

ANNUAL REPORT 2016

PEOPLE ARE OUR VALUE. KNOWLEDGE IS OUR PRODUCT.



DRI'S TRANSITION

FOUR STRATEGIC DIRECTIONS

1. **STRENGTHEN OUR EFFORTS** WITH FEDERAL RESEARCH AGENCIES
2. **INCREASE** CORPORATE/PUBLIC PARTNERSHIPS



Both 2016 and 2017 are transitional years for DRI given the departure of long-time President Dr. Stephen Wells to the New Mexico Institute of Mining and Technology and the arrival of our new President Dr. Kristen Averyt from the University of Colorado. I have had the honor and pleasure of serving as Acting President between Steve's departure and Kristen's arrival.

During this one-year period, I decided to focus on four strategic directions which I felt would strengthen DRI over the next 5–10 years and position it for enhanced leadership in the environmental sciences. The criteria for these strategic directions were based on the organization's reputation and mission which is built on the highest quality, world-class environmental basic and applied research, science services and the application of new technologies, dominantly provided to federal and state agencies. Over the past several years, DRI has also been taking on a significant educational role.

The first strategic direction was to strengthen our efforts with federal research agencies to ensure that we have the greatest chance for success within the programs we currently have funded and for new potential opportunities.

The second strategic direction, increased corporate/public research partnerships, is key to our future success. We need to broaden partnerships with the commercial sector to take advantage of the research strengths here at DRI. With support from Governor Sandoval's Knowledge Fund, DRI has been able to grow and leverage new relationships and businesses through our Applied Innovation Center, WaterStart, the Desert Research Corporation, and efforts in unmanned aircraft systems (UAS).

An excellent example of this approach is our collaboration with Renown Health and 23andMe, a leading personal genetics company, to launch one of the first community-based population health studies in the U.S. that will combine health, population, and genetic information with environmental data.

Our third strategic direction involves planning for a major initiative for successful individual and foundation philanthropic efforts. I am absolutely convinced that this organization cannot fulfill its mission without significant philanthropic funds. We are in the process of hiring a Chief Development Officer and setting up an organizational structure for the operation of a development office. Our goal is to have donated philanthropic resources provide 10-percent of the Institute's budget within five years.

DESERT

3. **EXPAND** INDIVIDUAL AND FOUNDATION PHILANTHROPIC EFFORTS

4. **ENHANCE** NSHE COLLABORATIONS



Dr. Robert Gagorian, Dr. Kristen Averyt, and
Regent Jason Geddes, Ph.D.

We have also launched our first fund-raising initiative, the DRI Innovation Research Program, and have received enthusiastic support for this effort. The purpose of the Program is to increase the opportunities for our faculty and technical staff to succeed in their research by financially supporting their best ideas thus enhancing DRI's reputation as the best place to undertake research on our Earth System.

The fourth strategic direction focuses on new ways to broaden our partnerships with the other Nevada System of Higher Education (NSHE) institutions. Our staff already have joint grants and contracts with University of Nevada, Las Vegas (UNLV) and University of Nevada, Reno (UNR) faculty, as well as teaching responsibilities. However, we want to find ways to broaden or enhance those partnerships. There have been discussions between faculty and postdocs at both universities encouraging further exchange of research, teaching, and outreach ideas. In addition, we now have a joint postdoc

program with UNLV and UNR. The idea is to focus on areas where there are mutually beneficial synergies. I have talked with the presidents of Nevada's universities and community colleges, and I am looking for future partnerships as well.

I feel we have made solid progress on our strategic directions over the past several months and that we are on the right track to prepare DRI for a bright future.

It is an exciting time to be here!

Dr. Robert B. Gagorian
DRI ACTING PRESIDENT
(JULY 1, 2016 THROUGH JUNE 30, 2017)

DRI'S NEW PRESIDENT

On February 3, 2017, the Board of Regents of the Nevada System of Higher Education approved the appointment of Dr. Kristen Averyt as the next president of the Desert Research Institute, effective July 1, 2017.

"It is a genuine honor to have been selected to serve as the next president of DRI," said Averyt. "I look forward to working with the faculty, students, and staff to enhance DRI's global reputation for scientific excellence, while fostering new opportunities and partnerships that will help us better understand our changing environment and the implications for Nevada, the region, and the world."

Dr. Averyt comes to DRI from the University of Colorado, Boulder where she was the associate director for science at the Cooperative Institute for Research in Environmental Sciences (CIRES). She earned her doctorate in geological and environmental science from Stanford University and a master's in chemistry, with distinction, from the University of Otago, New Zealand, where she was a Fulbright fellow. Averyt completed her undergraduate degrees in marine science and chemistry at the University of Miami in 1998, graduating magna cum laude and receiving the University Chemistry Award, given to the top chemistry graduate.



RESEARCH INSTITUTE



HAZARDOUS CHEMICALS DISCOVERED IN FLAVORED E-CIGARETTE VAPOR

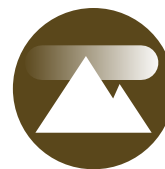


Building on more than 30 years of air quality research in some of the most polluted urban environments on Earth, a team of atmospheric scientists at DRI turned their attention toward the growing e-cigarette industry and the unidentified effects of vaping on human health.

