



UNLV



Collaborative Research

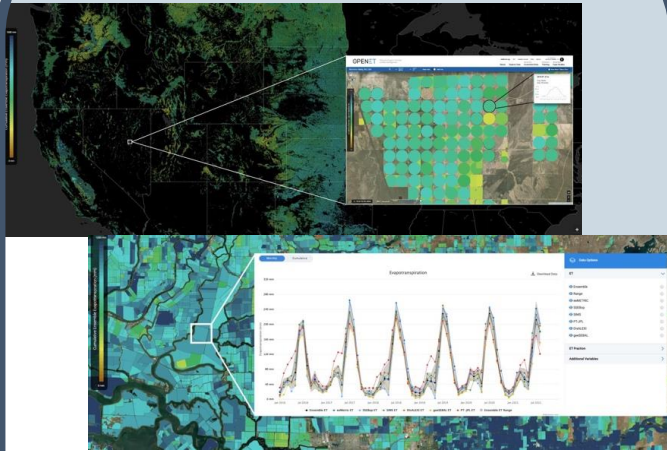
Impacts on Daily Life | Improving Lives of Nevadans

**Nevada System of Higher Education
Board of Regents
Research Advisory Council
Sept. 3-4, 2026**



WATER RESOURCES & SUSTAINABILITY

for the Driest State in the Nation



- Using satellite retrievals, cloud computing, and ground-truth data to provide a common platform for evapotranspiration (ET)
- Understanding consumptive use informs planning and action



- Providing support for rural counties in developing water resource plans
- Smaller counties require updated plans and do not have staffing to support the full effort



- Microplastics can be found in every above ground waterway
- Understanding where they come from, how they move through the environment, and exposure pathways is critical for understanding potential human and ecosystem impacts





WILDFIRE

Modeling, Impacts & Decision Support



- Modeling wildfires requires knowledge of fuels, understanding of atmospheric and ground conditions, and models for propagation
- The Harnessing the Data Revolution for Fire Science (HDRFS) is an NSHE-wide NSF EPSCoR project that builds capacity and advances the science of wildfire prediction



- Wildfire smoke is a major public health concern with acute and long-term health impacts
- Dispersion of the smoke plume, chemical transformations, and overlap with human activities determines exposure levels and health outcomes



- Landscapes are changed for years to centuries following wildfires with implications for flooding, invasive species, and future wildfires
- Samples following the LA wildfires of 2025 are being analyzed for toxic, wind — suspendable compounds



DRI

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THE SCIENCE OF SNOW



Mountain Rain or Snow

It's 37°F, is it raining? ❌

Actually, it's snowing! ✅

- Mountain Rain or Snow uses citizen science approach to identify where the rain/snow elevation line is
- Crowd-sourced data used to provide real-time information and improve model predictions

FLOODED

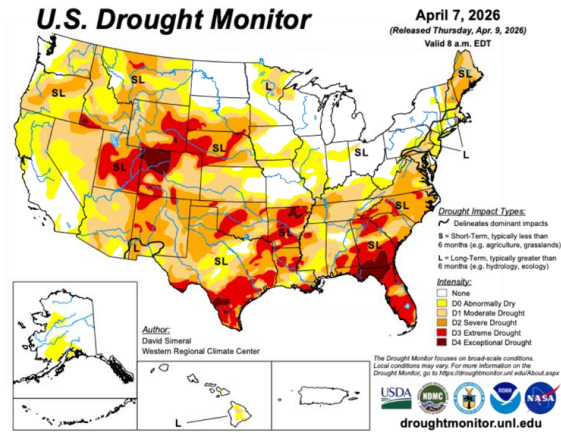
- Wintertime flooding and debris flow are highly dependent on rain/snow transition and timing and distribution of snowmelt

- Water resources in the arid West are highly dependent on mountain snowpack and timing of runoff





HEAT, DROUGHT & the Human Experience



- Drawing on the data and analysis capabilities of the WRCC, DRI is a co-author on the U.S. Drought Monitor, a widely used drought planning tool across state and federal agencies



- Reno and Las Vegas are the two fastest warming cities in the nation
- Modeling the interaction between the air, sun, and the built environment is key to understanding urban heat, the impact on everyday life, and mitigation strategies



- The human experience of extreme heat requires a different approach than traditional scientific discovery
- The Nevada Heat Lab tries to understand and ameliorate the impact of heat on communities, the vulnerable, and social and economic systems





