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NWRRI - Desert Research Institute

Newsletter written and compiled by
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Program Spotlight: WaterStart

Inside this issue:

Fresh water is vital to economic development and maintaining quality of life, but the potential effects of climate change on the availability of this resource are a global concern. Finding ways to preserve valuable water resources is crucial for sustaining growing populations, particularly in arid and semiarid regions such as Nevada. Therefore, in addition to the water resources research that Desert Research Institute (DRI) is conducting, the institute supports advancements in water resources management and conservation statewide through its partnership with WaterStart.

Syrinix is one of the water tech innovation companies that has been brought to Nevada through the WaterStart program. Syrinix provides intelligent pipeline monitoring systems, such as the system pictured above, that generate valuable flow data for optimized decision making and risk management. Photo courtesy of the Las Vegas Valley Water District.

WaterStart, housed at DRI, is a public-private, not-for-profit, joint venture that was established in 2013 through the Nevada Governor's Office of Economic Development (GOED) to bring new water research, technology, and economic development opportunities to Nevada.

Nevada's climate provides unique opportunities for developing new technologies and industries around the conservation and preservation of water resources. "Nevada is one of the driest states in the country and innovation is key to the long-term, sustainable management of

RFPs

If you have questions about submitting a NWRRI proposal, e-mail Amy Russell (Amy.Russell@dri.edu).

For current RFP information, visit the NWRRI website (www.dri.edu/nwrri).

(Program Spotlight continued)

its water resources," explains Dr. Kumud Acharya, who is the Executive Director of the Division of Hydrologic Sciences at DRI as well as the former Chief Technology Officer of WaterStart. "Therefore, it makes sense for Nevada to lead water technology innovation activities."

WaterStart leverages the expertise of Nevada's academic, public, and private sector institutions to create new economic opportunities in water technologies in the state. The institute's connections with the University of Nevada, Reno (UNR), and the University of Nevada, Las Vegas (UNLV), provide WaterStart with access to cutting-edge water resources research. "DRI has more hydrologists than any other academic institution in the United States," Acharya says. "Currently, DRI, UNR, and UNLV produce a wealth of innovations in water technology that can provide opportunities for further developments." The Southern Nevada Water Authority (SNWA), which is one of the leading early adopters of innovative water technologies in the nation, is also part of the WaterStart network.

The WaterStart network includes other public and private sector institutions, such as MGM International; the Truckee Meadows Water Authority; Winnemucca Farms, Inc.; GOED; the Department of Employment, Training, and Rehabilitation; the Las Vegas Global Economic Alliance; and the Economic Development Authority of Western Nevada. This diverse network maximizes the expertise of multiple sectors and opens channels for further economic opportunities for water technology innovations in the state. "Our goal is to build a global water technology innovation hub in Nevada by attracting, partnering with, and servicing national and international water-related businesses, which will accelerate workforce and economic development across the state," explains Nate Allen, the Executive Director of WaterStart. "We also hope that the partnerships between WaterStart and industry will increase funding for NSHE institutions through their support of the commercialization of new water technologies."

Desert Research Institute and WaterStart will work to bring technology companies to Nevada by targeting companies that meet their partners' technology needs. The selected companies are then provided with matching funds through the program's commercialization fund to conduct pilot studies at one of the partner facilities. This network of strategic partnerships also allows for close collaboration with first adopters so that new technologies can be scaled for use much more quickly. "In addition to reaching out directly to new tech companies, we organize workshops and invite tech companies to pitch their products, and we regularly attend national and international water expos to look for new innovative water

Echologics pipeline monitoring systems precisely identify and locate emerging leaks so that repairs can be made before more significant failures occur. Photo courtesy of the Las Vegas Valley Water District.

"Our goal is to build a global water technology innovation hub in Nevada by attracting, partnering with, and servicing national and international water-related businesses, which will accelerate workforce and economic development across the state."