Research published in the December 2016 issue of *Environmental Science & Technology* (ES&T), a journal of the American Chemical Society, reported that the aerosols (commonly called vapors) produced by flavored e-cigarettes liquids contain dangerous levels of hazardous chemicals known to cause cancer in humans. The study confirmed that these toxic aldehydes, such as formaldehyde, are formed not by evaporation, but rather during the chemical breakdown of the flavored e-liquid caused by the rapid heating process (pyrolysis) that occurs inside e-cigarettes or electronic nicotine delivery systems.

“How these flavoring compounds in e-cigarette liquids affect the chemical composition and toxicity of the vapor that e-cigarettes produce is practically unknown.”

—ANDREY KHLSTOV, PH.D., A DRI ATMOSPHERIC SCIENCE RESEARCH PROFESSOR

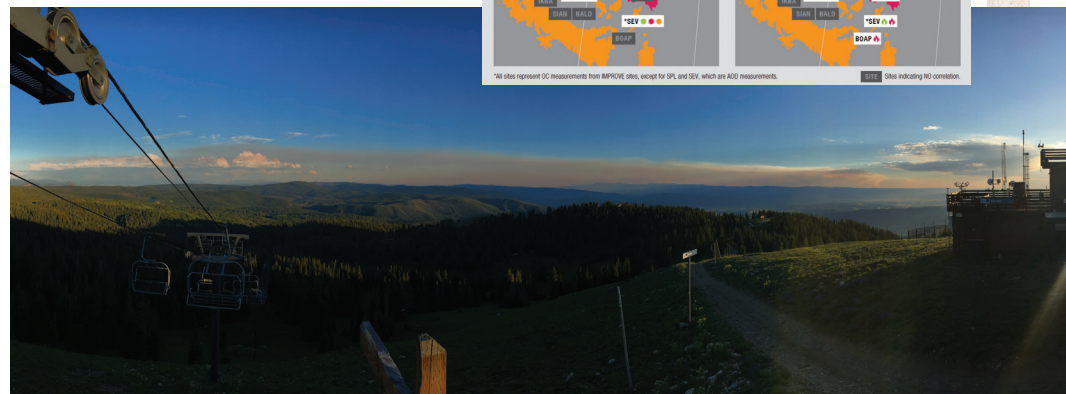
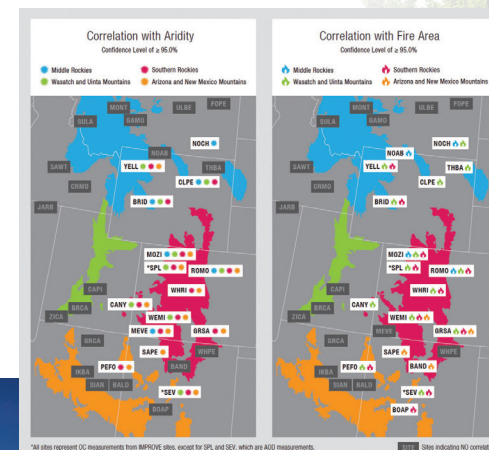


ROCKY MOUNTAIN HAZE—STUDY FINDS A LINK BETWEEN DROUGHT AND AIR QUALITY IN THE WESTERN WILDERNESS

During summer months in the West people often escape to the mountains to avoid the haze regularly found in lower elevation cities and valleys. New research published in *Environmental Research Letters* finds the haze could be catching up. Led by Gannet Hallar, Ph.D., a professor of atmospheric science at DRI and the University of Utah, the study identifies a direct connection between the severity of ongoing drought and related wildfires in the Intermountain West with summertime air quality, particularly the concentration of aerosol particles in remote high-elevation mountain wilderness regions. Haze in the air is caused by small airborne particles known as aerosols. These particles are often so small that they remain suspended in the air and don't settle out. Climate projections suggest that drought and wildfire risk will continue to increase in coming decades.

“If you take that into the future, we’re going to see significant hazing of the West.”

—GANNET HALLAR, PH.D., A DRI ATMOSPHERIC SCIENCE RESEARCH PROFESSOR WHO CONDUCTS RESEARCH AT DRI'S STORM PEAK LABORATORY, A MOUNTAIN-TOP OBSERVATION RESEARCH LAB NEAR STEAMBOAT SPRINGS, COLORADO, AT AN ELEVATION OF 10,525 FEET ABOVE SEA LEVEL





KEEPING GIRLS IN SCHOOL BY PROVIDING CLEAN WATER, SANITATION AND HYGIENE ACCESS

Across rural Ghana, West Africa rates of school attendance among girls drops off upon reaching adolescence due in part to lack of adequate access to clean water, sanitation, and hygiene (WASH) services in schools. In 2016, DRI and the WASH Center at the University for Development Studies (UDS) in northern Ghana partnered with Catholic Relief Services (CRS) to complete field research to understand needs for WASH services in schools that hinder girls' access to education, significantly limiting their longer-term options for educational and economic attainment. The research collaboration is part of a larger, on-going CRS project called the Integrated Sanitation, Hygiene, and Nutrition for Education (I-SHINE) project, located in 138 communities in Northern Ghana with support from Helmsley Charitable Trust. The focus of this project is to encourage school attendance by improving personal hygiene behaviors.



