in the Upper Great Plains** - Rachel McDaniel, South Dakota State University (co-author: B. Bleakley (1st author))

2:20 PM - 2:40 PM
Break (Grand Ballroom B)
Light refreshments available.

2:40 PM - 4:00 PM
Concurrent Technical Sessions
*Student presenter in oral presentation competition

Session 13 — **Human Dimensions of Water Resources Management** — **Room 324**

Moderator - Julie Mueller, Northern Arizona University

2:40 PM **Water scarcity and its effect on human behaviors** - Lindsay Sansom, Texas A&M University (co-author: B. Hannibal (1st author))

3:00 PM **Confirming the environmental concerns over surface water conditions within the Houston neighborhood of Manchester utilizing participatory-based research** - Garett Sansom, Texas A&M University - Institute for Sustainable Communities (co-authors: P. Berke, T. McDonald, E. Shipp, J. Horney)

3:20 PM ***Risk perception and trust in international transboundary groundwater sharing: Texas-Mexico case study** - Lindsay Sansom, Texas A&M University

3:40 PM **Can environmental attributes influence protected area designation? A case study valuing preferences for springs in Grand Canyon National Park** - Julie Mueller, Northern Arizona University (co-authors: A. Springer, R. Lima)

Session 14 — **Modeling III** — **Room 300**

Moderator - Laurent Ahiablame, South Dakota State University

2:40 PM ***Modification of the SWAT model for improving hydrological simulation in intensively irrigated watersheds** - Xiaolu Wei, Colorado State University (co-authors: R. Bailey, A. Tasdighi)

3:00 PM **How hydrologic allocation modeling has supported decision making in the Colorado Rio Grande Basin** - Brian Macpherson, DiNatale Water Consultants (co-author: K. DiNatale (1st author))

3:20 PM ***Geo-DSS for integrated river basin management: Russian River case study** - Christopher Fields, Colorado State University (co-authors: J. Labadie, L. Johnson)

3:40 PM ***Development of the future value function for optimal reservoir operation through the application of Q-learning** - Matthew Peacock, Colorado State University (co-author: J. Labadie)

Session 15 — **Irrigation Aquifer Depletion and Challenges to Sustainability: Groundwater & Crop Modeling I** — **Room 312**

Moderator - Daniel Devlin, Kansas State University

2:40 PM ***Comparison of methods for estimating agricultural groundwater pumping in the Central Valley, CA** - Stephen Maples, Dept. of Land, Air, and Water Resources, UC Davis (co-author: G. Fogg)

3:00 PM **An integrated modeling framework for investigating water management practices in the Ogallala Aquifer Region** - Ryan Bailey, Colorado State University (co-authors: P. Gowda, I. Kisekka, S. Nozari, C. Ray, V. Uddameri, X. Lin, A. Andales, V. Prasad, M. Schipanski, R. Waskom)

3:20 PM **Calibration and validation of DSSAT-CSM using lysimeter data for estimating daily ET and crop yield in the Texas High Plains** - Pradip Adhiakri, Oklahoma State University (co-authors: P. Gowda, G. Marek, I. Kisekka, D. Brauer, B. Northup, A.C. Rocateli)

3:40 PM **Calibration of CERES-Maize against precision weighing lysimeter data under semi-arid conditions of eastern Colorado** - Allan Andales, Colorado State University (co-authors: M.C. Capurro, G.E.B. Smith, P.H. Gowda, I. Kisekka)

Session 16 — **Water Conservation Strategies and Practices for Agriculture I** — **Room 304/306**

Moderator - Mary Love Tagert, Mississippi State University Extension Service

2:40 PM **Overview and benefits of on-farm water storage systems in Mississippi watersheds** - Mary Love Tagert, Mississippi State University Extension Service (co-authors: J.O. Paz, J.D. Pérez-Gutiérrez, R. Karki)

3:00 PM ***Irrigation water supply potential of on-farm water storage systems in Mississippi agricultural watersheds** - Juan D. Pérez-Gutiérrez, Mississippi State University (co-authors: J.O. Paz, M.L. Tagert)

3:20 PM **Assessment and mitigation of irrigation reservoir levee erosion** - Daniel Wren, USDA-ARS (co-authors: Y. Ozeren, M. Reba)

3:40 PM **Validation of smart phone apps and other best management practices to improve crop water use efficiency** - Kelly Morgan, University of Florida

Session 17 — **Adaptive Management** — **Room 322**

Moderator - Brian Hurd, New Mexico State University

2:40 PM ***Understanding the emergence of adaptive water governance: A case study of the Cache River Watershed of southern Illinois** - Jodie Hancock, Southern Illinois University Carbondale (co-author: K. Akamani)

3:00 PM ***Water governance and community sustainability: Evaluating the impact of the Joint Venture Partnership on the resilience of communities in the Cache River Watershed** - Rachel Sheely, Southern Illinois University Carbondale (co-author: K. Akamani)

3:20 PM **Improving Saipan's water system operation** - Shahram Khosrowpanah, University of Guam (co-authors: L. Heitz, M. Iglecias)

3:40 PM **A Latent Class Discrete Continuous Choice Model of residential water demand** - Marwa Salem, North Carolina State University

Session 18 — **Water Quality: Nutrients II** — **Room 308/310**

Moderator - Gurbir Singh, Southern Illinois University Carbondale

2:40 PM **Water quality monitoring to identify nutrient sources and sub-watershed priorities within the Lake Wister Watershed** - Bradley Austin, Arkansas Water Resources Center (co-authors: D. Leasure, S. Patterson, B. Haggard)

3:00 PM ***Investigation of the use of a simple model with national datasets to predict nutrient loads in urban stormwater** - Tyler Dell, Colorado State University (co-authors: M. Arabi, C. Olson)

3:20 PM **Water resources in the Tualatin River Basin: Management under increasing water demands and climate change** - Raj Kapur, Clean Water Services (co-authors: K. Williamson (1st author), R. Kapur, T. Lu)

3:40 PM **Governance, policy, and economics of clean water in the Delaware River Basin in Delaware, New Jersey, New York, and Pennsylvania** - Gerald Kauffman, University of Delaware

4:00 PM - 4:10 PM
Break (Grand Ballroom B)

Tuesday, June 13

4:10 PM - 5:10 PM

Concurrent Technical Sessions

*Student presenter in oral presentation competition

Session 19 — **All Voices Matter: How to Draw Underrepresented Voices into Water Policy Decisions** — **Room 324**

Moderator - MaryLou Smith, Colorado State University

4:10 PM **River Sisters Initiative - Reconnecting municipal Colorado River water users from source to sea** - Jorge Figueroa, Western Resource Advocates

4:30 PM ***Latino students learning about water for policy decision opportunities** - Nancy Negrete Contreras, Colorado Water Sustainability Fellows (co-author: M. Smith)

4:50 PM **Ten Tribes Partnership - A place at the Colorado River Basin water policy table** - Daryl Vigil, Ten Tribes Partnership

Session 20 — **Modeling IV** — **Room 300**

Moderator - Kyna Borel, Texas A&M University

4:10 PM ***Application of neural networks to development of a computationally efficient surrogate to the MODFLOW model: Application to the stream-aquifer system of the Lower Arkansas River Basin in Colorado** - Faizal Rohmat, Colorado State University (co-authors: J. Labadie, T. Gates)

4:30 PM ***Potential for LID practices to retrofit urban watersheds** - Esther Mosase, South Dakota State University (co-author: L. Ahiablame)

4:50 PM ***Estimating potential *E. coli* loads and transport due to rainfall from domestic sources** - Kyna Borel, Texas A&M University (co-authors: V. Swaminathan, R. Karthikeyan)

Session 21 — **Irrigation Aquifer Depletion and Challenges to Sustainability: Groundwater & Crop Modeling II** — **Room 312**

Moderator - Amy Kremen, Colorado State University

4:10 PM **Multi-model generation of corn production functions with associated uncertainty in High Plains** - Isaya Kisekka, Kansas State University (co-authors: A. Araya, P.V.V. Prasad, P.H. Gowda, A. Andales)

4:30 PM **Landscape-scale crop water productivity model for multi-year water management decisions** - Robert Aiken, Kansas State University (co-authors: X. Lin, P. Colaizzi, D. O'Brien, L. Baumhardt)

4:50 PM **Calculation of evapotranspiration: Recursive and explicit methods** - Robert Lascano, USDA - ARS (co-author: T. Goebel)

Session 22 — **Water Conservation Strategies and Practices for Agriculture II** — **Room 304/306**

Moderator - Juan D. Pérez-Gutiérrez, Mississippi State University

4:10 PM **Management strategies for adapting semi-arid corn production to limited irrigation conditions** - Allan Andales, Colorado State University (co-authors: J.L. Chavez, N.C. Hansen)

4:30 PM **The Limited Irrigation Research Farm in northern Colorado** - Kendall DeJonge, USDA-ARS

4:50 PM **Nebraska Agricultural Water Management Network (NAWMN): Integrating research and extension/outreach to enhance agricultural production efficiency** - Suat Irmak, University of Nebraska-Lincoln, NAWMN

Session 23 — **Climate Disturbance Impacts and Extreme Shifts in Hydrology over the Western United States** — **Room 322**

Moderator - Kurt Solander, Los Alamos National Laboratory

4:10 PM **The influence of climate change and climate-driven disturbances on streamflow and water balances in the Colorado River** - Katrina Bennett, Los Alamos National Laboratory (co-authors: T. Bohn, R. Middleton)

4:30 PM **Evaluating the impact of groundwater depletions on the dynamics of integrated hydrologic systems** - Laura Condon, Syracuse University (co-author: R. Maxwell)

4:50 PM **Climate impacts on energy and water supplies in coupled natural-human systems within the Colorado River Basin** Kurt Solander, Los Alamos National Laboratory (co-authors: K. Bennett, R. Middleton)

Session 24 — **Water Quality: Panel Discussion** — **Room 308/310**

Moderator - Alexandra Chase, National Sea Grant Law Center

4:10 PM **Beyond dead zones: The impact of agricultural nutrients on drinking water and associated legal policies, planning, and challenges for successful water quality management**
Panelists: Alexandra Chase, National Sea Grant Law Center; Catherine Janasie, National Sea Grant Law Center; Ellen Essman, Ohio State University Extension Agricultural & Resource Law Program; Peggy Kirk Hall, Ohio State University Extension Agricultural and Resource Law Program

5:30 PM - 7:00 PM
Welcome Reception and Poster Session
(Grand Ballroom B/C)
Hors d'oeuvres and Cash Bar
Sponsored by Colorado Water Institute, Colorado State University

Poster Presentations

*Student presenter in poster competition
(In alphabetical order by presenter last name, # corresponds to location in room)

1. ***Impacts of large water reservoirs on precipitation: A case study of Tarbela Dam** - Irfan Abid, Georgia Institute of Technology
2. ***Assessing groundwater vulnerability in the South Platte River Basin under future changes in land use and climate** - Fatima Aliyari, Colorado State University (co-authors: R.T. Bailey, A. Tasdighi, M. Arabi)
3. ***Diagnosing the effects of external forcings on streamflow** - Leah Bensching, University of Colorado Boulder (co-authors: W. Farmer, B. Livneh)
4. ***Water banking, recharge and recovery in Arizona: The use of long-term storage credits** - Rebecca Bernat, University of Arizona (co-author: S.B. Megdal)
5. **Tools & support for integrating real environmental data into education** - Liza Brazil, CUAHSI
6. **Selection of optimum conditions for the treatment of beef cattle wastewater by the electrocoagulation process** - Erick Butler, West Texas A&M University (co-authors: C. Clewett, N. Spaar, R. DeOtte, O. Mulamba)
7. **Water use intensity factors for military-unique facilities to support resilient Army installations** - Kelly J. Chen, ERDC-CERL (USACE) (co-authors: E. Jenicek (1st author), N. Garfinkle, N. Bartholomew, M. Kodack)
8. ***Approach to determining causes of high groundwater levels in the LaSalle/Gilcrest area** - Chenda Deng, Colorado State University (co-author: R. Bailey)
9. ***Use of satellite-based remote sensing evapotranspiration model results to inform parameters in cropping system models** - Sulochan Dhungel, University of Utah (co-author: M.E. Barber)
10. ***Stream temperature dynamics in a semiarid riparian ecosystem in north central Oregon** - Nicole Durfee, Oregon State University (co-author: C. Ochoa)
11. ***Deriving a statistically representative removal constant from the international stormwater BMP database** - Ryan Gilliom, Colorado School of Mines (co-authors: J. McCray, T. Hogue)
12. **Water quality, quantity, and usefulness of playa systems in the Texas High Plains** - Nathan Howell, West Texas A&M University (co-authors: E. Butler, B. Guerrero)
13. ***Winter storms and climate change in the Oregon Cascades** - Michelle Hu, Oregon State University (co-author: A. Nolin)
14. **Non-stationary precipitation scenario development in the southwest United States** - Peng Jiang, Desert Research Institute Las Vegas (co-authors: M. Gautam, L. Chen, Z. Yu, K. Acharya)
15. **Water education - A design perspective** - Kathleen Kambic, University of New Mexico
16. **Coupling fluvial and oceanic drivers in flooding forecasts for San Francisco Bay** - Jungho Kim, Colorado State University (co-authors: C. Venkatachalam, R. Cifelli, L. Johnson)