POLAR RESEARCH

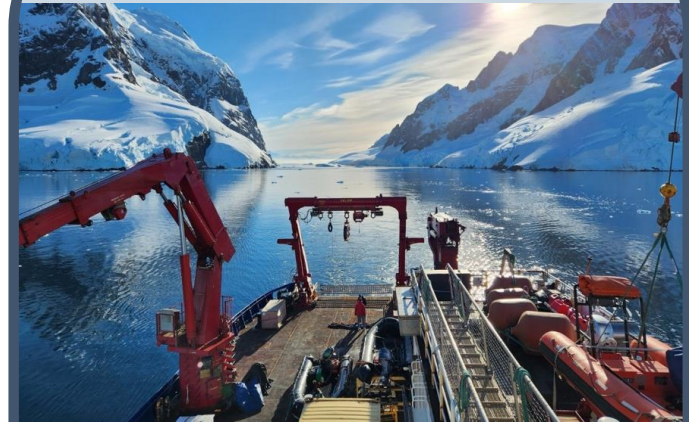
from & for Nevada



- Analyzed in state-of-the-art facilities on DRI's Reno campus, ancient ice contains the historical record of our planet's atmosphere and helps us understand the world we live in now



- A longstanding area of expertise at DRI, the physics of cloud interactions with aerosols allows us to understand how the poles are changing and what impacts aerosol pollution can have



- The biology of Antarctic waters holds priceless information about genetic diversity, promising medicines, and indicators of our planet's health





WASTEWATER INTELLIGENCE FOR A HEALTHIER NEVADA

*Translating hidden community-health signals from the lab into
earlier warning and targeted public-health action*



DETECT

Pathogens, variants,
antimicrobial resistance,
STIs, and community
substance use and
opioid trends



Pathogens &
Variants



Antimicrobial
Resistance



STIs



Substance Use
& Opioids



INTERPRET

Sequencing, mass spectrometry
analytics, and AI convert
wastewater signals into
decision-ready knowledge



Sequencing



Mass
Spectrometry
Analytics



AI & Data
Integration



Decision-Ready
Knowledge



ACT

Nevada examples: hospital infection
control, targeted treatment based on
outbreak data, STI testing, and state
public dashboards showing
health trends.



Hospital Infection
Control



Targeted
Treatment



STI
Testing



Public Dashboards
& Health Trends



SAVES \$\$\$

through non-invasive
testing of wastewater
rather than individuals.



PRIORITIZED

fentanyl testing sites
& harm reduction and
intervention.

IN PARTNERSHIP WITH



STRONGER COMMUNITIES. HEALTHIER NEVADA. EARLIER INSIGHTS. SMARTER ACTION.

UNLV RADIOCHEMISTRY & NUCLEAR ENGINEERING

EDUCATION AND RESEARCH FOR A SAFER,
SECURE, AND SUSTAINABLE NUCLEAR FUTURE



EDUCATING THE NEXT GENERATION



Advanced Degrees
Ph.D. in Radiochemistry
and M.S. & Ph.D. programs



Hands-On Learning
State-of-the-art labs,
training, and simulators



Workforce Ready
Preparing graduates for
careers in industry, national
labs, and academia



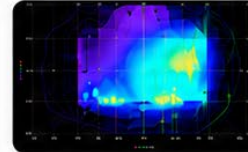
Professional Development
Building leaders for the
nuclear future



RESEARCH THAT MATTERS



**RADIATION DETECTION
& MONITORING**
Developing advanced
technologies to detect
and measure radiation
for public safety



**NUCLEAR ENERGY
& MATERIALS**
Creating materials and
reactor technologies for
clean, reliable energy



**NUCLEAR SAFEGUARDS
& SECURITY**
Protecting people and
infrastructure through
innovative security solutions



SOCIETAL IMPACT



CLEAN ENERGY
Advancing nuclear technologies
that reduce carbon emissions and
support energy independence



SAFER COMMUNITIES
Improving radiation detection,
emergency response, and
national security



IMPROVING HEALTH
Developing medical isotopes and
materials that enhance diagnosis
and treatment



BUILDING THE WORKFORCE
Educating and training a diverse
workforce to meet global energy
and technology needs



**POWERING DISCOVERY.
SHAPING THE FUTURE.**
Research today. Impact tomorrow.



INNOVATION
Solving real-world
challenges



PARTNERSHIPS
Collaborating with industry,
labs, and communities



EDUCATION
Inspiring the next
generation



IMPACT
Creating a safer, cleaner,
and healthier world



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OUR CENTERS & LABORATORIES



Chambers-Grundy Center for Transformative Neuroscience

World's only Alzheimer Clinical Trial Observatory
(funded by Gate's Ventures)
Clinical Trial Observatory
(funded by Alzheimer Drug Discovery Foundation)
Alzheimer Disease and Related Dementias
Innovation Incubator (funded by National Institute on Aging)