FEATURED RESEARCH



A LIFE-DETECTION STRATEGY FOR NASA'S EUROPA LANDER CONCEPT

Dr. Alison Murray's research has taken her to the southern-most waters surrounding Antarctica to the depths of the Pacific Ocean, and as far north as the Arctic Circle. Her expertise studying the microorganisms inhabiting some of Earth's harshest ecosystems is now helping NASA in its search for life beyond our planet. In a new report released to NASA, Murray and 20 other scientists assess the scientific value and engineering design of a future mission to the surface of Jupiter's icy moon Europa. The report outlines three science goals and recommends a life-detection strategy, a first for a NASA mission since the Mars Viking mission era more than four decades ago.

"This is a very real step toward a signs of life mission."

—ALISON MURRAY, PH.D., A DRI MOLECULAR MICROBIAL ECOLOGIST, BEST KNOWN FOR HER WORK DISCOVERING THE EXISTENCE OF MICROBIAL LIFE WITHIN AN ANTARCTICA'S ICE-SEALED, ANOXIC, DARK, AND NEGATIVE 13-DEGREE CELSIUS BRINES OF LAKE VIDA, THE LARGEST OF SEVERAL UNIQUE LAKES FOUND IN THE MCMURDO DRY VALLEYS



UNDERSTANDING PHARMACEUTICAL AND STEROIDAL COMPOUND UPTAKE IN QUAGGA MUSSELS

A new DRI project will evaluate the uptake rates of select contaminants from pharmaceutical and personal care products in quagga mussels to understand the effects of these contaminants on aquatic species in Lake Mead—the primary water source for the Las Vegas metropolitan area and a habitat for diverse wildlife, including endangered species such as the razorback sucker. Quagga mussels are an invasive species that have been spreading rapidly in the lake since they were first detected in 2007. A DRI-led research team will study a group of trace organic chemicals found in highly prescribed and widely used pharmaceutical compounds and personal care products including antibiotics, antidepressants, an anticonvulsant, and a steroidal hormone. This project will provide insight into the exposure pathways of these chemicals and their effects on non-target species to help develop ecological risk assessments. The researchers will evaluate the ambient concentrations and quagga mussel uptake rates of trace organics. Understanding the bioaccumulation of trace organic chemicals in quagga mussels will clarify their role in the Lake Mead ecosystem.

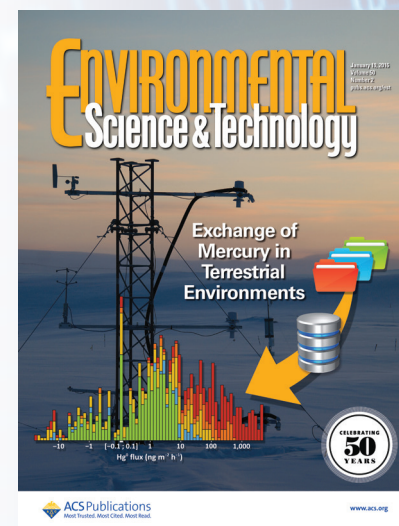


NEW DATABASE EXAMINES GLOBAL MERCURY SINKS AND SOURCES

Gaseous elemental mercury (Hg^0) is a semi-volatile chemical, the only metal that easily exchanges between land surfaces and the atmosphere. Despite nearly 40 years of scientific research, major uncertainties still exist concerning the environmental factors controlling these exchanges and their impacts on atmospheric mercury pollution loads. DRI research published in *Environmental Science & Technology* has, for the first time, compiled more than 200,000 individual mercury flux measurements taken at 243 different sites mainly across North America, Asia, and Europe. Analyzing data and results from 132 scientific studies dating back more than 35 years, a DRI research team statistically examined the magnitude of mercury fluxes; the environmental factors that control them, including solar radiation, air and soil temperatures, soil moisture, and soil and atmospheric mercury concentrations, and provided new constraints on these fluxes worldwide.

"Our worldwide scaling of mercury fluxes revealed several patterns previously unseen. Most significantly, we estimate global emissions from land surfaces at 607 metric tons annually, which is a significant amount of the total atmospheric emissions. However, the database illustrates that large areas of the globe are nearly fully void of any mercury flux data, including Africa, Central Asia, Australia, and many polar regions."

—YANNICK AGNAN, LEAD AUTHOR ON THE REPORT AND A POSTDOCTORAL FELLOW OF BIOGEOCHEMISTRY AT DRI





DRI WILDLAND FIRE RESEARCH CENTER TARGETS NEW ERA OF FIRE SCIENCE

More than 10 million acres of land across the United States were scorched by wildland fires in 2015—more than any other year on record. Those fires destroyed more than 2,600 homes nationwide and burned nearly one million acres of land in California and Nevada alone. A new DRI research center is aiming to help federal, state, and local agencies reduce those dramatic numbers and better prepare for, understand, and respond to wildland fire causes, processes, and effects. The initial focus of DRI's new Wildland Fire Science Center (WFSC) is to support the development of advanced technologies and tools needed for better fire science and management, including unmanned aircraft systems (UAS) and satellite remote sensing, as well the Institute's unique biomass burning facilities and ecosystem laboratories.

"Fire science is inherently interdisciplinary. Combining our broad expertise in operational fire support, fire emissions, fire ecology, and fire hydrology was a logical step to gain a holistic understanding of what is causing more extreme fires, what is happening during and after the fire, and the catastrophic effects we are seeing on our environment and our communities."