Tuesday, June 13

17. **Data visualization of environmental time-series: A demonstration of an interactive poster and information portal** - Richard Koehler, NOAA/National Weather Service
18. ***An exploration of particle filtering techniques to determine aquifer properties from groundwater well data influenced by tidal forcing** - Jose Kolb-Lugo, University of North Florida (co-authors: C. Brown, P. Kreidl)
19. **Solar river - A plan to power the CAP canal with solar power, leveraging current easements and boundaries and replacing coal power** - Ben Lepley, University of Arizona (co-author: A. Schwarz)
20. ***Perceptions of safe water** - Christine Martin, Little Big Horn College
21. ***Surface and ground water flow modeling for calibrating steady state using MODFLOW in Colorado River Delta, Baja California, Mexico** - Kedir Mohammed Bushira, Univeridad Autonoma De Baja California (co-authors: J. Ramirez Hernandez, Z. Sheng)
22. ***Characterizing water quality of the South Platte River, from Waterton Canyon through Brighton, CO** - Emily Mullins, Metropolitan State University of Denver (co-authors: S. Schliemann, R. Brazeau)
23. **Short and long-term effects of a large-scale critical zone disturbance on hydrologic response** - Fabian Nippgen, University of Wyoming
24. **Shifting peaks: When are our lakes the greenest?** - Rebecca L. North, University of Missouri (co-authors: J.L. Graham, D.V. Obrecht, H.M. Baulch, J.J. Hudson, O. Abirhire, P.J. Dillon, R.E.H. Smith, T.Y. Kim, A.P. Thorpe, C. Pollard, J.R. Jones)
25. **Three Rivers QUEST – Water quality monitoring in the Ohio River Basin** - Melissa O'Neal, WV Water Research Institute (co-author: P. Ziemkiewicz)
26. ***Impacts of the expanding dairy industry on water usage and business composition in the Southern Ogallala Aquifer Region** - Rachel Owens, West Texas A&M University (co-authors: B. Guerrero, S. Amosson, L. Almas)
27. ***Modeling redevelopment impacts on urban stormwater runoff in Denver, Colorado** - Chelsea Panos, Colorado School of Mines (co-authors: T. Hogue, J. McCray, D. Mollendor)
28. ***Assessment of managed aquifer recharge efficiency through the use of HYDRUS -1D** - Olga Rodriguez, Texas A&M AgriLife Research Center (co-authors: Z. Sheng, S. Abudu, E. Reynoso)
29. ***Evaluation of riparian restoration success in southern Illinois** - Benjamin Roosa, Southern Illinois University Carbondale (co-authors: K. Williard, J. Schoonover, S. Indorante)
30. ***Integrated groundwater-surface water modeling with emphasis on recharge estimation and optimal groundwater abstraction (A case study in the Neishaboor Watershed, Iran)** - Alieh Saadatpour, Colorado State University (co-authors: A. Alizadeh, A.N. Ziaei, S. Park, R. Bailey, A. Izady)
31. **Quantifying the dynamics of freshwater and saltwater interface in the Upper Floridan Aquifer** - Xizhen Du Schenk, Georgia Southern University
32. ***Water sampling and the effects of adsorption on aqueous heavy metals** - Haley Sir, Metropolitan State University of Denver (co-authors: R. Brazeau, S. Schliemann)
33. ***A new model for vertical seepage in karst lake environments** - Chris Slater, University of South Florida
34. ***Using satellite data to build climate resilience: A high resolution multi-sensor monitor of waterbody change during the 2015/2016 East African drought** - Kimberly Slinski, Colorado School of Mines (co-authors: J. McCray, T. Hogue)
35. **Innovative stormwater management practices and standards for North Carolina** - Kurt Smith, Methodist University (co-author: M. Woodward)
36. **Development of a control optimization system for real time monitoring of managed aquifer recharge and recovery systems using intelligent sensors** - Kathleen Smits, Colorado School of Mines (co-authors: Z.W. Drumheller, J. Lee, T.H. Illangasekare, J. Regnery, P.K. Kitanidis)
37. ***Incorporating sustainability metrics and co-benefits into a decision support tool for stormwater infrastructure selection** - Katie M. Spahr, Colorado School of Mines (co-authors: C.D. Bell, T.S. Hogue, J.E. McCray)
38. ***Estimating potential *E. coli* loads from livestock and wildlife sources using Python-SELECT** - Vaishali Swaminathan, Texas A&M University (co-authors: K. Borel, R. Karthikeyan)
39. ***Enhanced microbial sulfate removal through a novel electrode-integrated bioreactor** - Daniel C. Takaki, University of Minnesota - Duluth (co-authors: T. Deen, C.L. Chun, D.S. Jones)
40. ***Considerations for soil moisture sensor use in heavy soils and a humid temperate climate** - Maureen Thiessen, Louisiana State University (co-author: S. Davis)
41. ***Investigation of coliform contamination in private well water on the Crow Reservation** - Emery Three Irons, Montana State University

42. ***Using drought tolerant plants with integrative irrigation management to reduce groundwater reliance** - Amy Uyen Truong, Texas A&M University
43. ***Analyzing water rebate programs in Tucson, AZ** - Ethan Vimont, University of Arizona
44. ***Community composition of denitrifying bacteria within sediments impacted by acid mine drainage** - Ben Wise, University of Colorado Denver (co-authors: T. Roane, A. Mosier)
45. **The impacts of change in irrigation methods on regional water resource utilization and management in Yanqi Basin, Xinjiang, China** - Pengnian Yang, Texas A&M AgriLife Research Center at El Paso (co-authors: Z. Sheng, S. Abudu, Q. Liu)
46. ***Index-based assessment of agricultural drought using remote sensing in the semi-rid region of western Turkey** - Tugba Yildirim, EGE University (co-author: S. Asik)

7:00 pm - 8:00 pm
Water quality Regulation Discussion: High-stakes, High-controversy Changes in Water Quality Regulation: Des Moines, WOTUS and What Now? (Room 322)

Moderator - John Wiener, University of Colorado

The new administration has announced review of the rule sometimes called the Clean Water Rule and in the last few years, the Waters of the U.S. Rule. The announced intention is to delete the more expansive test for jurisdiction, called the "significant nexus" test, from the 2006 Supreme Court *Rapanos* case. Jurisdiction would be sharply reduced. Attendees are invited to discuss agricultural and other sources of non-point source pollution, and consequences for water providers, ecosystems, and agriculture itself, and to consider responses and issues when the formal rule-making is announced.

7:00 pm - 8:30 pm
Graduate Student Happy Hour (Avogadro's Number)

See page 33 for more details.

Wednesday, June 14

7:30 am - 8:30 am
Breakfast Roundtables
(Grand Ballroom B)

Rise and shine….get your breakfast….and join in as we discuss: "Multi-institution Research Proposals"

- Table 1 – Agricultural Irrigation, Conservation, and Efficiency
- Table 2 – Conjunctive Use of Surface Water and Groundwater under Drought and Flood Conditions
- Table 3 – Urban Water Issues: Infrastructure, Resilience, and Security
- Table 4 – Water and Ecosystem Services

EVERYONE is encouraged to join the discussion! Take advantage of the opportunity of having so many active water institutions in one location. Bring your ideas and suggestions and become part of a new multi-institution collaborative effort!

8:30 am - 9:15 am
Plenary Session: Warren A. Hall Medal Recipients
(Grand Ballroom C)

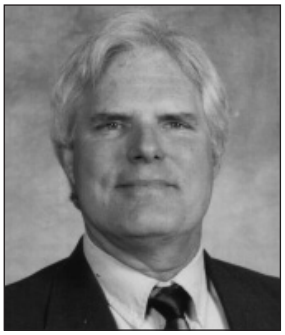
Moderator - Doug Parker, California Institute for Water Resources, University of California

Water Sustainability for the Nation: What Will it Take?



Deborah L. Swackhamer is Professor Emerita at the University of Minnesota of Science, Technology, and Public Policy in the Humphrey School of Public Affairs and Environmental Health Sciences in the School of Public Health. She also directed the Water Resources Center from 2002 until 2014. She received a B.A. in Chemistry from Grinnell College, IA and an M.S. and Ph.D. from the University of Wisconsin-Madison in Water Chemistry and Limnology & Oceanography, respectively. After two years post-doctoral research in Chemistry and Public & Environmental Affairs at Indiana University, she joined the Minnesota faculty in 1987. She officially retired from the University in 2015, and continues to work informally with researchers and decision makers on water resource policy. In 2012 Dr. Swackhamer completed a four year term as Chair of the Science Advisory Board of the U.S. Environmental Protection Agency, and served as a member of the Science Advisory Board of the International Joint Commission of the U.S. and Canada from 2000-2013. She currently serves as Chair of the U.S. EPA Board of Scientific Counselors. She is a member of the National Academy of Sciences Board of Environmental Science and Toxicology. She was President of the National Institutes of Water Resources in 2011-2012. Dr. Swackhamer received the prestigious Founders Award from the Society of Environmental Toxicology and Chemistry for lifetime achievement in environmental sciences in 2009. She is a lifetime Fellow in the Royal Society of Chemistry in the UK. In November, 2014 she was named an Inaugural Fellow of the international Society of EnvironmentalToxicology and Chemistry.

Update to "Optimal Operation of Multi-purpose Reservoir Systems: State-of-the-art Review"



John W. Labadie, Ph.D., P.E., F.ASCE, D.WRE, is Professor of Civil and Environmental Engineering at Colorado State University, serving as Coordinator of the Water Resources Planning and Management Program. He received his B.S. and M.S. degrees in Engineering at the University of California, Los Angeles, and Ph.D. in Industrial Engineering and Operations Research from the University of California, Berkeley. Dr. Labadie specializes in application of decision support systems, artificial intelligence, machine learning, and knowledge-based systems to complex problems in water resources and environmental systems management. He is developer and instructor of the graduate courses: GIS in Civil and Environmental Engineering, Computer-aided Water Management and Control, Engineering Optimization, and Engineering Decision Support Systems, with all courses offered through CSU Online. He has served as Principal and Co-Principal investigator for over 50 research projects totaling over $8 million in funding from sponsors at the federal, state, local, and international levels. He served as Senior Editor of the Journal of Water Resources Planning and Management, with his 2004 review on optimal operation of multireservoir systems one of the top five most cited articles published by any of the EWRI journals to date. He is a Fulbright Research Scholar, won two annual Best Paper awards from scholarly journals, and was the 2015 CSU Online Innovative Educator.

9:15 AM - 9:30 AM
Break (Grand Ballroom B)

9:30 AM - 10:50 AM
Concurrent Technical Sessions

*Student presenter in oral presentation competition

Session 25 — Challenges of Interdisciplinary Graduate and Undergraduate Programs in Water Resources — Room 324

Moderator - Sharon Megdal, University of Arizona Water Resources Research Center

9:30 AM **Challenges and opportunities associated with two graduate interdisciplinary programs at the University of Arizona** Sharon Megdal, University of Arizona Water Resources Research Center

9:50 AM **Challenges and opportunities associated with the graduate Water Management and Hydrological Science transdepartmental program at Texas A&M University** - Ronald Kaiser, Texas A&M University

10:10 AM **Choose Your Own Adventure: Crafting an interdisciplinary water resources degree** - John Fleck, University of New Mexico Water Resources Program

10:30 AM **Inventing the future: A new undergraduate degree program in water resources, policy and management at Virginia Tech** - Kevin McGuire, Virginia Tech (co-author: S. Schoenholtz)

Session 26 — Groundwater Management in a Changing Environment — Room 300

Moderator - Dannele Peck, USDA Agricultural Research Service

9:30 AM **Alternative groundwater management strategies over the Ogallala Aquifer in southeastern Wyoming** - Dannele Peck, USDA Agricultural Research Service (co-authors: K. Hansen (1st author), D. Peck, K. Willis)

9:50 AM ***Analysis of groundwater (over) extraction induced by farmers' downside risk-aversion** - Nicolas Quintana Ashwell, Kansas State University (co-authors: N. Hendricks, J. Peterson)

10:10 AM **Comparing actual and predicted groundwater trading: The role of transaction costs and trading restrictions** - Karina Schoengold, University of Nebraska (co-author: E. Juchems)

10:30 AM ***Redefining borders: Options for more sustainable management of U.S./Mexico transboundary aquifers** - Christina Welch, Oregon State University

Session 27 — Irrigation Aquifer Depletion and Challenges to Sustainability: Innovative Solutions (New Practices, Sources, Crops) — Room 312

Moderator - Kevin Wagner, Texas A&M University

9:30 AM **The challenges of increased irrigated production in the future** - Thomas Marek, Texas A&M AgriLife Research (co-authors: D. Porter, Q. Xue, J. Bell)

9:50 AM **Aquifer depletion in the Lower Mississippi River Basin: Challenges and solutions** - Joseph Massey, USDA-ARS-Delta Water Management Research Unit (co-authors: M.L. Reba (1st author), J. Massey, M.A. Adviento-Borbe, D. Leslie, M. Yaeger, J. Farris)

10:10 AM **Local aquifer alternatives: The case of the Dockum Aquifer in the Texas Panhandle** - Nathan Howell, West Texas A&M University (co-author: R. DeOtte)

10:30 AM **Water use for beef production on pastures in West Texas** - Chuck West, Texas Tech University (co-authors: L.L. Baxter, C.P. Brown, P.E. Green)

Session 28 — Are Voluntary Conservation Programs Effective? — Room 304/306

Moderator - Ron Lacewell, Texas A&M AgriLife

9:30 AM **Targeted voluntary conservation using Farm Bill programs** - Martin Lowenfish, USDA-Natural Resources Conservation Service

9:50 AM **Nonpoint source contamination in Oklahoma watersheds** - Shanon Phillips, Oklahoma Conservation Commission

10:10 AM **Cost-effective conservation programs for protecting water quality: What are the challenges?** - Marc Ribaudo, Economic Research Service - USDA (co-author: R. Claassen)

10:30 AM **Litigation over phosphorus pollution of the Scenic Illinois River Watershed in northeastern Oklahoma** - Robert Taylor, Auburn University

Wednesday, June 14

Session 29 — **Understanding the Transition towards Sustainable Urban Water Systems** — **Room 322**
Moderator - Mazdak Arabi, Colorado State University

9:30 AM **One water financial model: From service provision to resource allocation** - Neil Grigg, Colorado State University (co-authors: A. Maas, T. Connor)

9:50 AM ***Residential water and electricity: Substitutes or complements?** - Alexander Maas, Colorado State University (co-authors: M. Arabi, D. Manning, C. Goemans)

10:10 AM ***A collaborative evaluation of centralized and decentralized strategies for dual water supply** - Jeanne Cole, Colorado State University (co-authors: S. Sharvelle, D. Fourness, L. Roesner, J. Haukaas)

10:30 AM **Framework and parameterization of a decision support tool for stormwater infrastructure** - Colin Bell, Colorado School of Mines (co-authors: K. Spahr, J. McCray, T. Hogue)

Session 30 — **Quantifying the Water Quality Outcomes of Watershed-scale Conservation Projects I** — **Room 308/310**
Moderator - Jennifer Tank, University of Notre Dame

9:30 AM ***Nutrient and sediment export from a corn/soybean rotation planted with winter cover crops: A paired watershed study** - Gurbir Singh, Southern Illinois University Carbondale (co-authors: K.W.J. Williard, J.E. Schoonover, J.F. Crim)

9:50 AM **Monitoring agricultural sub-watersheds containing conservation practices in the Black Hawk Lake Watershed, Iowa -** Leigh Ann Long, Iowa State University (co-authors: C. Brendel, M. Soupir, C. Ikenberry, M. Helmers, A. Kaleita)

10:10 AM **People-Land-Water: Testing agricultural BMPs at the farm and watershed scales** - Thomas Fisher, Horn Point Laboratory, University of Maryland Center for Environmental Science (co-authors: R. Fox, A. Gustafson, K. Kvalnes, M. Lepori-Bui, J. Lewis, K. Fisher)

10:30 AM ***Comparing the effectiveness of increased winter land cover on nutrient export across two Indiana agricultural watersheds** - Matt Trentman, University of Notre Dame (co-authors: J. Tank, S. Christopher, B. Hanrahan, U. Mahl, K. Prior, S. Speir)

10:50 AM - 11:00 AM
Break (Grand Ballroom B)

11:00 AM - 12:00 PM
Concurrent Technical Sessions
*Student presenter in oral presentation competition

Session 31 — **Water Resources Education: Roles of Commercial Projects and Field Stations** — **Room 324**
Moderator - Allen Berthold, Texas A&M University

11:00 AM **Getting out of the laboratory – Our experience and lessons learned from the National Science Foundation Innovation Corps Program** - Allen Berthold and Kelly Brumbelow, Texas A&M University