– Nate Allen

(Program Spotlight continued)

tech companies," Allen adds. "So far, we have brought about a dozen companies to the state, and they have started creating new jobs and contributing to the local economy."

More information about WaterStart and the water technology innovations the program is currently seeking can be found at waterstart.com. ■

Postdoc Interview: John Umek

We asked postdoctoral fellow Dr. John Umek about his current research and his continuing research plans. Here's what he had to say:

1) What sparked your interest in water resources research?

When I was growing up, I spent a lot of time camping, hunting, and fishing, which developed my passion for the outdoors. In college, I took a wide range of classes, but aquatic ecology sparked my interest more than any other biology class. From that point on, I knew my career path was pretty much set.

2) What do you find most interesting about water resources research, particularly working in an arid/semiarid environment such as Nevada?

The most interesting aspect of water research in the West is how it provides a unique oasis for multiple types of organisms. My master's degree focused on tracking the movement of native Lahontan cutthroat trout in central Nevada using radio telemetry and microsatellite genetics. It was interesting to see how a threatened endemic fish uses river sections for movement, reproduction, and habitat preference on a small spatial scale. Additionally, the staff work I did at the University of Nevada, Reno, and my dissertation looked at food webs and numerous species in Walker Lake, Lake Mead, and Lake Tahoe to model the biotic and abiotic factors that influence aquatic ecosystems. It was fascinating to document the differences between these Great Basin lakes.

3) What kinds of research are you currently working on and what have you learned so far from this research?

I am currently working with Dr. Don Sada to create innovative methods for integrating aquatic biology and hydrogeology to address groundwater issues in the arid West. One of my long-term goals is to try to determine the biodiversity patterns of benthic invertebrates in springs on a large geographical scale. It has been interesting to see the amount of biodiversity, differences in community structure, and number of rare species in such small desert springs. The effects of even slight changes to the systems can have large-scale consequences to the spring ecosystem. It has also been very interesting to study new aquatic environments and see areas of the Great Basin

(Postdoc Interview continued)

that I haven't seen before.

4) What do you hope to learn more about from the research you are doing?

I hope to gain a better understanding of the anthropogenic impacts, such as climate change and water use, on our water resources and their effects on benthic invertebrate communities in particular. I would also like to learn more about food web structures and changes within particular ecosystems over time, which could provide a critical foundation for understanding predator-prey dynamics and resource competition in systems that haven't yet been studied thoroughly enough compared with their use and importance. Assessing limnological characteristics and processes based on their effects on benthic invertebrates will hopefully help define the ecosystem structure and population dynamics within these ecosystems. This information will also help characterize healthy and unhealthy river and lake ecosystems, as well as determine proper courses of action to conserve water quality and native fishes, invertebrates, and plant communities.

5) Do you have a preference for lab work or fieldwork, and if so, why?

I prefer working in the field over lab work. Both lentic and lotic ecosystems present their own challenges, but once I'm on the water, I find the work very enjoyable. However, I will admit that on occasion, I do enjoy identifying benthic invertebrates in the lab and extending my taxonomic knowledge.

6) What are some of your other research interests? Do you have any goals for incorporating those interests into your work as you continue in your career?

My other main research interest includes understanding the impacts of invasive species on aquatic ecosystems. Invasive species are a common problem and one of the largest threats to biodiversity in aquatic ecosystems. Unfortunately, I believe that a lot of the aquatic ecosystems I'm studying now (and will study in the future) will have invasive species, so this is an aspect that I'd like to incorporate into my research. I would also like to be involved with large-scale watershed projects in the future. Participating in the Walker Lake project gave me a thorough understanding of the importance of working with multiple collaborators to address the numerous aspects associated with water research.

7) What is one of your favorite movies or books and why?

One of my favorite books is *Undaunted Courage* by Stephen E. Ambrose. It's a fascinating account of the Lewis and Clark expedition. Not only is the book an incredible story, but it also includes a lot of naturalistic observations ranging from the Great Plains to the West Coast.