—HANS MOOSMÜLLER, PH.D., A DRI ATMOSPHERIC SCIENCE RESEARCH PROFESSOR AND DIRECTOR OF THE NEW RESEARCH CENTER



FEATURED RESEARCH



DRI SECURES \$47 MILLION TO CONTINUE WORK FOR U.S. DEPARTMENT OF ENERGY

Building on more than 40 years of service to the U.S. Department of Energy (DOE), DRI was awarded a long-term research contract in April of 2017 to support the national security mission of the Nevada National Security Site (NNSS). The new Technical Research, Engineering, and Development Services contract has a value of up to \$47.7 million and extends for up to five years. DRI faculty and staff will provide scientific and engineering services to the DOE, National Nuclear Security Administration/Nevada Field Office in support of nuclear stockpile stewardship, nonproliferation and counterterrorism, emergency response to radiological and nuclear events, remediation and restoration of legacy environmental issues, cultural resources compliance, and sustainable land stewardship. DRI contributes to nearly all of the DOE Nevada Field Office's major programs.

"This is the largest multi-disciplinary research program at DRI. We have a superb team of people from across the Institute—on both our Las Vegas and Reno campuses—who are dedicated to serving DOE in this very important effort in support of our nation's security."

—DR. ROBERT GAGOSIAN, DRI ACTING PRESIDENT



BE PART OF SOM

Renown
HEALTH FOUNDATION



POWERED BY

Nevada Governor's Office of
ECONOMIC DEVELOPMENT
Empowering Success

“Partnering with a Nevada-born, world-leading environmental research institute makes perfect sense. With DRI’s help, we can take on population health improvement through data science expertise and leading-edge environmental research.”

—ANTHONY SLONIM, M.D., DRPH, PRESIDENT AND CEO OF RENOWN HEALTH

[PROUDLY FUNDED BY RENOWN HEALTH FOUNDATION AND NEVADA’S KNOWLEDGE FUND]



"Nevada's greatest resource is, and always has been, our people. Renown's forward-thinking approach to community healthcare, combined with DRI's data and environmental expertise, will create incredible potential for new scientific discoveries and encourage citizens just like myself to take a proactive role in self-care and ultimately change the way we think about our health moving forward."

— NEVADA GOVERNOR BRIAN SANDOVAL



DRI AND RENOWN MAKE HISTORY WITH GOVERNOR BRIAN SANDOVAL AND 23ANDME

Renown Health, Desert Research Institute, the Nevada Governor's Office of Economic Development, and personal genetics company 23andMe worked together in September of 2016 to launch one of the first community-based population health studies in the U.S. that integrates genetics, environmental data, and individual health information.

With this information, DRI-led research teams hope to illuminate genetic patterns and health trends that provide answers to critical medical questions. Combining genetic data with health and population data from Renown, as well as information from environmental databases, DRI scientists are analyzing and modeling public health risks ranging from disease and illness, to the effects of air quality on the health of Nevadans.

Funded by the Renown Health Foundation and Nevada's Knowledge Fund, the pilot study offered 10,000 northern Nevadans an opportunity to volunteer for research and gain access to their individual genetic information at no cost.

Nevada Governor Brian Sandoval, who announced his participation as one of the first Nevada residents to complete 23andMe's simple DNA test as part of this study, said this offers an unprecedented opportunity for residents of the Silver State.

Researchers hope to build an infrastructure to apply the population health pilot to all approximately 2.8 million Nevada residents—doing so could enable researchers to build predictive models and to look for significant population health factors across demographic variables (gender, age, income, location) and distinct population health strata that consider community health, individual health, and chronic disease variables, as well as their interactions.



UNMANNED AIRCRAFT SYSTEMS



RESEARCH AND DISCOVERY

ACCOMPLISHMENTS

- A DRI-led research team recorded the longest unmanned, cross-country drone flight in Nevada history.
- The DRI-led unmanned aerial cloud-seeding project reached a new milestone in 2016 through the successful integration and deployment of 14 ejectable cloud-seeding flares at low altitude utilizing the Savant platform developed by Reno-based Drone America.
- Using fixed-wing and rotor-driven aircraft, a team of DRI research scientists successfully tested the use of unmanned aircraft systems (UAS) to support large-scale, multi-crop agricultural needs in Nevada. In collaboration with aviation engineers from AboveNV, a leading aerial survey and UAS services company based in Reno, a DRI-led research team completed more than twenty, 40-minute test flights above Winnemucca Farms, Inc., one of Nevada's largest agricultural producers. Test flights were performed at an average altitude of 300 feet above ground level over several of the farms' more than 16,000 acres of potato, wheat, peas, and alfalfa crops.
- UAS experts at DRI were part of an elite team selected by NV Energy in 2016 to complete a drone pilot program to inspect, collect, and analyze data on sections of its transmission and distribution lines. All of the flights were successfully conducted under visual line-of-sight (VLOS) conditions. The data collected were then incorporated into NV Energy's mapping system and used to determine areas that may need attention. DRI assisted with the analysis of the collected data.