Pam Quirk Brain Health and Biomarker Laboratory

Blood biomarker measurement, storage, discovery



Cognitive Aging and Neuropsychological Equity Laboratory

Neuropsychological measures across understudied populations



Neuro-regenerative Innovative Health (NIH) Laboratory

Research enabling brain recovery from stroke



Translational Mechanisms and Drug Discovery Laboratory

Brain organoids advance drug discovery for clinical trials



Repetitive Head Injury and Chronic Traumatic Encephalopathy Laboratory

Multidisciplinary program with School of Public Health

Department of Brain Health

ADVANCING BRAIN HEALTH

to subdue Alzheimer's, stroke, and effects of repetitive head injury.



\$314,000,000

of NV Medicaid cost/y
for Alzheimer's



55,000

Nevadans have
Alzheimer's Dementia



137,000

NV caregivers provide
226,000,000 hours of care

Leading innovation. Driving discovery. Improving lives. | For Nevada. For the Future.

Integrated fMRI and High-Performance Computing

Advanced Imaging. Powerful Computing. Better Health Outcomes.



CLINICAL TRIALS

Driving the development of novel medications and treatments for rapid clinical application.



MONITORING & EVALUATION

Post-procedure analysis and real-time evaluation of ongoing therapies and medications.



fMRI CORE RESEARCH FACILITY

Advanced imaging for brain research, clinical trials, and education

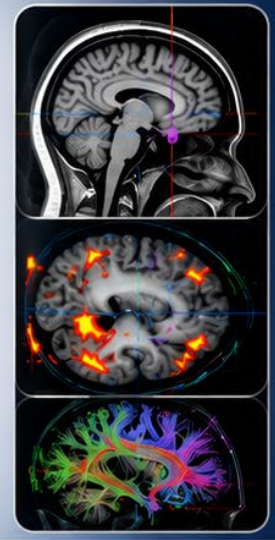
DIAGNOSIS & ASSESSMENT

Precise identification of underlying mechanisms, risk factors, and biomarkers using advanced fMRI.



MAPPING & TREATMENT PLANNING

Tracking symptom progression and designing targeted, personalized interventions.



BIOMEDICAL, BRAIN-HEALTH, AND LIFE-SCIENCES FACULTY
Advancing discovery through collaborative research.



EDUCATION, BEHAVIORAL, AND SOCIAL SCIENCES
Understanding the human brain and behavior.



EMERGING RESEARCH GROUPS AND POSTDOCTORAL SCHOLARS
Fostering innovation and the next generation of researchers.



UNLV HIGH-PERFORMANCE COMPUTING

Powering large-scale data analysis, modeling, and AI for brain health research



ARTIFICIAL INTELLIGENCE, COMPUTER SCIENCE, AND CYBERSECURITY
Enabling advanced analytics, machine learning, and data security.



ENGINEERING AND PHYSICAL SCIENCES
Modeling complex systems and developing new technologies.

IMPROVED HEALTH OUTCOMES

- Earlier and more precise diagnosis
- Personalized, data-driven treatment plans
- More effective therapies and clinical outcomes
- Stronger partnerships with healthcare and industry
- A highly trained workforce and engaged students

UNLV

DIVISION OF RESEARCH

Integrated fMRI and High-Performance Computing

Transforming Brain Science into Discoveries, Treatments, and Hope.



DISCOVER



COLLABORATE



INNOVATE



IMPACT

POST-STROKE BRAIN RECOVERY

Novel vascular regeneration and neural recovery to restore brain function after stroke.



Lina Nih



THE IMPACT

- Restores blood flow and promotes neural recovery
- Reduces long-term disability and improves quality of life
- Lower healthcare costs and caregiver burden



**STRONGER RECOVERY.
BETTER LIVES.**

WAVR™ – DIGGING DEEPER

Generating clean water from the air using an energy-efficient process for arid climates.



Jeremy Cho



FROM RESEARCH TO REAL-WORLD IMPACT



RESEARCH

UNLV-developed atmospheric water harvesting technology



INVENTION

Energy-efficient system designed for arid regions



PILOT & TESTING

Field validation and performance optimization



COMMERCIALIZATION

Scalable product addressing global water challenges

THE CHALLENGE

Water scarcity in arid regions threatens communities, agriculture, and economic growth.

THE SOLUTION

WAVR captures clean, drinkable water from the air using minimal energy.