11:20 AM **Commercial projects at university hydraulics laboratories: Research relevance, student training, or unfair competition?** - Robert Ettema, Colorado State University

11:40 AM **Field stations as ambassadors and agents for bridging silos: Engagement in watershed protection, research and natural resource literacy in a land of private property** - Tom Arsuffi, Texas Tech University Llano River Field Station (co-authors: T. Broad, K. Wagner)

Session 32 — **Coupling Surface and Near Surface Hydrologic Processes in Mountain Front Hydrology: Applications of Hydrogeophysics** — **Room 300**
Moderator - Ginger Paige, University of Wyoming

11:00 AM ***Water partitioning and storage via preferential pathways at the hillslope scale observed using time-lapse ERT** - Maneh Kotikian, University of Wyoming (co-authors: A. Parsekian, G. Paige, A. Carey)

11:20 AM ***Shifts in seasonal snowpack dynamics and the effect of water transport schemes in modeling spring melt-out** - Mark Pleasants, University of Wyoming (co-author: T. Kelleners)

11:40 AM ***Identification of surface and subsurface flow paths affecting return flow: Merging hydrology and geophysics** - Niels Claes, University of Wyoming (co-authors: G. Paige, A. Parsekian)

Session 33 — **Irrigation Aquifer Depletion and Challenges to Sustainability: Innovative Solutions (Irrigation Systems)** — **Room 312**

Moderator - Dana Porter, Texas A&M University

11:00 AM **Corn management in the Texas High Plains** - Qingwu Xue, Texas A&M AgriLife Research (co-authors: T. Marek, W. Xu, J. Bell)

11:20 AM **Effects of irrigation technology and management on WUE and crop yield: A meta-analysis** - Donna Mitchell McCallister, Texas Tech University (co-authors: C. West, A. Cano, D. Rudnick)

11:40 AM **SDI increases water use efficiency of grain crops in Southern High Plains** - Steven Evett, USDA Agricultural Research Service, Bushland, Texas (co-authors: D. Brauer, P. Colaizzi, G. Marek, S. O'Shaughnessy, J. Moorhead)

Session 34 — **Water Markets** — **Room 304/306**

Moderator - Lucia Levers, UC Riverside

11:00 AM **Efficiency in the Imperial Valley: What does it mean for the Salton Sea?** - Lucia Levers, UC Riverside (co-authors: T. Skaggs, K. Schwabe)

11:20 AM **Determinants of water market prices in the western United States** - Craig Broadbent, Brigham Young University Idaho (co-authors: Q. Beeson, K. Toll)

11:40 AM **Irrigation rate structure to address agricultural water scarcity: An example from North Louisiana** - Naveen Adusumilli, Louisiana State University Agricultural Center (co-author: B. Baiamonte)

Session 35 — **Stretching Our Water Supplies: Planning and Implementing Reuse I** — **Room 322**

Moderator - June Wolfe, Texas A&M AgriLife Research - Blackland Research and Extension Center

11:00 AM **A risk based framework for decentralized non-potable water systems** - Sybil Sharvelle, Colorado State University

11:20 AM **Responsible management of decentralized non-potable water systems** - Ed A. Clerico, Natural Systems Utilities, LLC

11:40 AM **Stormwater reuse in Carver County: An innovative approach to reducing pollutant loads to water resources** - Tim Sundby, Carver County

Session 36 — **Quantifying the Water Quality Outcomes of Watershed-scale Conservation Projects II** — **Room 308/310**

Moderator - Jennifer Tank, University of Notre Dame

11:00 AM ***Real-time monitoring provides insight into nitrate-N export during storms in two contrasting agricultural watersheds** - Shannon L. Speir (co-authors: J.L. Tank, T.V. Royer, U.H. Mahl, M.T. Trentman, B.R. Hanrahan, K. Prior, S.F. Christopher)

11:20 AM **Understanding hydrologic pathways and assessing conservation benefits in the Western Lake Erie Basin** - Mark Williams, USDA ARS (co-authors: K. King, D. Smith, S. Livingston, C. Huang)

11:40 AM ***Quantifying changes in nutrient export from an agricultural watershed following the planting of winter cover crops** - Brittany Hanrahan, University of Notre Dame (co-authors: J. Tank, S. Christopher, M. Trentman, U. Mahl, S. Speir, K.R. Prior, T.V. Royer)

Wednesday, June 14

12:00 PM - 1:30 PM

Authors' Plenary Luncheon Session (Grand Ballroom D)

Must be pre-registered and bring ticket.

ALL OTHERS - LUNCH ON YOUR OWN

See page 37 for restaurants within walking distance.

Moderator - Sharon Megdal, University of Arizona Water Resources Research Center



Dr. William M. Alley and Rosemarie Alley are a scientist/nonscientist team writing for the general public on Environmental and Earth Science issues confronting society. Dr. Alley was Chief, Office of Groundwater for the U.S. Geological Survey for almost two decades and is currently Director of Science and Technology for the National Ground Water Association. Rosemarie Alley is a freelance writer. Their latest book is *High and Dry: Meeting the Challenges of the World's Growing Dependence on Groundwater*. They previously published *Too Hot to Touch* on the science, history, and politics of nuclear waste.



John Fleck is Professor of Practice in Water Policy and Governance in the University of New Mexico Department of Economics and Director of the university's Water Resources Program, where he co-teaches classes in contemporary water policy issues, modeling, and technical communication for water managers. A science journalist with 30 years of newspaper experience, he first wrote about water in the 1980s as a beat reporter covering the Metropolitan Water District of Southern California. He is the author of the book *Water is for Fighting Over and Other Myths About Water in the West*, an exploration of solutions to the Colorado River Basin's water problems, published by Island Press.

1:30 PM - 2:50 PM

Concurrent Technical Sessions

*Student presenter in oral presentation competition

Session 37 — **Water Resources Education: Training Tools and Outreach** — **Room 324**

Moderator - Drew Gholson, Texas A&M AgriLife Extension Service

1:30 PM	**Needs assessment: Delivery of watershed science to locally-elected water resources managers** - Troy Gilmore, University of Nebraska - Lincoln (co-authors: J. Korus, L. Pennisi, D. Martin)
1:50 PM	***Learning preferences for water resource information from extension and other sources** - Drew Gholson, Texas A&M AgriLife Extension Service (co-authors: D. Boellstorff, S. Cummings)
2:10 PM	**Successes and challenges in training adult professionals through distance learning** - Ruth Kline-Robach, Michigan State University (co-author: L. Wolfson)
2:30 PM	**Science informing policy: Mississippi case study** - Jeff Johnson, Mississippi State University (co-authors: K. Whittington, S. Mabry)

Session 38 — **The U.S.-Mexico Transboundary Aquifer Assessment Program: Accomplishments to Date** — **Room 300**

Moderator - William Alley, National Ground Water Association

1:30 PM	**The U.S.-Mexico Transboundary Aquifer Assessment Program - The first five years** - William Alley, National Ground Water Association
1:50 PM	**Assessment of the Mesilla Basin/Conejos-Médanos and Hueco Bolson Aquifer Systems under the Transboundary Aquifer Assessment Act** - Delbert Humberson, United States Geological Survey (co-authors: A. Teeple (1st author), D. Humberson)
2:10 PM	**U.S.-Mexico Transboundary Aquifer Assessment Program - New Mexico investigations** - Anne-Marie Matherne, USGS New Mexico Water Science Center (co-author: A. Robertson)
2:30 PM	**The Binational Study of the Transboundary San Pedro Aquifer: Successful experience on binational work** - Ismael Minjarez Sosa, Universidad de Sonora (co-authors: J. Callegary, E. Tapia Villaseñor, R. Monreal Saavedra, F. Grijalva Noriega, F. Gray, C. Scott, L. Oroz Ramos, S. Megdal)

Session 39 — **Irrigation Aquifer Depletion and Challenges to Sustainability: Innovative Solutions (Irrigation Systems & Scheduling)** — **Room 312**

Moderator - Amy Kremen, Colorado State University

1:30 PM — ***Geo-spatial analysis of soil water redistribution of different irrigation technologies** - Tobias Oker, Kansas State University, Southwest Research-Extension Center (co-authors: I. Kisekka, C. Hillyer)

1:50 PM — **A GIS-based precision irrigation system design for irrigation in the Western U.S.** - Susan A. O'Shaughnessy, USDA ARS (co-authors: M.A. Andrade, S.R. Evett, P.D. Colaizzi)

2:10 PM — **Free online irrigation management tools: From universities to producers** - Jonathan Aguilar, Kansas State University (co-authors: D. Rogers, I. Kisekka, D. Porter, C. Hillyer, A. Andales, D. Rudnick)

2:30 PM — **Education and technology transfer in agricultural water management: Effective communication with stakeholders** - Dana Porter, Texas A&M University (co-authors: K. Wagner, J. Aguilar, D. Rogers, T. Marek, G. Marek)

Session 40 — **Economic Implications of Agricultural and Municipal Water Management in the Southwestern United States** — **Room 304/306**

Moderator - Lynne Lewis, Bates College

1:30 PM — ***Heterogeneous water demands: Implications for conservation and welfare** - Alexander Maas, Colorado State University (co-authors: C. Goemans, D. Manning, S. Kroll)

1:50 PM — **The cost of stability consumption-based fixed rate billing for water utilities** - Amy Schmidt, Bates College (co-author: L. Lewis)

2:10 PM — ***Rural to urban water transfers and the future of rural agricultural economies in the semi-arid West** - Kevin Crofton, Colorado State University (co-authors: D. Manning, C. Goemans, H. Cutler)

2:30 PM — ***The impact of preference aggregation on support for groundwater management policies** - R. Aaron Hrozencik, Colorado State University (co-authors: D. Manning, J. Suter, C. Goemans, R. Bailey)

Session 41 — **Stretching Our Water Supplies: Planning and Implementing Reuse II** — **Room 322**

Moderator - June Wolfe, Texas A&M AgriLife Research - Blackland Research and Extension Center

1:30 PM — **Concepts to increase global water supplies** - Anish Jantrania, Texas A&M AgriLife Extension and Research (co-author: J. Wolfe)

1:50 PM — **Combining climate change scenarios and hydrological modeling to support water infrastructure planning with a focus on aquifer storage and recovery (ASR)** - June Wolfe III, Texas A&M AgriLife Research - Blackland Research and Extension Center (co-authors: J. Jeong, A. Jantrania, R. Bailey)

2:10 PM — **Designing an aquifer geochemical characterization program to enhance water reuse project planning** - Kelly Donahue, Brown and Caldwell (co-authors: S. Wang, M. Schumacher, T. Dufour, E. Mackey)

2:30 PM — **Development of low-cost water reuse system by minor modification of the wastewater treatment plant: Engineering evaluation** - Hafiz Ahmad, Florida State University (co-author: J. Miller)

Session 42 — **Quantifying the Water Quality Outcomes of Watershed-scale Conservation Projects III** — **Room 308/310**

Moderator - Jennifer Tank, University of Notre Dame

1:30 PM — **Linking soil health to improved water quality via the planting of cover crops in two Indiana watersheds** - Ursula Mahl, University of Notre Dame (co-authors: S. Christopher, J. Tank, B. Hanrahan, M. Trentman, K. Prior, S. Speir, T. Royer)

1:50 PM — ***Response in dissolved organic carbon dynamics and greenhouse gas emissions to watershed-scale implementation of winter cover crops** - Kara Prior, Indiana University (co-authors: T. Royer, J. Tank, S. Christopher, B. Hanrahan, U. Mahl, S. Speir, M. Trentman)

2:10 PM — **Long-term research and monitoring of conservation practice effects in Iowa watersheds** - Thomas Moorman, National Laboratory for Agriculture and the Environment, USDA-ARS (co-authors: M. Tomer, D. Jaynes, T. Kaspar, T. Parkin, R. Malone, T. Isenhart)

2:30 PM — ***Re-aligning stream rehabilitation theory and practice to attenuate edge-of-field and in-stream nitrate export and in agricultural waterways in Canterbury, New Zealand** - Brandon Goeller, University of Canterbury (co-authors: C. Febria, H. Warburton, K. Collins, K. Hogsden, H. Devlin, J. Harding, A. McIntosh)

Wednesday, June 14

2:50 PM - 3:10 PM
Break (Grand Ballroom B)
Light refreshments available.

3:10 PM - 4:30 PM
Concurrent Technical Sessions
*Student presenter in oral presentation competition

Session 43 — **Integrating Science and Management in a Decision-Making Framework** — **Room 324**
Moderator - Connie Woodhouse, University of Arizona

3:10 PM	**Using synthetic data as an uncertainty assessment tool** - Stephanie McAfee, University of Nevada, Reno (co-authors: C. Woodhouse, G. McCabe, G. Pederson)
3:30 PM	**The Upper Missouri Basin Impacts Assessment and Missouri Headwaters Basin Study** - Patrick Erger, Bureau of Reclamation (co-authors: G. Benock, L. Dolan, J. Heffner, M. McGuire, J. Lanini, D. Broman, G.T. Pederson, J. Martin, C.A. Woodhouse, E.C. Cook)
3:50 PM	**Applied paleohydrologic information for improved water management in the Upper Missouri Basin** - Gregory Pederson, U.S. Geological Survey (co-authors: J. Martin, C.A. Woodhouse, E.C. Cook, M. McGuire, J. Lanini, D. Broman, P. Erger, L. Dolan, S. Gangopadhyay, G. Benock)
4:10 PM	**Overcoming the "last-mile" problem of use-inspired research** - Jeffrey Lukas, Western Water Assessment, University of Colorado Boulder

Session 44 — **The U.S.-Mexico Transboundary Aquifer Assessment Program: Ongoing Work and Future Directions** — **Room 300**
Moderator - Sam Fernald, New Mexico Water Resources Research Institute

3:10 PM	***The U.S. Mexico Transboundary Aquifer Assessment Program in Arizona: Current and future efforts** - Elia Tapia, University of Arizona Water Resources Research Center (co-authors: S. Megdal, J.D. Petersen-Perlman)
3:30 PM	**Aquifers shared between Mexico and the U.S.: Management perspectives and their transboundary nature** - Rosario Sanchez, Texas Water Resources Institute (co-author: G. Eckstein)
3:50 PM	**The Mesilla Valley Basin Aquifer the impact of water regimes on riparian vegetation. Can cooperation, conservation strategies, and policies ensure the sustainability of groundwater?** - Aracely Tellez and Maria Milanes-Murcia, New Mexico Water Resources Research Institute
4:10 PM	**Additional dialogue on the US-Mexico Transboundary Aquifer Assessment Program: Past, present, and future** - Jacob D. Petersen-Perlman, Water Resources Research Center, University of Arizona (co-author: S. Megdal)

Session 45 — **Irrigation Aquifer Depletion and Challenges to Sustainability: Innovative solutions (Policies)** — **Room 312**
Moderator - David Brauer, CPRL-ARS-USDA