[PROUDLY FUNDED BY NEVADA'S KNOWLEDGE FUND]



NEW RESEARCH REVEALS INSIGHTS INTO HOW **BLACK CARBON AEROSOLS** IMPACT CLOUD FORMATION

It is widely known that black carbon, or soot, aerosol particles emitted from South Asia are spread across the northern Indian Ocean during the winter monsoon season. These masses of air pollution adversely affect human health and have been shown to play a significant role in regional and global climate change, second only to carbon dioxide. Research published in 2016 by Eric Wilcox, Ph.D., an atmospheric scientist at DRI, outlined new insights into how these high concentrations of black carbon aerosols may also reduce atmospheric turbulence and enhance relative humidity near the Earth's surface, exacerbating both human health impacts and

extreme weather events. The study, "Black carbon solar absorption suppresses turbulence in the atmospheric boundary layer," appeared in the October issue of *Proceedings of the National Academies of Science*. Utilizing a fleet of unmanned aircraft systems (UAS) with specialized instrumentation developed by the Scripps Institution of Oceanography at the University of California San Diego, Wilcox and his colleagues for the first time measured the atmospheric turbulence and vertical flow of latent heat above the ocean's surface up to altitudes of 3,600 meters (12,000 feet)—an area of the atmosphere commonly known as the marine boundary layer. The UAS flights were performed in 2012 at various altitudes for distances of up to 10 miles, averaging over three hours. They originated at Hanimaadhoo in the northern part of the Maldives, a country made up of a string of islands south of India.

"To completely understand the effects of these harmful aerosols on our climate and the modifications they cause to clouds and weather systems originating in the boundary layer, you have to first understand the turbulent dynamics of the air where the aerosols reside and the clouds form."

—ERIC WILCOX, PH.D., ASSOCIATE RESEARCH PROFESSOR OF CLIMATOLOGY





In 2016, WaterStart, a cluster of global leaders in the implementation of water innovation, rebranded and unveiled a new focus. Led by DRI, and formerly known as the Nevada Center of Excellence in Water, WaterStart is working to make Nevada an incubator for new technologies by leveraging the state's leadership and expertise in water.

Housed within DRI's Las Vegas campus, WaterStart is a joint venture between academic and public management agencies and the private sector focused on creating innovation in the U.S. water market. WaterStart aims to catalyze water technology, research, and expertise. Sitting at the nexus of technology, research, and economic development, WaterStart provides channels for innovation for various stakeholders including: water management agencies, large consumers of water, technology companies, and policy makers, and provides services ranging from technical evaluation, demonstration, and commercialization funding to business development.



"WaterStart operates in a region of proven first adopters. Our goal is to leverage statewide partners in order to create an international hub for technology companies working in concert to meet challenges in water today and in the future."

— NATE ALLEN, EXECUTIVE DIRECTOR FOR WATERSTART

[PROUDLY FUNDED BY NEVADA'S KNOWLEDGE FUND]

MAJOR NEWS & ACCOMPLISHMENTS

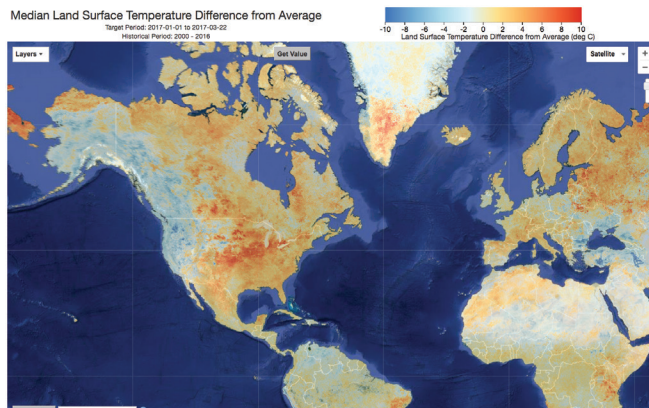
- *MGM Resorts International and WaterStart Announce Collaboration to Identify Sustainable Technologies in Water, Catalyze Technology Research* (MARCH 2016)
- *Ionex SG Partners with Nevada's WaterStart; Marks Water Treatment Technology Leader's First Expansion Outside California* (JULY 2016)
- *Israeli-based WellToDo Announces Entry into Nevada, Will Conduct Nitrate Removal Pilot Program* (AUGUST 2016)
- *Truckee Meadows Water Authority (TMWA) and WaterStart Announce Collaboration to Evaluate New Technology for Identifying Contaminants through Pilot Program* (APRIL 2017)
- *Queensland Scale-up RedEye Launches North America Operations in Nevada Following State-to-State Innovation Commitment* (APRIL 2017)

TECHNOLOGY PORTFOLIO

WaterStart creates channels for innovation by providing testing, connections, and marketing opportunities for companies with novel solutions to challenges in the water sector. WaterStart is proud to showcase its technology portfolio of companies including:



CLIMATEENGINE.ORG UNVEILED AT WHITE HOUSE WATER SUMMIT



In March of 2016, the research team behind *ClimateEngine.org* unveiled their commitment to expanding the web application's unique role in helping the nation address water issues during the White House Water Summit held in Washington, D.C., in conjunction with the United Nations World Water Day. The Summit focused on raising awareness of water issues and potential solutions in the United States and catalyzing ideas and actions to help build a sustainable and secure water future through innovative science and technology. DRI and University of Idaho, in partnership with Google, have developed *ClimateEngine.org*—a web application that enables users to quickly process and visualize satellite earth observations and gridded weather data for environmental monitoring and to improve early warning of drought, wildfire, and crop-failure risk. Utilizing access to one petabyte (1,000 terabytes) of cloud storage and 50 million donated hours of computing time on Google's Earth Engine environmental cloud computing platform, the web-based application is

able to mine, process, and analyze a 30-year archive of high resolution optical and thermal images taken of Earth by the Landsat satellites in a matter of seconds, compared to hours and even days with traditional computing systems.