"One of my long-term goals is to try to determine the biodiversity patterns of benthic invertebrates in springs on a large geographical scale. It has been interesting to see the amount of biodiversity, differences in community structure, and number of rare species in such small desert springs."
– John Umek

8) Cake or Pie?

Cake; I still haven't found anything better than a piece of carrot cake. ■

Upcoming Events

2017 ASA, CSSA, and SSSA International Annual Meeting:
Managing Global Resources for a Secure Future
October 22-25, 2017
Tampa, FL
www.acsmeetings.org/

GSA 2017
October 22-25
Seattle, WA
community.geosociety.org/gsa2017/home

2017 Annual AWRA Conference
November 5-9, 2017
Portland, OR
www.awra.org/meetings/Portland2017/

NGWA Groundwater Summit 2017
December 4-7, 2017
Nashville, TN
groundwatersummit.com/

AGU Fall Meeting
December 11-15, 2017
New Orleans, LA
fallmeeting.agu.org/2017/

2018 Ocean Sciences Meeting February 11-16, 2018
Portland, OR
osm.agu.org/2018/

NWRA 2018 Annual Conference
February 26-March 1, 2018
www.nvwra.org/2018-annual-conference-program

NWRA 2018 Conference Tour of the Nevada National Security Site
February 26, 2018
Las Vegas, NV
www.nvwra.org/2018-conference-tour

Water Rights in Nevada Class
February 26, 2018
Las Vegas, NV
www.nvwra.org/2018-water-rights-seminar

NGWA Groundwater Issues and Science Affecting Policy and Management in the Southwest
February 26 & 27, 2018
Albuquerque, NM
www.ngwa.org/Events-Education/conferences/Pages/5034feb18.aspx

Advanced Water Rights in Nevada Class
February 27, 2018
Las Vegas, NV
www.nvwra.org/2018-adv-water-rights-seminar

2018 Nevada Well Drilling Regulations & Forms Class and Water Well Drilling Exam Tutorial
February 27, 2018
Las Vegas, NV
www.nvwra.org/2018-wellregs-workshop

2018 Groundwater Workshop
February 27, 2018
Las Vegas, NV
www.nvwra.org/2018-usgs

2018 AWRA Spring Specialty Conference: GIS & Water Resources X
April 22-25, 2018
Orlando, FL
www.awra.org/meetings/Orlando2018/index.html

North American Forest Soils Conference: International Symposium on Forest Soils
June 10-16, 2018
Quebec City, Quebec, Canada
www.cef-cfr.ca/index.php?n=Colloque.NAFSC-ISFS2018

Water Rights in Nevada Class
June 11, 2018
Reno, NV
www.nvwra.org/2018-june-water-rights

Advanced Water Rights in Nevada Class
June 12, 2018
Reno, NV
www.nvwra.org/2018-june-advanced-water-rights

Nevada Well Drilling Regulations & Forms Class and Water Well Drilling Exam Tutorial
June 12, 2018
Reno, NV
www.nvwra.org/2018june-wellregs

AGU Chapman Conference
September 25-27, 2018
Washington, D.C.
chapman.agu.org/congo-hydrologic-research/

Success and the dedication to quality research have established the Division of Hydrologic Sciences (DHS) as the Nevada Water Resources Research Institute (NWRRI) under the Water Resources Research Act of 1984 (as amended). As the NWRRI, the continuing goals of DHS are to develop the water sciences knowledge and expertise that support Nevada's water needs, encourage our nation to manage water more responsibly, and train students to become productive professionals.

Desert Research Institute, the nonprofit research campus of the Nevada System of Higher Education, strives to be the world leader in environmental sciences through the application of knowledge and technologies to improve people's lives throughout Nevada and the world.

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DRI Desert Research Institute | Nevada Water Resources Research Institute

www.dri.edu/nwrri

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