3:10 PM	**The economics of local enhanced management areas in southwest Kansas** - Bill Golden, Kansas State University (co-author: B. Guerrero)
3:30 PM	**Sustainable Groundwater Management Policy in California: Its implementation so far** - Samuel Sandoval-Solis, University of California, Davis (co-author: M. Flores Marquez)
3:50 PM	***Implementing the Sustainable Groundwater Management Policy in California, Case of Study: Ukiah Valley Groundwater Basin** - Maritza Flores Marquez, University of California, Davis (co-author: S. Sandoval-Solis)
4:10 PM	**Do water user associations increase the adoption of micro-irrigation systems? A conceptual framework and implications for water policy design** - Seong Park, Texas A&M AgriLife Research (co-authors: Y. Fan (1st author), S. Park, Z. Nan)

Session 46 — **Arizona Programs and Projects to Address Future Colorado River Shortages** — **Room 304/306**

Moderator - Perri Benemelis, Central Arizona Groundwater Replenishment District

3:10 PM **Colorado River shortages to Arizona under the 2007 interim guidelines** - Vineetha Kartha, Colorado River Management, Arizona Department of Water Resources

3:30 PM **Water banking in Arizona** - Terri Sue Rossi, Arizona Water Banking Authority

3:50 PM **Recovery of banked water in Arizona: Planning and implementation** - Laura Grignano, Central Arizona Water Conservation District (CAWCD) (co-author: K. Seasholes)

4:10 PM **Voluntary programs to protect lakes Powell and Mead - Colorado River Pilot System Conservation Program and drought response actions memorandum of understanding** - Chuck Cullom, Central Arizona Project (co-author: D. Ikeya)

Session 47 — **Aquifer Recharge & Cloud Seeding** — **Room 322**

Moderator - David Kreamer, University of Nevada, Las Vegas

3:10 PM **Estimation of available surface water for managed aquifer recharge in California's Central Valley: A case study on the Cosumnes River Basin** - Erfan Goharian, University of California, Davis (co-authors: S. Sandoval-Solis, G. Fogg)

3:30 PM **Managing artificial recharge in Las Vegas and southern Nevada** - David Kreamer, University of Nevada, Las Vegas

3:50 PM **Tracking hurricane precipitation signatures in aquifer recharge: An exercise in citizen science** - Kristine Uhlman, Retired: University of Arizona WWRC (co-author: C. Eastoe)

4:10 PM **Weather modification in Colorado** - Erik Skeie, Colorado Water Conservation Board

Session 48 — **Quantifying the Water Quality Outcomes of Watershed-scale Conservation Projects IV** — **Room 308/310**

Moderator - Jennifer Tank, University of Notre Dame

3:10 PM **Agriculture partners to protect water quality in the Western Lake Erie Basin** - Andrea Stay, Michigan Department of Agriculture and Rural Development

3:30 PM **Water quality targeting success stories: Achieving cleaner water through farm conservation watershed projects** - Michelle Perez, American Farmland Trust

3:50 PM **Conservation practice effectiveness and application for water quality improvements in agricultural subwatersheds of the Mackinaw River, Illinois, USA** - Maria Lemke, The Nature Conservancy (co-authors: D. Kovacic, M. Day, M. Wallace, W. Perry, J. Kraft, K. Kirkham, A. Maybanks, K. Bohnhoff, T. Noto, M. Linsenbigler)

4:10 PM **Agricultural watershed projects and conservation practices: Synthesis and lessons learned from 13 watersheds across the United States** - Deanna Osmond, North Carolina State University (co-authors: D. Meals, D. Hoag, M. Arabi, D. Line, A. Sharpley)

4:45 PM -5:45 PM
Student Speed Networking Event: Making Connections (Room 306)
See page 33 for more details.

6:00 PM -7:30 PM
Awards Banquet
(Grand Ballroom C/D)
Must be pre-registered. Bring your ticket with you.

Thursday, June 15

8:30 am - 9:50 am
Plenary Session:
Expanding Funding and Partnership Opportunities in a Changing Environment
(Grand Ballroom C)

Moderator - Doug Parker, California Institute for Water Resources, University of California



Peter Colohan is the Director of Service Innovation and Partnership for the Office of Water Prediction at the National Oceanic and Atmospheric Administration (NOAA). From 2010 to 2016, Peter served as a senior advisor to Obama Administration officials on environmental data, climate, water, and drought, first as a member of the White House staff in the Office of Science and Technology Policy (OSTP), then as OSTP's Assistant Director for Environmental Information, then as Senior Advisor to the NOAA Chief Scientist. From 2002 to 2010, Peter served NOAA as a consultant and program manager in strategic planning and international coordination of Earth observations and environmental monitoring. During this time, he facilitated the establishment of the Group on Earth Observations (GEO), an intergovernmental body involving over 90 governments, five United Nations agencies, and more than 50 international organizations. Peter holds degrees from the College of William and Mary in Virginia and American University's School of International Service.



Ted Kowalski is a Senior Program Officer, leading the Walton Family Foundation's Colorado River Initiative. In this role, Ted supports work that promotes sustainable management of the Colorado River in order to benefit rivers. Prior to joining the Foundation, Ted was the Chief of the Interstate, Federal and Water Information Section, for the Colorado Water Conservation Board. In this role, Ted represented the State of Colorado in State, Federal, inter-State, and international negotiations. Ted is recognized for his deep expertise in Colorado River water management issues. He has testified before the U.S. Congress and before the Colorado General Assembly, and he has spoken at dozens of conferences. Ted started his career in the Colorado Attorney General's office working on water law issues. Ted has a law degree from the University of Colorado and an undergraduate degree from Cornell University.



James W. Jones currently is a Program Director with the National Science Foundation for the INFEWS initiative in the Engineering Directorate (CBET Division). He received a Ph.D. from North Carolina State University in Biological and Agricultural Engineering. His research area is on mathematical modeling of cropping systems; interactive effects of climate, soil, water, genetics, and management on productivity; climate risk management and decision support for agriculture; and integration of crop and other models for application at field and broader spatial scales. He co-founded the Agricultural Model Intercomparison and Improvement Program (AgMIP – www.agmip.org) and the Florida Climate Institute, a coalition of nine universities in Florida conducting research and outreach activities on climate change and sea level rise and associated impacts and societal responses (www.floridaclimateinstitute.org). He is recognized globally as a leader in modeling cropping systems and applying them for improving agricultural productivity and resource use efficiency. He has organized and taught courses on concepts and applications of agricultural systems models for assessment of climate and management responses during the last thirty years. He is a member of the National Academy of Engineering and Fellow member of four societies (AAAS, ASABE, ASA, SSSA), and is Distinguished Professor Emeritus of the University of Florida.



Sally Rockey became the inaugural Executive Director of the Foundation for Food and Agriculture (FFAR) in September 2015. Prior to this role, Dr. Rockey was an award-winning leader in Federal research, overseeing the operations of the extramural programs in both agriculture and biomedicine. She spent 19 years with the U.S. Department of Agriculture (USDA) where she held a number of positions within the Cooperative State Research, Education, and Extension Service. Very early in her career she became the head of the competitive grants program, overseeing the extramural grants process and portfolio. In her final years with USDA she was the Chief Information Officer, applying her breadth of government knowledge to information technology. She brought her experience in agriculture research to her 11-year career at the National Institutes of Health, where she emphasized the connection between agriculture, food, and health. As Deputy Director for Extramural Research, Dr. Rockey oversaw the operations of the largest Federal extramural research program and led groundbreaking initiatives and activities that have and will have a lasting positive impact on the research community. Dr. Rockey received her Ph.D. in Entomology from the Ohio State University and did postgraduate work at University of Wisconsin prior to joining the government. She has devoted her career to improving people's lives through research and will continue her mission by seeing FFAR become an essential component of the scientific enterprise.

9:50 AM - 10:10 AM
Break (Grand Ballroom B)

10:10 AM - 11:50 AM
Concurrent Technical Sessions

*Student presenter in oral presentation competition

Session 49 — Room 324

Students, Fellows, and Feds: Training the Next Generation of Water Resource Professionals

Moderator - Mary Donohue, University of Hawaii

10:10 AM	**The water resource workforce: Impressions from the nonprofit sector** - Larry E. Brazil, RTI International
10:30 AM	**How embracing diversity improves results: Sharing experiences from a 20 year career in a water utility** - Carol Webb, City of Fort Collins
10:50 AM	**The United States Geological Survey (USGS) workforce: Today and tomorrow** - Earl Greene, United States Geological Survey (USGS)
11:10 AM	**How the USGS engages with universities to provide research and training opportunities for students** - Eleanour Snow, U.S. Geological Survey
11:30 AM	**Evaluating student training and STEM workforce development at the National Institutes for Water Resources (NIWR)** - Mary Donohue, University of Hawaii (co-authors: E.A. Greene, P. Moravcik, D.T. Lerner)

Session 50 — Room 300

Groundwater in the Southwest and its Role and Limitations in Mitigating Climate Change Impacts

Moderator - Brian Hurd, New Mexico State University

10:10 AM	**Using multiple data sources to identify trends and sustainability in agricultural groundwater use in the southwestern United States** - Emile Elias, USDA-ARS, Jornada Experimental Range, SW Climate Hub (co-authors: M. Lopez, C. Maxwell, D. James, R. Smith, C. Steele, A. Rango)
10:30 AM	***How does moral hazard in crop insurance affect producers' groundwater use for irrigation?** - James Keeler, University of Nebraska Lincoln (co-authors: T. Mieno, C. Walters)
10:50 AM	**Crop suitability, surface water availability and groundwater storage effects of agricultural groundwater banking** - Helen Dahlke, University of California, Davis (co-authors: T. Kocis, A. Brown, G. Kourakos, T. Harter)
11:10 AM	**Considerations of climate risk in groundwater valuation and management** - Brian Hurd, New Mexico State University (co-author: P. Ghosh)
11:30 AM	**Gaining a better understanding of the shared transboundary groundwater resources by upgrading the Hueco Bolson Model** - Zhuping Sheng, Texas A&M University (co-authors: D. Zhang, S. Abudu, J. Tracy, A. Michelsen, K.M. Bushira, Q. Liu, P. Yang)

Thursday, June 15

Session 51 — **Advancing Agricultural Water Security and Resilience Under Nonstationarity and Uncertainty: Evolving Roles of Blue, Green, & Grey Water** — **Room 312**

Moderator - Paula Rees, MA Water Resources Research Center

10:10 AM **The challenge of water footprint analysis in agricultural water resource management** - Marty Matlock, University of Arkansas (co-authors: G. Thoma, E. Boles)

10:30 AM **Agricultural use of reclaimed water in Florida: Food for thought** - Lawrence R. Parsons, University of Florida, IFAS

10:50 AM ***Towards optimizing green and blue water investment portfolios to achieve food security in Sub Saharan Africa** - Sarah Freeman, University of Massachusetts, Amherst (co-authors: C. Brown, E. Douglas, P. Weiskel, R. Vogel)

11:10 AM **Blue, green, and grey water: A current review of empirical approaches for quantifying human appropriation of water resources** - Stanley Mubako, University of Texas at El Paso

11:30 AM **Mesoscale data fusion to map and model the U.S. Food-Energy-Water system (INFEWSion)** - Christopher Lant, Utah State University (co-author: B. Ruddell (1st author))

Session 52 — **Integrated Forest Planning to Build Fire Resilient Watersheds with Sustainable and Quality Water Supplies** — **Room 304/306**

Moderator - Yu Wei, Colorado State University

10:10 AM **Prioritizing fuel treatments to mitigate negative post-wildfire watershed responses in two Colorado municipal watersheds** - Benjamin Gannon, Colorado Forest Restoration Institute at Colorado State University (co-authors: Y. Wei, S. Kampf, L. MacDonald, J. Cannon, B. Wolk, A. Cheng, K. Jones, R. Addington, M. Thompson)

10:30 AM **Erosion and sediment delivery to streams following wildfire: Processes and predictions** - Stephanie Kampf, Colorado State University (co-authors: L. MacDonald, F. Saavedra, C. Wilson, S. Schmeer, D. Brogan, P. Nelson, B. Gannon)

10:50 AM **A multistage stochastic program with recourse for scheduling prescribed burning to mitigate watershed fire risk** - Dung Nguyen, Colorado State University (co-author: Y. Wei)

11:10 AM ***Assessing biological and physical controls on persistent nutrient losses in severely-burned watersheds** - Allison Rhea, Colorado State University (co-authors: T. Covino, C. Rhoades, T. Fegel)

11:30 AM **Wildfire risk management, watershed health, and suppression response** - Matthew Thompson, U.S. Forest Service (co-author: T. Warziniack)

Session 53 — **Water Sustainability in the South Platte River Basin** — **Room 322**

Moderator - Mazdak Arabi, Colorado State University

10:10 AM **Application of the Integrated Urban Water Model to assess scenarios of water conservation and reuse, climate change and urban growth** - Sybil Sharvelle, Colorado State University (co-authors: M. Arabi, A. Dozier)

10:30 AM ***Hydroeconomic modeling framework for assessing vulnerability to water demands in arid regions** - Andre Dozier, Colorado State University (co-authors: M. Arabi, C. Goemans, B. Wostoupal, Y. Zhang, K. Paustian)

10:50 AM **Can the M&I water supply gap be met exclusively with agricultural conservation?** - Doug Kenney, University of Colorado (co-authors: A. Dozier, M. Arabi, M. Squillace)

11:10 AM **Enhancing the DayCent model to analyze deficit irrigation practices in SPRB** - Yao Zhang, Colorado State University (co-authors: A. Dozier, M. Arabi, K. Paustian)

11:30 AM ***Identifying effective approaches to reduce WWTF nutrient load at the watershed scale accounting for removal efficiency and implementation cost** - Brock Hodgson, Colorado State University (co-author: S. Sharvelle)

Session 54	Gold King Mine Spill: Impacts of Legacy Mines on Watersheds Moderator - Karletta Chief, University of Arizona	Room 308/310
10:10 AM	**The social impacts of abandoned mines: Using Peer Listing models to mitigate corrosive community tendencies** - Rebecca Clausen, Fort Lewis College	
10:30 AM	**Building community partnerships to respond to Diné concerns regarding the Gold King Mine Spill** - Karletta Chief, University of Arizona (co-authors: P. Beamer, J. Ingram, N. Teufel-Shone, M. Begay Jr., D. Billheimer, N. Lothrop, J. Yazzie, R. Clausen)	
10:50 AM	**A perspective on the biogeochemical processes in the Animas River** - Lucía Rodríguez-Freire, University of New Mexico (co-authors: S. Avasarala, P. McLee, K. Artyushkova, A. Brearley, E. Peterson, L. Crossey, D. Latta, A. Ali, A. Schuler, J.M. Cerrato)	
11:10 AM	**What are the effects of the Gold King Mine Spill on San Juan County, NM agricultural irrigation ditches and farms?** - Kevin Lombard, New Mexico State University Agricultural Science Center at Farmington (co-authors: S. Fullen, A. Ulery, B. Hunter, D. VanLeeuwen, G. Jha, B. Francis)	
11:30 AM	**Examination of sediment microbial communities in the Animas River Watershed following the Gold King Mine Spill** - Patrick McLee, University of New Mexico (co-authors: L. Rodriquez, J. Cerrato, S. Avasarala, A. Schuler)	

Post-conference Field Trip

1:45 pm - 7:00 pm

Mountain Whitewater Descents Rafting Trip

Must be pre-registered. Bring your ticket with you.