Climate Engine

“In an era of increasing wealth of satellite and climate observations, approaches for quickly accessing, analyzing, and visualizing big data to better inform environmental decision making at relevant scales is lacking. ClimateEngine.org makes it possible to process and visualize earth observations like never before.”

—JUSTIN HUNTINGTON, PH.D., THE PROJECT CO-PRINCIPAL INVESTIGATOR AND A DRI ASSOCIATE RESEARCH PROFESSOR OF HYDROLOGY



PUBLIC OUTREACH

- On June 14, 2016, Dr. Huntington gave a plenary presentation at Google in Mountain View, CA. He spoke about “Monitoring Drought with Google Earth Engine: From Archives to Answers.”
- On November 3, 2016, Climate Engine was shown off by DRI's Dr. Britta Daudert and U of I's Dr. Katherine Hedgewisch in the Tools Cafe of the National Climate Science Center's Graduate and Early Career Training Workshop, University of Massachusetts in Amherst, MA.
- A paper outlining the impact of Climate Engine was recently published in the high impact journal, *Bulletin of the American Meteorological Society*.



[IN PARTNERSHIP WITH GOOGLE]

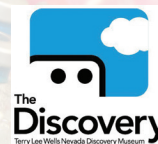


SCIENCE DISTILLED—DRI AND THE DISCOVERY LAUNCH NEW NOVA SCIENCE CAFÉ LECTURE SERIES TO MAKE SCIENCE MORE APPROACHABLE

This new evening lecture series, created by DRI and the Terry Lee Wells Nevada Discovery Museum (The Discovery), makes cutting-edge science approachable through presentations on current and curious topics held at hip locations in a social atmosphere.



A NOVA Science Café presented by DRI and The Discovery



Terry Lee Wells Nevada Discovery Museum

TOPICS HAVE INCLUDED:

- The Winter that Was
- Fish Tales
- Fire Seasoned
- Nevada Inhales
- Batteries Included
- The Birds and Bees

CELEBRATING OVER 15 YEARS OF SCIENCE IN THE CLASSROOM



Building on nearly two decades of science education and outreach across Nevada, DRI announced a new brand and renewed focus for its preK-12 outreach program in April of 2017. DRI's Science Alive program—formerly known as Green Power—has expanded its reach to provide Nevada's preK-12 educators with a comprehensive set of modern tools and resources focused on science-based, environmental education. Science Alive provides inquiry-based STEM (science, technology, engineering, and mathematics) curriculum, classroom supplies, and professional training to any teacher in Nevada who is interested.

SCIENCE ALIVE STATS:

- 20,134 students reached in 2016
- 385 teachers trained in 2016
- 188 schools participating (29% of NV)



science alive

FOSTERING SCIENTIFIC TALENT AND PROVIDING RESEARCH-FOCUSED EDUCATIONAL OPPORTUNITIES

For higher education students, DRI provides a learning environment strongly focused on collaborative, interdisciplinary research. DRI faculty members participate in numerous academic programs throughout the Nevada System of Higher Education. Students conduct their research at DRI while earning degrees through the universities in programs such as Atmospheric Sciences, Hydrologic Sciences, Cellular and Molecular Biology, Environmental Science, Life Sciences, Geological Sciences, and Anthropology.

NEW JOINT POSTDOCTORAL FELLOW PROGRAM WITH UNLV

In 2016, DRI and UNLV launched a new joint postdoctoral fellow program aimed at strengthening faculty relationships and collaboration between the two institutions.

SHARING THEIR EXPERIENCE...



"After getting back into academic research, I realized that I really wanted and needed to take the next step to get my PhD. DRI was a good fit for me given its location, research expertise on arid western lands, and because of the opportunities to work with and learn from my advisors and others at DRI."

—CHRISTINE ALBANO
(DRI MENTOR: MICHAEL DETTINGER, PH.D.)



"I was attracted to DRI because of its well-established and fully equipped Luminescence lab. My research in optically-stimulated luminescence (OSL) requires very specialized laboratory conditions and instrumentation, and there are a very limited number of institutions around the world that offer these facilities."

—KATHLEEN RODRIGUES
(DRI MENTOR: AMANDA KEEN-ZEBERT, PH.D.)

FULBRIGHT SCHOLAR (DRI MENTOR ALEXANDRA LUTZ, PH.D.)



Daniel Saftner, a DRI graduate research assistant, was awarded a prestigious Fulbright Student Scholarship in May of 2016 that allowed him to teach, study, and lead a project focused on increasing access to safe, sustainable drinking water sources in Maradi, Niger, in West Africa.

Saftner, who is pursuing his masters in hydrogeology from the Graduate Program of Hydrologic Sciences at the University of Nevada, Reno, worked in partnership with World Vision's Niger Integrated Water, Sanitation, and Hygiene Project (NI-WASH), which provides humanitarian and research assistance in countries with needs related to water, sanitation, and hygiene.