Enjoy a whitewater rafting trip down Colorado's only designated Wild and Scenic River – The Cache La Poudre! This adventure offers a continuous 8-mile section of class II, III and IV rapids combined with views of steep Rocky Mountain canyons and insight from local rafting guides on the environmental history and ecology of the area for an unforgettable experience. June 15 falls within the river's peak runoff season so rafters will truly experience the white water. This is a participatory activity, so come prepared to paddle and join in the fun!

Schedule

1:45 PM, Meet in lobby of Ft. Collins Hilton Hotel (425 West Propect Rd.) and load vans (leaving at 2:00 PM).
3:00 PM, Arrive at Mountain Whitewater Descents. Raft trip will be 1.5-2 hours, depending on flow.
6:00 - 6:30 PM, Return to Mountain Whitewater Descents.
7:00 PM, Return to Hilton.

Please note: Participants will be required to wear a wet suit. Rentals are available for $10 or you can bring your own. Participants will be required to sign a liability waiver, available for preview at: https://www.smartwaiver.com/w/550742ce7d615/web/

Presenter Index

A

Abid, Irfan (Poster), Georgia Institute of Technology, irfan_abid@hotmail.com
Adhiakri, Pradip (Session 15), Post Doctoral Fellow, Oklahoma State University, pradip.adhikari@okstate.edu
Adusumilli, Naveen (Session 34), Assistant Professor, Louisiana State University Agricultural Center, nadusumilli@agcenter.lsu.edu
Aguilar, Jonathan (Session 39), Assistant Professor, Kansas State University, jaguilar@ksu.edu
Ahiablame, Laurent (Session 2), Assistant Professor, South Dakota State University, laurent.ahiablame@sdstate.edu
Ahmad, Hafiz (Session 41), Associate Teaching Professor, Florida State University, hahmad@pc.fsu.edu
Ahn, So-Ra (Session 8), Assistant Research Scientist, Texas A&M AgriLife Research Center, sora.ahn@ag.tamu.edu
Aiken, Robert (Session 21), Associate Professor, Kansas State University, raiken@ksu.edu
Aliyari, Fatima (Poster), Research Assistant, Colorado State University, fatimaa@colostate.edu
Alley, William (Session 38), Director, Science and Technology, National Ground Water Association, walley@ngwa.org
Alley, William and Rosemarie (Plenary), Invited Authors
Alodah, Abdullah (Session 8), Ph.D. Candidate, University of Ottawa, aso261@hotmail.com
Andales, Allan (Sessions 15 & 22), Associate Professor, Colorado State University, Allan.Andales@colostate.edu
Arsuffi, Tom (Session 31), Director, Texas Tech University Llano River Field Station, tom.arsuffi@ttu.edu
Austin, Bradley (Session 18), Post Doctoral Research Associate, Arkansas Water Resources Center, bjaustin@uark.edu

B

Bailey, Ryan (Session 15), Assistant Professor, Colorado State University, rtbailey@colostate.edu
Beasley, Jeffrey (Session 1), Associate Professor, LSU AgCenter, jbeasley@agcenter.lsu.edu
Bell, Colin (Session 29), Post Doctoral Research Fellow, Colorado School of Mines, Cdbell@mines.edu
Bennett, Katrina (Session 23), Director's Postdoctoral Fellow, Los Alamos National Laboratory, kbennett@lanl.gov
Bensching, Leah (Poster), University of Colorado Boulder, leah.bensching@colorado.edu
Bernat, Rebecca (Poster), Graduate Teaching Assistant, University of Arizona, rebeccabernat@email.arizona.edu
Berthold, Allen (Session 31), Research Scientist, Texas A&M University, taberthold@ag.tamu.edu
Blount, William K. (Session 8), Ph.D. Student, Research Assistant, Colorado School of Mines, Department of Hydrologic Science and Engineering, wkblount@mymail.mines.edu
Borel, Kyna (Session 20), Graduate Research Assistant, Texas A&M University, kborel@tamu.edu
Bovee, Brett (Session 10), Regional Director, WestWater Research, LLC, bovee@waterexchange.com
Brauer, David (Session 3), Manager of the Ogallala Aquifer Program, CPRL-ARS-USDA, david.brauer@ars.usda.gov
Brazil, Larry E. (Session 49), Vice President, Water Resources Management Division, RTI International, lbrazil@rti.org
Brazil, Liza (Poster), Community Support Specialist, CUAHSI, lbrazil@cuahsi.org
Broadbent, Craig (Session 34), Professor of Economics, Brigham Young University Idaho, broadbentcr@byui.edu
Broad, Tyson (Session 11), Watershed Coordinator, Llano River Field Station - Texas Tech University, tyson.broad@ttu.edu
Brumbelow, Kelly (Session 31), Associate Professor and Assistant Department Head for Undergraduate Programs, Texas A&M University, kbrumbelow@civil.tamu.edu
Burnett, David (Session 6), Director of Technology, Texas A&M University-GPRI, burnett@tamu.edu
Butler, Erick (Poster), Assistant Professor of Environmental Engineering, West Texas A&M University, ebutler@mail.wtamu.edu

C

Cabot, Perry (Session 4), Research and Extension Leader, Colorado State University, perry.cabot@colostate.edu
Castle, Anne (Plenary), Senior Fellow, Getches-Wilkinson Center for Natural Resources, Energy, and the Environment, University of Colorado
Chase, Alexandra (Session 24), Ocean and Coastal Law Fellow, National Sea Grant Law Center, archase@olemiss.edu
Chen, Kelly J. (Poster), ERDC-CERL (USACE), kchen35@illinois.edu
Chief, Karletta (Sessions 7 & 54), Assistant Professor, University of Arizona, kchief@email.arizona.edu
Claes, Niels (Session 32), Research Associate, University of Wyoming, nclaes@uwyo.edu
Clausen, Rebecca (Session 54), Associate Professor, Fort Lewis College, clausen_r@fortlewis.edu
Clerico, Ed A. (Session 35), CEO Emeritus, Natural Systems Utilities, LLC, eclerico@naturalsystemsutilities.com
Cole, Jeanne (Session 29), Ph.D. Candidate, Colorado State University, cole.jeanne@gmail.com
Colohan, Peter (Plenary), Director of Service Innovation and Partnership, Office of Water Prediction, National Oceanic and Atmospheric Administration
Condon, Laura (Session 23), Assistant Professor, Syracuse University, lecondon@syr.edu
Conroy-Ben, Otakuye (Session 7), Assistant Professor, Arizona State University, otakuye.conroy@asu.edu

Presenter Index

Crofton, Kevin (Session 40), Graduate Student, Colorado State University, kevincro@rams.colostate.edu
Cullom, Chuck (Session 46), Colorado River Programs Manager, Central Arizona Project, ccullom@cap-az.com

D

Dahlke, Helen (Session 50), Assistant Professor, University of California, Davis, hdahlke@ucdavis.edu
Davis, Stacia (Session 1), Assistant Professor, LSU AgCenter, sdavis@agcenter.lsu.edu
DeJonge, Kendall (Session 22), Agricultural Engineer, USDA-ARS, kendall.dejonge@ars.usda.gov
Dell, Tyler (Session 18), Research Associate, Colorado State University, tyler.dell@colostate.edu
Deng, Chenda (Poster), Graduate Research Assistant, Colorado State University, dengchenda@gmail.com
DeOtte, Robert (Session 9), Professor of Civil and Environmental Engineering, West Texas A&M University, rdeotte@wtamu.edu
Devlin, Daniel (Session 3), Director, Kansas Center for Agricultural Resources and the Environment, Kansas State University, ddevlin@ksu.edu
Dhungel, Sulochan (Poster), Ph.D. Student, University of Utah, sulochandhungel@gmail.com
Dobrowolski, James (Session 3), National Program Leader for Water, USDA National Institute of Food and Agriculture, jdobrowolski@nifa.usda.gov
Donahue, Kelly (Session 41), Senior Geochemist, Brown and Caldwell, kdonahue@brwncald.com
Donohue, Mary (Session 49), Program Specialist Faculty, University of Hawaii, donohuem@hawaii.edu
Doyle, John (Session 7), Co-Principle Investigator, Little Big Horn College, doylej@lbhc.edu
Dozier, Andre (Session 53), Ph.D. Candidate, Colorado State University, andre.dozier@colostate.edu
Durfee, Nicole (Poster), Graduate Student, Oregon State University, durfeen@oregonstate.edu

E

Elias, Emile (Session 50), Research Hydrologist and Deputy Director, USDA-ARS, Jornada Experimental Range, SW Climate Hub, emileelias@ars.usda.gov
Emanuel, Ryan (Session 7), Associate Professor, North Carolina State University, ryan_emanuel@ncsu.edu
Erger, Patrick (Session 43), Supervisory Hydrologist, Bureau of Reclamation, perger@usbr.gov
Erickson, Gary (Session 6), Senior Applications Specialist, GE Analytical Instruments, Gary.erickson@ge.com
Essman, Ellen (Session 24), Director, Ohio State University Extension Agricultural & Resource Law Program, essman.23@osu.edu
Ettema, Robert (Session 31), Professor, Colorado State University, rettema@engr.colostate.edu
Evett, Steven (Session 33), Research Soil Scientist, USDA Agricultural Research Service, Bushland, Texas, steve.evett@ars.usda.gov

F

Fields, Christopher (Session 14), Research Assistant, Colorado State University, christopher_fields@msn.com
Figueroa, Jorge (Session 19), Senior Water Policy Analyst, Western Resource Advocates, jorge.figueroa@westernresources.org
Fisher, Thomas (Session 30), Professor, Horn Point Laboratory, University of Maryland Center for Environmental Science, fisher@umces.edu
Fleck, John (Plenary & Session 25), Director, University of New Mexico Water Resources Program, fleckj@unm.edu
Flores Marquez, Maritza (Session 45), Graduate Student Researcher, University of California, Davis, mfloresmarquez@ucdavis.edu
Freeman, Sarah (Session 51), Ph.D. Student, University of Massachusetts, Amherst, sarah.stgeorgefreeman@gmail.com

G

Gannon, Benjamin (Session 52), Research Associate, Colorado Forest Restoration Institute at Colorado State University, benjamin.gannon@colostate.edu
Garner, Bruce (Session 1), County Agent - Agriculture and Natural Resources, LSU AgCenter, bgarner@agcenter.lsu.edu
Gholson, Drew (Session 37), Program Specialist - Water Resources, Texas A&M AgriLife Extension Service, dgholson@tamu.edu
Gilliom, Ryan (Poster), Graduate Research Assistant, Colorado School of Mines, ryan.gilliom@gmail.com
Gilmore, Troy (Session 37), Groundwater Hydrologist, University of Nebraska - Lincoln, gilmore@unl.edu
Goeller, Brandon (Session 42), Ph.D. Student, University of Canterbury, brandon.goeller@pg.canterbury.ac.nz
Goharian, Erfan (Session 47), Postdoctoral Researcher, University of California, Davis, egoharian@ucdavis.edu
Golden, Bill (Session 45), Assistant Research Professor, Kansas State University, bgolden@k-state.edu
Gotkowitz, Madeline (Session 12), Hydrogeologist, Wisconsin Geological Survey, mbgotkow@wisc.edu
Greene, Earl (Session 49), Chief of External Research & National Director of the Water Resources Research Institutes, United States Geological Survey (USGS), eagreene@usgs.gov

Presenter Index

Grigg, Neil (Session 29), Professor, Colorado State University, Neil.Grigg@colostate.edu
Grignano, Laura (Session 46), Senior Policy Analyst, Central Arizona Water Conservation District (CAWCD), lgrignano@cap-az.com

H

Haggard, Brian (Session 12), Director, Arkansas Water Resources Center, haggard@uark.edu
Hancock, Jodie (Session 17), Graduate Student, Southern Illinois University Carbondale, jodie.c.hancock@gmail.com
Hanrahan, Brittany (Session 36), Ph.D. Candidate, University of Notre Dame, bhanrah3@nd.edu
Higgins, Marian (Session 6), CMGC Foundation, Marian@cmgc.com
Hobbins, Mike (Session 5), Research Scientist, NOAA - Physical Sciences Division, mike.hobbins@noaa.gov
Hodgson, Brock (Session 53), Ph.D. Candidate, Colorado State University, bahodgso@rams.colostate.edu
Howell, Nathan (Session 27 & Poster), Assistant Professor of Environmental Engineering, West Texas A&M University, nhowell@wtamu.edu
Hrozencik, R. Aaron (Session 40), Research Assistant, Colorado State University, aaronhroz@gmail.com
Humberson, Delbert (Session 38), Hydrologist, United States Geological Survey, dhumberson@usgs.gov
Hu, Michelle (Poster), Graduate Research Assistant, Oregon State University, hujy@oregonstate.edu
Hurd, Brian (Session 50), Professor, New Mexico State University, bhurd@nmsu.edu

I

Irmak, Suat (Session 22), Professor, University of Nebraska-Lincoln, NAWMN, suat.irmak@unl.edu

J

Janasie, Catherine (Session 24), Research Counsel, National Sea Grant Law Center, cjanasie@olemiss.edu
Jantrania, Anish (Session 41), Associate Professor/Extension Specialist, Texas A&M AgriLife Extension and Research, ajantrania@tamu.edu
Jiang, Peng (Poster), Postdoctoral Fellow, Desert Research Institute Las Vegas, peng.jiang@dri.edu
Johnson, Jeff (Session 37), Director, Delta Research and Extension Center, Mississippi State University, jeff.johnson@msstate.edu
Jones, James W. (Plenary), Program Director, National Science Foundation for the INFEWS Initiative in the Engineering Directorate (CBET Division)

K

Kaiser, Ronald (Session 25), Professor and Program Director, Texas A&M University, rkaiser@tamu.edu
Kambic, Kathleen (Poster), Assistant Professor, Department of Landscape Architecture, University of New Mexico, kambic@unm.edu
Kampf, Stephanie (Session 52), Associate Professor, Colorado State University, stephanie.kampf@colostate.edu
Kapur, Raj (Session 18), Water Resources Program Manager, Clean Water Services, kapurr@cleanwaterservices.org
Kartha, Vineetha (Session 46), Colorado River Management, Arizona Department of Water Resources, vkartha@azwater.gov
Kauffman, Gerald (Session 18), Director, Delaware Water Resources Center, University of Delaware, jerryk@udel.edu
Keeler, James (Session 50), Graduate Student, University of Nebraska Lincoln, keelerjamesb@gmail.com
Kehmeier, Paul (Session 4), Vice-President, Orchard Ranch Ditch Company, Paul-Kehmeier@msn.com
Kenney, Doug (Session 53), Director, Western Water Policy Program, University of Colorado, douglas.kenney@colorado.edu
Khosrowpanah, Shahram (Session 17), Interim Dean, School of Engineering, University of Guam, khosrow@triton.uog.edu
Kim, Jungho (Poster), Research Scientist, Colorado State University, jungho.kim@colostate.edu
Kirk Hall, Peggy (Session 24), Senior Research Associate, Ohio State University Extension Agricultural and Resource Law Program, hall.673@osu.edu
Kisekka, Isaya (Session 21), Kansas State University, ikisekka@ksu.edu
Kline-Robach, Ruth (Session 37), Outreach Specialist, Michigan State University, kliner@msu.edu
Koehler, Richard (Poster), National Hydrologic and Geospatial Sciences Training Coordinator, NOAA/National WeatherService, richard.koehler@noaa.gov
Kolb-Lugo, Jose (Poster), Research Assistant, University of North Florida, n00870162@unf.edu
Kotikian, Maneh (Session 32), Graduate Student, University of Wyoming, mkotikia@uwyo.edu
Kowalski, Ted (Plenary), Senior Program Officer, leading the Walton Family Foundation's Colorado River Initiative
Kreamer, David (Session 47), Professor, University of Nevada, Las Vegas, dave.kreamer@unlv.edu
Kuhn, Eric (Plenary), General Manager, Colorado River District
Kuitu, Michael (Session 12), Extension Program Specialist, Texas A&M AgriLife Extension Service, mkuitu@tamu.edu

Presenter Index

L

Labadie, John W. (Plenary), Professor of Civil and Environmental Engineering, UCOWR Warren A. Hall Medal Award Recipient, Colorado State University
Lant, Christopher (Session 51), Professor and Head, Department of Environment and Society, Utah State University, chris.lant@usu.edu
Lascano, Robert (Session 21), Research Leader, USDA - ARS, Robert.Lascano@ars.usda.gov
Lemke, Maria (Session 48), Aquatic Ecologist, The Nature Conservancy, mlemke@tnc.org
Lepley, Ben (Poster), Assistant Lecturer, University of Arizona, lepley@email.arizona.edu
Levers, Lucia (Session 34), UC Riverside, lucia.levers@ucr.edu
Lin, Xiaomao (Session 9), Assistant Professor, Kansas State University, xlin@ksu.edu
Lombard, Kevin (Session 54), Associate Professor and Superintendent, New Mexico State University Agricultural Science Center at Farmington, klombard@nmsu.edu
Long, Leigh Ann (Session 30), Research Associate II, Iowa State University, lalong@iastate.edu
Lowenfish, Martin (Session 28), Landscape Initiatives Team Leader, USDA-Natural Resources Conservation Service, martin.lowenfish@wdc.usda.gov
Lukas, Jeffrey (Session 43), Research Integration Specialist, Western Water Assessment, University of Colorado Boulder, lukas@colorado.edu

M

Maas, Alexander (Sessions 29 & 40), Research Scientist, Colorado State University, alexander.s.maas@gmail.com
MacIlroy, Kelsea (Session 4), Research Assistant, Colorado Water Institute, kelsea.macilroy@colostate.edu
Macpherson, Brian (Session 14), Water Resources Engineer, DiNatale Water Consultants, brian@dinatalewater.com
Mahl, Ursula (Session 42), Senior Research Technician, University of Notre Dame, umahl@nd.edu
Maples, Stephen (Session 15), Ph.D. Candidate, Dept. of Land, Air, and Water Resources, UC Davis, srmap@ucdavis.edu
Marek, Thomas (Session 27), Sr. Research Engineer & TAMUS Regents Fellow, Texas A&M AgriLife Research, t-marek@tamu.edu
Markel, Doron (Session 11), Lake Kinneret Monitoring and Management Director, Israel Water Authority, doronm10@water.gov.il
Martin, Christine (Poster), Little Big Horn College, martinc@lbhc.edu
Massey, Joseph (Session 27), Research Agronomist, USDA-ARS-Delta Water Management Research Unit, joseph.massey@ars.usda.gov
Matherne, Anne-Marie (Session 38), Unit Chief, Environmental Geosciences, USGS New Mexico Water Science Center, matherne@usgs.gov
Matlock, Marty (Session 51), Professor of Ecological Engineering and Executive Director, Office for Sustainability, University of Arkansas, mmatlock@uark.edu
McAfee, Stephanie (Session 43), Assistant Professor of Geography/Dep. State Climatologist - Nevada, University of Nevada, Reno, smcafee@unr.edu
McDaniel, Rachel (Session 12), Assistant Professor, South Dakota State University, rachel.mcdaniel@sdstate.edu
McGuire, Kevin (Session 25), Associate Professor, Virginia Tech, kevin.mcguire@vt.edu
McLee, Patrick (Session 54), Graduate Research Assistant, University of New Mexico, pmclee@unm.edu
McLeroy, L. Keith (Session 6), Senior Technical Consultant, Global Petroleum Research Institute, Texas A&M University, keith@ecolyse.com
Megdal, Sharon (Sessions 3 & 25), Director, University of Arizona Water Resources Research Center, smegdal@email.arizona.edu
Merrill, Leslie (Session 6), President, RETEGO Labs, lmerrill@retegolabs.com
Milanes-Murcia, Maria (Session 44), Post-Doctoral Scholar, New Mexico Water Resources Research Institute, mmilanes@nmsu.edu
Minjarez Sosa, Ismael (Session 38), Professor, Universidad de Sonora, iminjarez@gmail.com
Mitchell McCallister, Donna (Session 33), Research Assistant Professor, Texas Tech University, donna.m.mitchell@ttu.edu
Mohammed Bushira, Kedir (Poster), Universidad Autonoma De Baja California, kedir.mohammed@uabc.edu.mx
Moorman, Thomas (Session 42), Microbiologist, National Laboratory for Agriculture and the Environment, USDA-ARS, tom.moorman@ars.usda.gov
Morgan, Kelly (Session 16), Professor, University of Florida, conserv@ufl.edu
Mosase, Esther (Session 20), South Dakota State University, esther.mosase@sdstate.edu
Mubako, Stanley (Sessions 2 & 51), Research Assistant Professor, University of Texas at El Paso, stmubako@utep.edu
Mueller, Julie (Session 13), Associate Professor, Northern Arizona University, julie.mueller@nau.edu
Mullins, Emily (Poster), Metropolitan State University of Denver, emullin6@msudenver.edu

N

Negrete Contreras, Nancy (Session 19), Colorado Water Sustainability Fellows, ncnancy@rams.colostate.edu

Presenter Index

Nguyen, Dung (Session 52), Postdoctoral Fellow, Colorado State University, dzung.csu@gmail.com
Nippgen, Fabian (Poster), University of Wyoming, fnippgen@uwyo.edu
North, Rebecca L. (Poster), University of Missouri, northr@missouri.edu

O

Oker, Tobias (Session 39), Graduate Research Assistant, Kansas State University, Southwest Research-Extension Center, oker@ksu.edu
O'Neal, Melissa (Poster), Project Manager, WV Water Research Institute, moneal@mail.wvu.edu
O'Shaughnessy, Susan A. (Session 39), USDA ARS, Susan.O'Shaughnessy@ARS.USDA.GOV
Osmond, Deanna (Session 48), Professor, NC State University, deanna_osmond@ncsu.edu
Owens, Rachel (Poster), West Texas A&M University, reowens1@buffs.wtamu.edu

P

Panos, Chelsea (Poster), Ph.D. Student, Colorado School of Mines, cpanos@mymail.mines.edu
Park, Seong (Session 45), Associate Professor, Texas A&M AgriLife Research, scpark@ag.tamu.edu
Parsons, Lawrence R. (Session 51), University of Florida, IFAS, lparsons@ufl.edu
Peacock, Matthew (Session 14), Graduate Research Assistant, Colorado State University, mpeacock86@gmail.com
Peck, Dannele (Session 26), Director, Northern Plains Climate Hub, USDA Agricultural Research Service, dannele.peck@ars.usda.gov
Pederson, Gregory (Session 43), Research Scientist, U.S. Geological Survey, gpederson@usgs.gov
Pérez-Gutiérrez, Juan D. (Session 16), Ph.D. Candidate, Mississippi State University, jdp624@msstate.edu
Perez, Michelle (Session 48), Senior Policy Specialist, American Farmland Trust, mperez@farmland.org
Petersen-Perlman, Jacob (Session 44), Research Analyst, Water Resources Research Center, University of Arizona, jacobpp@email.arizona.edu
Phillips, Shanon (Session 28), Water Quality Division Director, Oklahoma Conservation Commission, shanon.phillips@conservation.ok.gov
Pleasants, Mark (Session 32), Graduate Assistant, University of Wyoming, mpleasan@uwyo.edu
Porter, Dana (Session 39), Professor, Extension Program Leader and Associate Department Head, Texas A&M University, d-porter@tamu.edu
Pournasiri, Maryam (Session 2), Ph.D. Candidate, University of Colorado Denver, maryam.pournasiriposhtiri@ucdenver.edu
Prior, Kara (Session 42), Ph.D. Student, Indiana University, kprior@indiana.edu

Q

Quintana Ashwell, Nicolas (Session 26), Graduate Research Assistant, Kansas State University, nicolasq@k-state.edu

R

Randall, Joshua (Session 11), Program Specialist, New Mexico Water Resources Research Institute, jnrandall24@gmail.com
Reyes, Julian (Session 5), Research Hydrologist, Climate Hub Fellow, USDA SW Climate Hub, julian.reyes@ars.usda.gov
Rhea, Allison (Session 52), Colorado State University, aerhea@colostate.edu
Ribaudo, Marc (Session 28), Chief, Conservation and Environment Branch, Economic Research Service - USDA, mribaudo@ers.usda.gov
Rockey, Sally (Plenary), Executive Director of the Foundation for Food and Agriculture (FFAR)
Rodríguez-Freire, Lucía (Session 54), Postdoctoral Research Associate, University of New Mexico, luciar@unm.edu
Rodriguez-Jeangros, Nicolas (Session 2), Ph.D. Candidate, Colorado School of Mines, nrodrigu@mymail.mines.edu
Rodriguez, Olga (Poster), Research Assistant, Texas A&M AgriLife Research Center, olga.rodriguez@ag.tamu.edu
Rohmat, Faizal (Session 20), Graduate Research Assistant, Colorado State University, immaddudin@gmail.com
Roosa, Benjamin (Poster), Graduate Research Assistant, Southern Illinois University Carbondale, benjamin.roosa@siu.edu

S

Saadatpour, Alieh (Poster), Visiting Scholar, Colorado State University, alieh@colostate.edu
Salem, Marwa (Session 17), North Carolina State University, msalem@rti.org
Sanchez, Rosario (Session 44), Research Scientist, Texas Water Resources Institute, rosario@tamu.edu
Sandoval-Solis, Samuel (Session 45), University of California, Davis, samsandoval@ucdavis.edu

Presenter Index

Sansom, Garett (Session 13), Associate Director, Texas A&M University - Institute for Sustainable Communities, gsansom@arch.tamu.edu
Sansom, Lindsay (Session 13), Project Coordinator for Texas Transboundary Groundwater Governance Project, Texas A&M University, Lindsay.sansom@gmail.com
Schenk, Xizhen Du (Poster), Georgia Southern University, xschenk@georgiasouthern.edu
Schmidt, Amy (Session 40), Bates College, amythyngschmidt@gmail.com
Schoengold, Karina (Session 26), Associate Professor, University of Nebraska, kschoengold2@unl.edu
Sharvelle, Sybil (Sessions 35 & 53), Associate Professor, Colorado State University, sybil.sharvelle@colostate.edu
Sheely, Rachel (Session 17), Graduate Student, Southern Illinois University Carbondale, rsheely@siu.edu
Sheng, Zhuping (Session 50), Professor, Texas A&M University, zsheng@ag.tamu.edu
Shepstone, Alan (Session 6), Texas A&M Petroleum Engineering, ashepstone14@gmail.com
Shultz, Steven (Session 1), Professor of Real Estate and Land Use Economics, University of Nebraska, sshultz@unomaha.edu
Singaraju, Sreeram (Session 9), Research Associate Engineer, Texas Tech University, sreeram.singaraju@ttu.edu
Singh, Gurbir (Session 30), Graduate Student, Southern Illinois University Carbondale, gsvw9@siu.edu
Sir, Haley (Poster), Metropolitan State University of Denver, hsir@msudenver.edu
Skeie, Erik (Session 47), Program Assistant, Colorado Water Conservation Board, erik.skeie@state.co.us
Slater, Chris (Poster), Ph.D. Candidate, University of South Florida, cjslater@mail.usf.edu
Slinski, Kimberly (Poster), Ph.D. Candidate, Colorado School of Mines, kslinski@mymail.mines.edu
Smith, Kurt (Poster), Professor, Methodist University, kusmith@methodist.edu
Smith, Mark (Session 10), Professor of Economics, Colorado College, msmith@ColoradoCollege.edu
Smits, Kathleen (Poster), Colorado School of Mines, ksmits@mines.edu
Snow, Eleanour (Session 49), Program Manager, Youth and Education, U.S. Geological Survey, esnow@usgs.gov
Solander, Kurt (Session 23), Postdoctoral Research Associate, Los Alamos National Laboratory, ksolander@lanl.gov
Spahr, Katie M. (Poster), Ph.D. Student, Colorado School of Mines, kspahr@mymail.mines.edu
Speir, Shannon L. (Session 36), Ph.D. Student, University of Notre Dame, sspeir@nd.edu
Stay, Andrea (Session 48), Grants and MAEAP Training Liaison, Michigan Department of Agriculture and Rural Development, staya@michigan.gov
Steele, Caitriana (Session 11), College Assistant Professor, New Mexico State University, caiti@nmsu.edu
Sue Rossi, Terri (Session 46), Technical Administrator, Arizona Water Banking Authority, tsrossi@azwater.gov
Sundby, Tim (Session 35), Water Resources Tech, Carver County, tsundby@co.carver.mn.us
Swackhamer, Deborah L. (Plenary), Professor Emerita, UCOWR Warren A. Hall Medal Award Recipient, University of Minnesota
Swaminathan, Vaishali (Poster), Graduate Assistant, Texas A&M University, vaishaliswaminathan@tamu.edu

T

Tagert, Mary Love (Session 16), Assistant Extension Professor, Mississippi State University Extension Service, mltagert@abe.msstate.edu
Takaki, Daniel C. (Poster), Graduate Student, University of Minnesota - Duluth, takak005@d.umn.edu
Tapia, Elia (Session 44), Graduate Associate, University of Arizona Water Resources Research Center, emtapia@email.arizona.edu
Taylor, Robert (Session 28), Professor Emeritus, Auburn University, taylocr@auburn.edu
Tellez, Aracely (Session 44), Graduate Research Assistant, New Mexico Water Resources Research Institute, atellez8@nmsu.edu
Thiessen, Maureen (Poster), Louisiana State University, maureen.e.thiessen@gmail.com
Thompson, Matthew (Session 52), Research Forester, U.S. Forest Service, mpthompson02@fs.fed.us
Three Irons, Emery (Poster), Montana State University, bad_war_deed@outlook.com
Trentman, Matt (Session 30), Ph.D. Student, University of Notre Dame, mtrentma@nd.edu
Truong, Amy Uyen (Poster), Texas A&M University, Uyen.truong@ag.tamu.edu