His project mapped seasonal shifts in aquifer depths and chemical concentrations in Niger's groundwater, as well as developed and distributed maps of that data to local people and organizations tasked with providing potable water.

THE NUMBERS



54

UNR AND UNLV
GRAD STUDENTS
WITH DRI FACULTY AS
PRIMARY ADVISORS

UNR AND UNLV
GRAD STUDENTS
SUPPORTED
BY DRI

39

DRI



26

NSHE CLASSES
TAUGHT BY
DRI FACULTY

80

DRI FACULTY
INVOLVED IN
TEACHING AND
ADVISING



ABOUT THE WESTERN REGIONAL CLIMATE CENTER (WRCC)

WRCC was established in 1986 with the mission of being a repository of historical climate data and information; the dissemination of high-quality climate data and information pertaining to the western United States; engagement in applied research related to climate issues; and the coordination of climate-related activities at state, regional, and national scales. The program has grown and evolved over the years to meet customer requests for information and engage users of climate information.

The passing of Dr. Kelly Redmond, Regional Climatologist and Deputy Director of the Western Regional Climate Center (WRCC), in November 2016 was a major loss for the Center and its colleagues. Kelly's 27 years of outreach and connections with the research and public communities established WRCC as the place to go for climate services in the western U.S.

This year, 2017, marks a number of changes for the WRCC program. Tim Brown, Ph.D., remains as director. Tamara Wall, Ph.D., is now the Center's Deputy Director while continuing her social science focusing in the areas of evaluation and deliberate co-production of knowledge. Nina Oakley, currently working on her Ph.D. in post-wildfire debris flow and landslides related to extreme precipitation events, is now one of two Regional Climatologists. The other Regional Climatologist is Dan McEvoy, Ph.D., who recently was promoted from a post-doc to a DRI faculty position, and has been working on drought research and application tools. Om Mishra, a software engineer, joined WRCC in January to help with updating the Center's data and computing infrastructure. WRCC is funded by NOAA and receives support from a number of other federal and state agencies. WRCC is located within the Division of Atmospheric Sciences at DRI.

WRCC PROGRAMS & SPECIAL SERIES:



Western Regional
Climate Center





IN MEMORIAM — DR. KELLY REDMOND

A **RESEARCH PROFESSOR** OF CLIMATOLOGY IN DRI'S DIVISION OF ATMOSPHERIC SCIENCES,
REGIONAL CLIMATOLOGIST, AND WRCC DEPUTY DIRECTOR



IN MEMORIAM

As deputy director for the Western Regional Climate Center (WRCC), Dr. Redmond spent more than three decades dedicated to the management, application and dissemination of climate data and knowledge to the general public. Since 1989, Dr. Redmond has been the voice and face of the WRCC and he pioneered many approaches in applied climatology. Clear communication of climate data and information to both expert and lay audiences was central to his mission day in and day out. He worked tirelessly to develop tools and services that could support everyone, from kindergarten teachers to research scientists, in utilizing climate data. Through his efforts, he established WRCC as a valued broker of climate information for the West, providing

data and services with integrity and transparency.

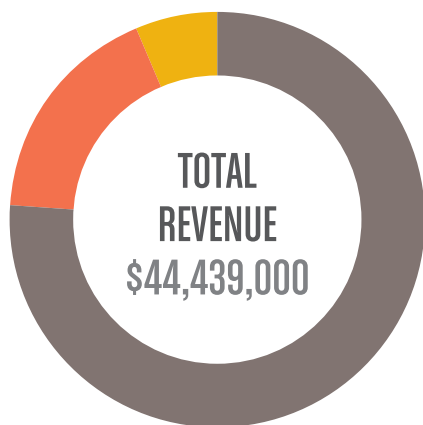
Dr. Redmond's major research contributions were related to drought, a dominant issue in the western U.S. which is linked to climate change and wildfire in the West, also key elements of Dr. Redmond's research. Some of Dr. Redmond's more recent studies involved snowfall trends, lake effects on snow, and large-scale winter circulation patterns and hydrologic consequences.

Dr. Redmond completed his undergraduate degree in physics at the Massachusetts Institute of Technology (MIT) in 1974. He went on to earn his M.S. in meteorology from the University of Wisconsin-Madison in 1977 based on research into an atmospheric emissivity approximation for climate modeling. This was followed by his Ph.D. in meteorology also from the University of Wisconsin-Madison in 1982. After completing his Ph.D., Dr. Redmond took a position in the Oregon State Climatology Office. From 1982 to 1984, he was the Oregon Assistant State Climatologist in the Climatic Research Institute and Atmospheric Sciences Department. For the following five years, Dr. Redmond served as the Oregon State Climatologist before moving to Nevada to begin work for the WRCC and DRI.