U

Udall, Brad (Session 4), Senior Scientist, Colorado Water Institute, Colorado State University, bradley.udall@colostate.edu
Uhlman, Kristine (Session 47), Retired: University of Arizona WWRC, kristineumhaniuhlman@gmail.com
Ukasha, Muhammad (Session 8), Graduate Student, Colorado State University, muhammad.ukasha@colostate.edu

V

Vigil, Daryl (Session 19), Ten Tribes Partnership, janwaterguy@gmail.com
Vimont, Ethan (Poster), Graduate Research Assistant, University of Arizona, vimont@email.arizona.edu

Presenter Index

W

Webb, Carol (Session 49), Water Resources and Treatment Operations Manager, City of Fort Collins, cwebb@fcgov.com
Wei, Xiaolu (Session 14), Ph.D. Candidate, Colorado State University, hhuwxl@gmail.com
Welch, Christina (Session 26), Master's Student, Oregon State University, welcchri@oregonstate.edu
West, Chuck (Session 27), Professor of Plant & Soil Science, Texas Tech University, chuck.west@ttu.edu
Wiener, John (Session 10), Research Associate, University of Colorado, john.wiener@colorado.edu
Williams, Mark (Session 36), Agricultural Engineer, USDA ARS, mark.williams2@ars.usda.gov
Wise, Ben (Poster), Research Assistant, University of Colorado Denver, ben.rogers.wise@gmail.com
Wolfe III, June (Session 41), Associate Research Scientist, Texas A&M AgriLife Research - Blackland Research and Extension Center, jwolfe@brc.tamus.edu
Wren, Daniel (Session 16), Research Hydraulic Engineer, USDA-ARS, daniel.wren@ars.usda.gov
Wyndham, Amber (Session 5), Soil Scientist, USDA-NRCS, amber.wyndham@co.usda.gov

X

Xue, Qingwu (Session 33), Associate Professor, Texas A&M AgriLife Research, qxue@ag.tamu.edu

Y

Yang, Pengnian (Poster), Visiting Scholar, Texas A&M AgriLife Research Center at El Paso; and Professor, Xinjiang Agricultural University, Pengnian.Yang@ag.tamu.edu
Yildirim, Tugba (Poster), Research Assistant, EGE University, tugbaayildirim@hotmail.com

Z

Zambreski, Zach (Session 5), Kansas State University, ztz@ksu.edu
Zhang, Yao (Session 53), PostDoc, Colorado State University, rzzhangyao@gmail.com
Zhang, Yongjun (Session 9), PostDoc, Kansas State University, yzhang015@ksu.edu

****** Calling Early Career Professionals and Students ******
Special Events

Tuesday, 12:00 pm - 12:50 pm
Effective Science Communication
Dr. John Calderazzo, Professor, Author, Best CSU Teacher Award
(Room 322)

(Eat a quick bite or pick up to-go lunch in the Student Center and join us!)



This session, aimed at early career professionals and students, will be led by John Calderazzo, Emeritus Professor of English at CSU. John uses the language and storytelling skills he has developed in teaching and writing nonfiction to help scientists and other researchers communicate their work to mainstream audiences, the media, decision makers, and other scientists. He's conducted communication workshops with the American Geophysical Union, United State Geological Survey, American Meteorological Society, and many other scientific organizations. He's a Best CSU Teacher award winner and the author of *Rising Fire: Volcanoes & Our Inner Lives* and other books and magazine articles that focus on the natural world and its effects on human culture. He is the co-founder of Changing Climates at CSU (www.changingclimates.colostate.edu), an interdisciplinary outreach and educational initiative.

Tuesday, 7:00 pm - 8:30 pm
Graduate Student Happy Hour at Avogadro's Number

This year's conference will feature an informal graduate student happy hour on Tuesday evening, June 13th from 7:00 - 8:30 pm at Avogadro's Number. The happy hour will be an opportunity for graduate students attending UCOWR to network with other students pursuing research in water resources. Avogadro's Number is a family-friendly bar and restaurant just north of CSU's campus with alcoholic and non-alcoholic beverage options. Weather permitting, the event will take place in Avogadro's large backyard patio. The event will serve to facilitate discussion and foster future collaborations between early career researchers in water resources. All attendees are invited to attend. CSU graduate student Aaron Hrozencik will meet anyone interested in attending at the UCOWR registration table in the Lory Student Center at 7:00 pm (immediately following the Welcome Reception and Poster Session) to guide interested parties to Avogadro's Number. Please contact Aaron Hrozencik at aaronhroz@gmail.com if you have any questions regarding the event.

Wednesday, 4:45 pm - 5:45 pm
Student Speed Networking Event: Making Connections
(Room 306)

Moderators - Katie Melander, Northern Colorado Water Conservancy District
Tom Cech, Metropolitan State University of Denver

The transition from college to your first career opportunity can be challenging and difficult. There are a number of questions and unique situations that can arise. Join other students, academic and industry professionals, and board and committee members for a speed networking event that includes Colorado water trivia, door prizes, and fun! Learn ways to better handle transitions, resumes, work balance, and anything else you may want to discuss. Snacks and refreshments will be provided.

AWARDS BANQUET

Wednesday, 6:00 PM, Grand Ballroom C/D

Must be pre-registered to attend. Bring your ticket with you.

Congratulations to the 2017 UCOWR awards recipients!
All recipients will be honored at the Awards Banquet.

WARREN A. HALL MEDAL

(recognizes distinguished lifetime achievement in the field of water resources)

John W. Labadie, Professor of Civil and Environmental Engineering at Colorado State University

Deborah L. Swackhamer, Professor Emerita of Science, Technology, and Public Policy at the University of Minnesota

FRIENDS OF UCOWR AWARD

(recognizes individuals or groups who have made outstanding contributions to UCOWR)

Doug Bennett, Conservation Manager for the Southern Nevada Water Authority, Las Vegas, Nevada

John C. Tracy, Director of the Texas Water Resources Institute at Texas A&M University

Faith Sternlieb, Postdoctoral Fellow, Ecosystem Science and Sustainability, Colorado State University

Reagan Waskom, Director of Colorado Water Institute and Chair of Colorado State University Water Center

EDUCATION AND PUBLIC SERVICE AWARD

(recognizes individuals, groups, or agencies that made significant contributions to increase public awareness of water resource development, use, or management)

Community Relations and Outreach (CRO) Program, Prince William County Service Authority
Karen Takacs, Manager

PH.D. DISSERTATION AWARD

(recognizes outstanding Ph.D. dissertations in two categories)

Madeline Gotkowitz, Hydrogeologist, Wisconsin Geological & Natural History Survey; University of Wisconsin - Extension (Natural Science and Engineering category)

Marwa Salem, Senior Economist, RTI International, Durham North Carolina; North Carolina State University (Water Policy and Socioeconomics category)

Thank you to the Warren Hall Medal and Awards Committee for their time and dedication to selecting deserving recipients from an excellent pool of candidates. Committee members are:

Awards Committee
Ari Michelsen, Chair, Texas A&M University, (ret.)
Kelly Cobourn, Virginia Tech University
Ellen Douglas, University of Massachusetts Boston
Melinda Laituri, Colorado State University
Jonathan Yoder, Washington State University

Warren Hall Medal Committee
Sharon Megdal, Chair, University of Arizona
Brian Haggard, University of Arkansas
Jeff Johnson, Mississippi State University

Many Thanks

Thank you to all the presenters, moderators, judges, and attendees.
Each of you are vital to a successful conference!

Conference Organizing Committee

Sharon Megdal, Chair, University of Arizona
Tom Cech, Metro State University Denver
Karletta Chief, University of Arizona
Ellen Douglas, University of Massachusetts Boston
Mike Gooseff, University of Colorado
Doug Kenny, University of Colorado
Dave Kreamer, University of Nevada Las Vegas
Melinda Laituri, Colorado State University
Katie Melander, Northern CO Water Conservancy
Brian Miller, University of Illinois
Ginger Paige, University of Wyoming
Faith Sternlieb, Colorado State University
Kevin Wagner, Texas A&M University
Karl Williard, Southern Illinois University

Technical Program Review Committee

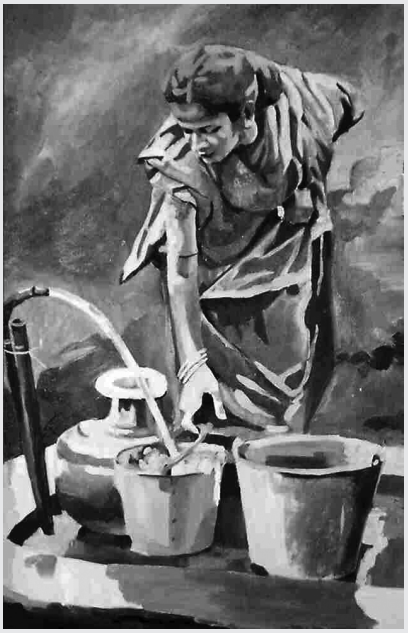
Kevin Wagner, Chair, Texas A&M University
Ellen Douglas, University of Massachusetts Boston
Mike Gooseff, University of Colorado
Brian Haggard, University of Arkansas
Dave Kreamer, University of Nevada Las Vegas
Amy Kremen, Colorado State University
Melinda Laituri, Colorado State University
Kevin McGuire, Virginia Tech University
Katie Melander, Northern CO Water Conservancy
Brian Miller, University of Illinois
Ginger Paige, University of Wyoming
Bryan Swistock, Penn State University
Karl Williard, Southern Illinois University

Special thanks to Colorado Water Institute at Colorado State University, Northern Colorado Water Conservancy District, and The Ivanhoe Foundation for their generous contributions in support of this conference.

The Ivanhoe Foundation

The Ivanhoe Foundation grants Fellowships to needy and deserving students from developing countries. These students must be studying at a U.S. university for a practical Master of Science degree in engineering or science, with an emphasis on water resources. Mr. Ivanhoe, the Foundation's founder, spent most of his working years in developing countries and observed firsthand the plight of water-deprived localities. He felt the most pressing need globally will be practical water-related degrees at the Masters level. For more information go to www.theivanhoefoundation.com.

Afternoon breaks sponsored by The Ivanhoe Foundation



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Interested in submitting a manuscript to our annual open issue in August? Submission deadline is December 15, 2017. Visit ucowr.org for author instructions.

Have an idea for a themed issue? Did you see an interesting concurrent session suitable for a themed issue? Contact Karl Williard, williard@siu.edu

UCOWR
UNIVERSITIES COUNCIL ON WATER RESOURCES

JCWRE is a publication of the Universities Council on Water Resources

Dining within Walking Distance

Ramskeller Pub – traditional pub fare, local brew on tap; 100 level of Lory Student Center

Aspen Grille – green restaurant, student run, fresh grilled; 300 level of Lory Student Center

Lory Student Center – in addition to above, numerous quick options available on conference site!

Spoons – soups, salads, sandwiches; 0.3 mi, 1101 Center Ave. Mall

Cafe Bluebird – homestyle American breakfasts and lunches; 0.3 mi, 524 W. Laurel St.

Rainbow – fresh breakfast and lunch, gluten free/vegan options, patio; 0.5 mi 212 W. Laurel St.

Mayor of Old Town – pub fare, 100 beers on tap; 0.6 mi, 632 S. Mason St.

Dam Good Tacos – fusion style tacos, burritos, and sautés; 0.5 mi, 120 W. Laurel St.

Avogadro's Number – breakfasts, burgers, tempeh, pizza, music; 0.7 mi, 605 S. Mason St.

The Colorado Room – sliders, wings, salads, poutine, bison, local craft beer; 0.7 mi, 642 S. College Ave.

Getting Around

(Denver International Airport is about one hour from Fort Collins, CO.)

Airport Shuttle Reservations

For a **discounted conference reservation**:
Visit the Green Ride website at
http://www.greenrideco.com/res_fc.php
and follow these steps:

- Choose Fort Collins, CO
- Enter discount code CSUMAP in the 'frequent user login' box at the bottom of the screen
- Click 'GO'
- After the screen refreshes, complete reservation.

You may also reserve by phone: (970) 226-5533

Taxi Services

All Cities Taxi (720) 440-7000
Denver Yellow Cab (303)777-7777
Freedom Cabs Inc. (303) 444-4444
Green Taxi Coop. (303) 806-8888
Union Taxi Coop. (303) 922-2222

Uber

www.uber.com
To/from airport:
uber X $85-107,
uber XL $149-196

Rental Cars

Avis (303) 342-5500
Enterprise (800) 261-7331
Hertz (800) 654-3131
Thrifty (800) 367-2277

Fort Collins Area Attractions

Fort Collins Bike Library: Fort Collins is easy to get around by bicycle due to its relatively flat topography and accessible infrastructure (bike racks throughout the city, bike lanes, and trails). Explore Fort Collins on two wheels with the bicycle sharing program. http://bikefortcollins.org/programs/bike-share

Old Town Fort Collins is lined with local boutiques, cafes, antique shops, retail stores, and candy and confectionery shops. There are a variety of restaurants (more than 84) serving dishes for every taste. http://www.visitftcollins.com/things-to-do/discover-old-town/

Magic Bus Tours, a local tour company offering brewing, ghost, farm to table, history, and other guided walking and bus tours. Details and booking at: https://themagicbustours.com/

Microbreweries: Fort Collins is nationally known for its many microbreweries. Read up on the local brew houses and accompanying restaurants at: http://fortcollinsbreweryguide.com/breweries.aspx

Horsetooth Reservoir lies just west of town and provides opportunities for boating, paddle-boarding, picnicking, swimming, and more. http://www.co.larimer.co.us/parks/horsetooth.cfm

Lory State Park offers mountain biking, hiking, and horseback riding amid some fabulous foothills scenery just minutes from Fort Collins and adjacent to Horsetooth Reservoir. http://cpw.state.co.us/placestogo/parks/Lory

So much to do, so little time! For more to explore, please visit:
http://ucowr.org/conferences/things-to-do-ftcollins

NOTES

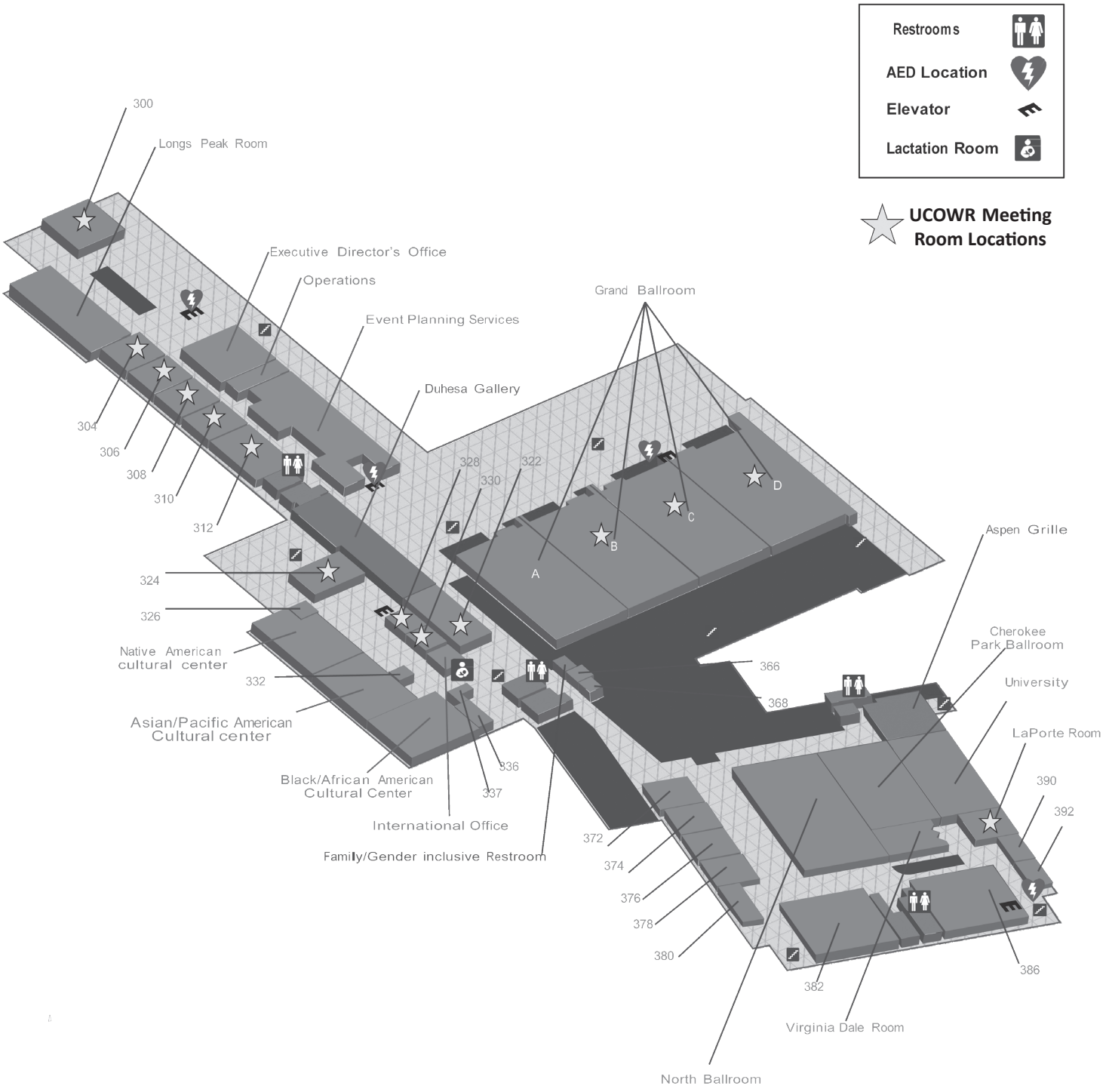
***** Tell Us About Your Conference Experience *****

All attendees will receive an email survey in the days following the conference.
Please provide your feedback and let's make next year's conference even better!

Lory Student Center at Colorado State University, 300 Level Map

1101 Center Avenue Mall
Fort Collins, Colorado 80523

All conference activities will be on the 300 level



Dorm Guests

Check in is at 4 pm at the Academic Village Commons Building accessed from Pitkin Street (circled on map). All guests must be checked out by 10 am the day of departure. You will be provided a room key and meal card at check-in. The meal card can be used for breakfast (7 am - 9:30 am) & lunch (11 am - 1:30 pm) on T/W/Th at Ram's Horn Dining Hall in the Commons Building. Breakfast is also available at the conference venue. All rooms are in the Academic Village Engineering Building (circled on map). Parking is nearby in lot 230. Your parking pass is only good for dorm parking, not at the Lory Student Center. The Commons Building front desk is open from 7 am to 11 pm, should you need assistance.

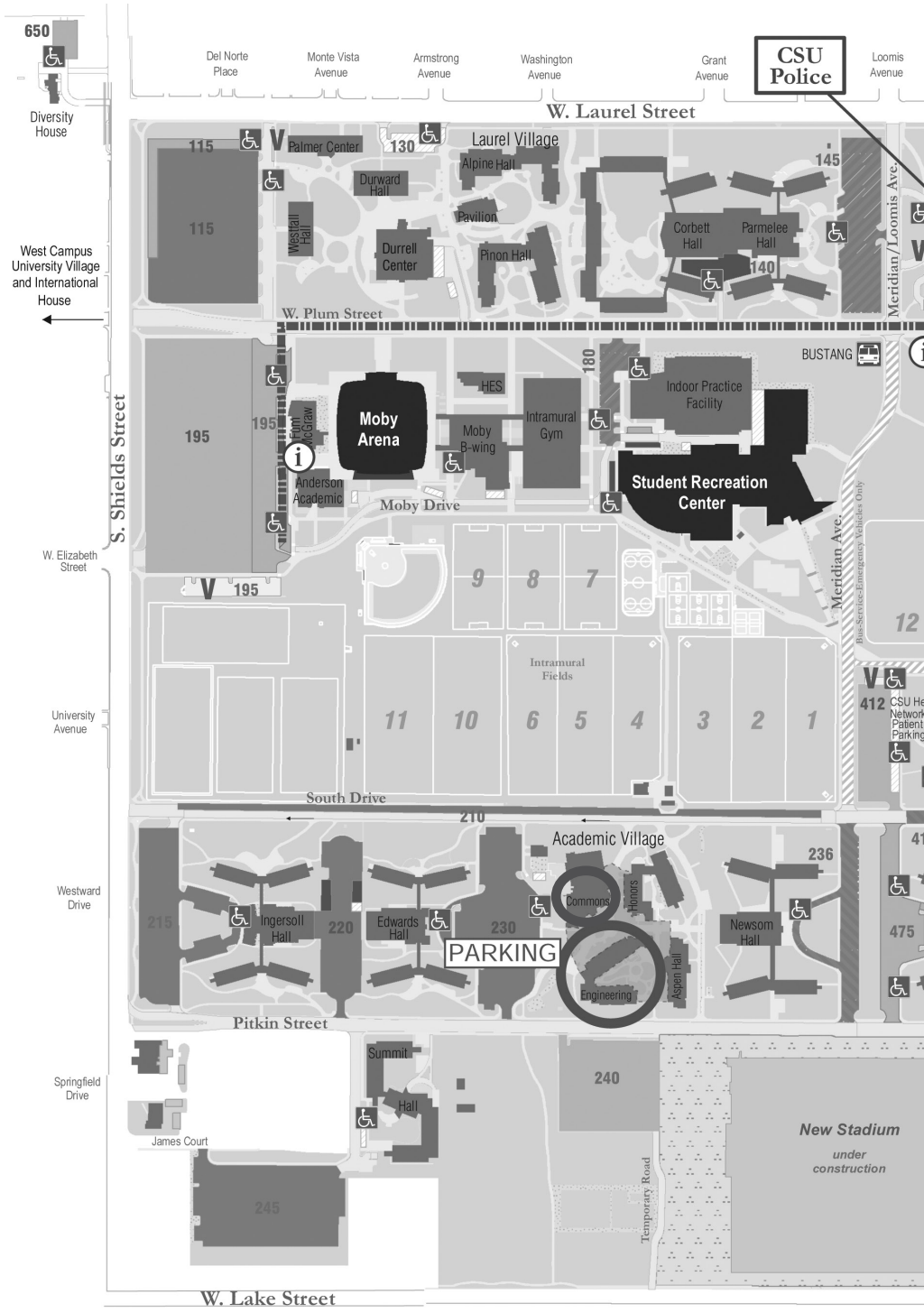
Hilton Guests

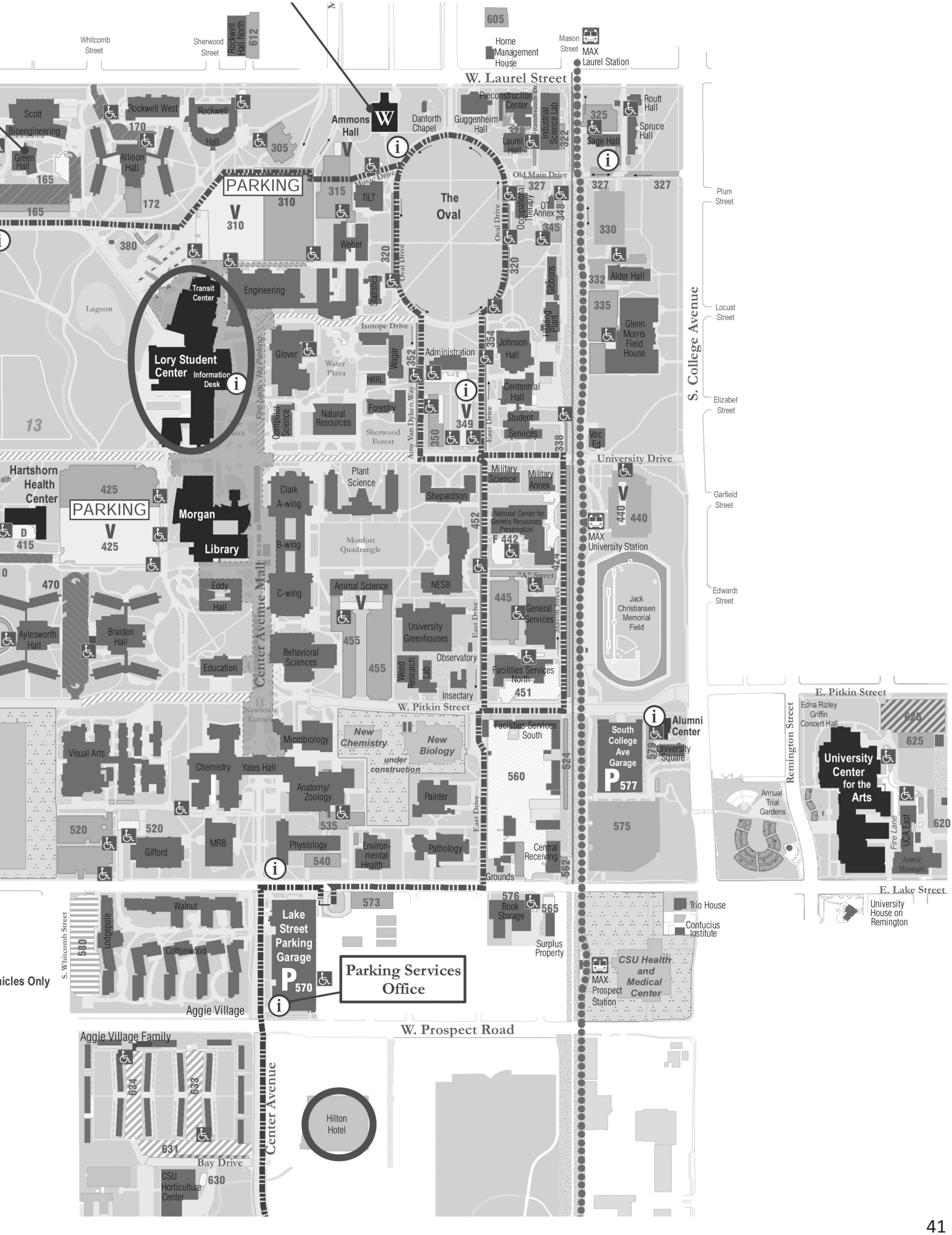
Check in is at 3 pm. Check out is at noon. Parking at the Hilton is included in your room rate. Breakfast will be available from 7:30 am to 8:30 am at the conference venue (Lory Student Center). The Hilton is 0.5 mile directly south of the Lory Student Center (both circled on map).

425 West Prospect Rd
Fort Collins, CO 80526
970-482-2626

Parking

If you purchased a parking tag during online registration, it will be available for pick up at the conference registration desk. Lory Student Center parking is in lots 310 and 425. If you did not purchase a tag, you may park in lot V 310 or V 425, which is pay-as-you-go. Parking is enforced 7:30 am to 4 pm.





W. Laurel Street
Whitcomb Street
Sherwood Street
Rockwell Hall North
Home Management House
Mason Street
MAX Laurel Station
Scott Bioengineering
Rockwell West
Rockwell Hall
Green Hall
Allison Hall
Ammons Hall
Danforth Chapel
Preconstruction Center
Guggenheim Hall
Industrial Science Lab
Laurel Hall
Routt Hall
Spruce Hall
Sage Hall
PARKING
Music Drive
TILT
The Oval
Old Main Drive
Occupational Therapy
OT Annex
Weber
Oval Drive
Engineering
Statistics
Gibbons
Heating Plant
Alder Hall
Glenn Morris Field House
Lagoon
Transit Center
Lory Student Center
Information Desk
Isotope Drive
Glover
Water Plaza
Wagar
NRRL
Administration
Johnson Hall
Centennial Hall
Student Services
Computer Science
Natural Resources
Forestry
Sherwood Forest
Amy Van Dyken Way
East Drive
Voc Ed
S. College Avenue
Plum Street
Locust Street
Elizabet Street
Garfield Street
Edwards Street
University Drive
Hartshorn Health Center
Morgan Library
Clark A-wing
Plant Science
Shepardson
Military Science
Military Annex
National Center for Genetic Resources Preservation
MAX University Station
B-wing
Monfort Quadrangle
"A" Street
Eddy Hall
C-wing
Animal Science
NESB
General Services
Jack Christiansen Memorial Field
Aylesworth Hall
Braiden Hall
University Greenhouses
Behavioral Sciences
Education
Observatory
Weed Research Lab
Facilities Services North
Insectary
Center Avenue Mall
Newton's Corner
W. Pitkin Street
E. Pitkin Street
Edna Rizley Griffin Concert Hall
Visual Arts
Microbiology
New Chemistry
New Biology
under construction
Facilities Services South
South College Ave Garage
Alumni Center
University Square
Chemistry
Yates Hall
Anatomy/ Zoology
Painter
Remington Street
University Center for the Arts
Annual Trial Gardens
Gifford
MRB
Physiology
Environ-mental Health
Pathology
Central Receiving
Grounds
Fire Lane
UCA East
Avenir Museum
E. Lake Street
University House on Remington
Walnut
Lodgepole
Cottonwood
Lake Street Parking Garage
Book Storage
Surplus Property
Trio House
Confucius Institute
S. Whitcomb Street
Parking Services Office
CSU Health and Medical Center
MAX Prospect Station
Aggie Village
W. Prospect Road
Aggie Village Family
Center Avenue
Hilton Hotel
Bay Drive
CSU Horticulture Center

2018 UCOWR/NIWR
Annual Water Resources Conference
Pittsburgh, PA

June 26-28, 2018
Pittsburgh Marriott City Center

Online abstract submission opens in October. Abstract deadline is January 22, 2018.



Have an idea for a special session?
Submit a one paragraph proposal to Kevin McGuire, Conference Chair, at kevin.mcguire@vt.edu. Deadline for submissions is September 22, 2017.

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