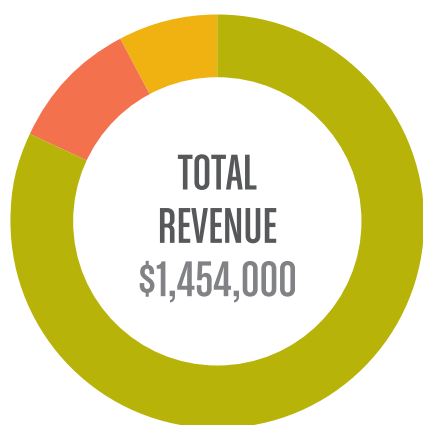
DESERT RESEARCH INSTITUTE FY16 FINANCIALS

FOR THE INSTITUTE



■ Total Grants & Contracts	\$33,882,000
Federal	\$24,178,000
Private & Foreign	\$3,288,000
State & Local	\$4,676,000
Other Non-NV State Governments	\$1,740,000
■ Total State Appropriations	\$7,784,000
State General Fund	\$7,369,000
State Appropriations for Capital	\$415,000
■ Total Other Resources	\$2,773,000

FOR THE FOUNDATION



■ Gifts & Contributions	\$1,195,000
■ DRI Support	\$149,000
■ Special Events & Other Revenue	\$110,000

GRANTS AND CONTRACT FUNDING SOURCES



FEDERAL	\$24,178,000
Dept. of Energy (DOE)	23.9%
National Science Foundation	10.1%
Dept. of Interior (DOI)	9.8%
Dept. of Defense (DOD)	9.5%
Environmental Protection Agency	6.2%
Dept. of Commerce (DOC)	3.8%
NASA	3.8%
Dept. of Agriculture (USDA)	3.2%
Other	1.1%
Total	71.4%

NON-FEDERAL	\$9,704,000
State Government	12.1%
Private	8.4%
Other Non-NV State Governments	5.1%
Local Government	1.7%
Foreign	1.3%
Total	28.6%

DRI INNOVATION RESEARCH PROGRAM

With a goal of raising \$1 million per year, over the next five years, to financially support the opportunity for DRI faculty, students, and technical staff to pursue their very best ideas.

POSTDOCTORAL SCHOLAR FUND

- Recruiting the best and brightest scientists to DRI.
- **Impact:** Ensures that DRI will have a pipeline of world-class scientific leaders for future succession to the faculty.

EARLY-CAREER FACULTY INNOVATION FUND

- Launching the faculty career of rising researchers.
- **Impact:** Provides new faculty with a financial incentive to pursue new ideas, projects and research opportunities, develop new collaborative partnerships (e.g. corporate/public). Allows for professional development through the attendance of workshops, conferences, and seminars. Provides opportunities for teaching/graduate student supervision.

MID-LEVEL FACULTY INNOVATION FUND

- Providing mid-level faculty the time to collaborate on new proposals and programs.
- **Impact:** Affords these faculty opportunities in professional development by pursuing new ideas, projects and research opportunities, and developing new collaborative partnerships (e.g. corporate/public). Offers opportunities for more involvement in teaching and supervising both undergraduate and graduate students from UNR, UNLV, Nevada State College, and the community colleges.

SENIOR FACULTY INNOVATION FUND

- Providing senior faculty the time to mentor early-career faculty to enhance their opportunity for long-term success.
- **Impact:** Affords these faculty members opportunities for developing and leading a major interdisciplinary research program proposal. Affords mentoring opportunities for early-career and mid-level stage faculty. Offers an opportunity to synthesize their breadth of research efforts over their career by writing or editing a book or journal.

TECHNOLOGY DEVELOPMENT FUND

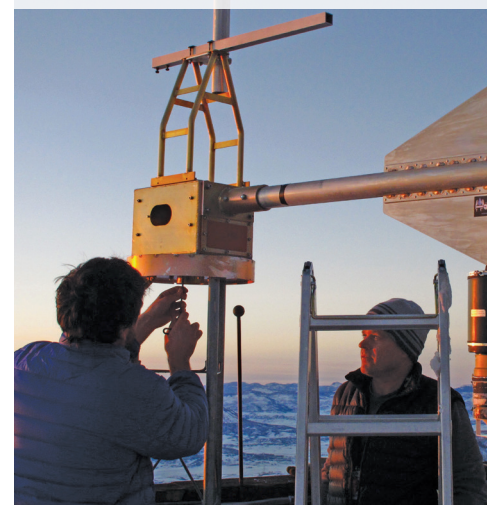
- Offering opportunities for faculty and technical staff to develop the next generation of state-of-the-art instruments and new technology for research.
- **Impact:** Increases opportunities to develop new corporate/public relationships, which directly support Nevada's new knowledge-based economy and advances Nevada's economic development efforts. Provides resources to DRI faculty to develop new intellectual property and/or commercialize existing intellectual property.

NEW SPECIAL PROJECTS FUND

- Supporting innovative new research and education projects and programs.
- **Impact:** Increases opportunities for DRI faculty and staff to develop new ideas and new projects or programs or special events that don't fit the traditional research funding model.



THE DRI FOUNDATION



WHAT WILL TOMORROW BRING?

Join DRI for a conversation on how scientific discovery benefits national policy, society, and Nevada.

- One-of-a-kind conversation and evening program honoring Dr. Marcia McNutt, President of the National Academy of Sciences.
- Dine and engage with DRI scientists working on over 400 exciting research projects around the world.
- Proceeds benefit the new DRI Innovation Research Program.



—Honoring—

Dr. Marcia McNutt, President
National Academy of Sciences
2017 DRI Nevada Medalist



2017 DRI NEVADA MEDAL EVENTS

Monday, September 25 | Peppermill Resort Spa Casino, Reno, NV

Wednesday, September 27 | Hard Rock Hotel & Casino, Las Vegas, NV

WWW.DRI.EDU/NVMEDAL