SOCIETAL BENEFIT

Reliable, sustainable water for communities, industry, and ecosystems — building resilience for Nevada and the world.



**CLEAN WATER. STRONGER COMMUNITIES.
SUSTAINABLE FUTURE.**

BATTERY X-RAY TECHNOLOGY

X-Ray regenerated battery technology that improves lithium battery capacity, safety, and lifespan.



Michael Pravica



THE IMPACT

- Increases battery capacity, safety, and lifespan
- Enables more efficient electric vehicles and renewable energy storage
- Supports a cleaner, more sustainable energy future



**POWERING INNOVATION.
DRIVING SUSTAINABILITY.**



UNLV innovations are solving real-world challenges and creating lasting impact for Nevada and beyond.



IMPROVED HEALTH
Better outcomes and quality of life



ECONOMIC GROWTH
Jobs, investment, and industry advancement



SUSTAINABLE SOLUTIONS
Addressing critical needs for future generations



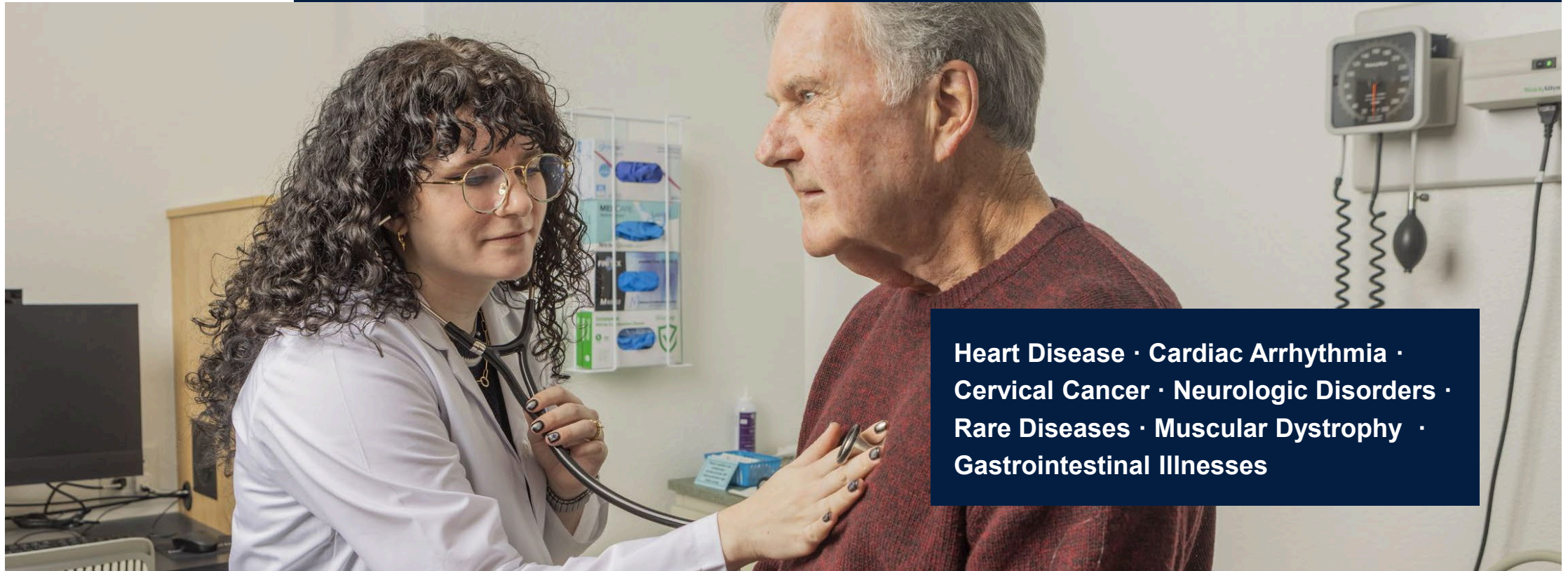
STRONGER NEVADA
Building a healthier, more resilient community



University of Nevada, Reno

RESEARCH THAT IMPROVES LIVES ACROSS NEVADA

Helping People Live Longer, Healthier Lives



Heart Disease · Cardiac Arrhythmia ·
Cervical Cancer · Neurologic Disorders ·
Rare Diseases · Muscular Dystrophy ·
Gastrointestinal Illnesses



University of Nevada, Reno

RESEARCH THAT IMPROVES LIVES ACROSS NEVADA

National Defense & Water Security

Energy Security · Quantum Information Science ·
Nuclear Stockpile Stewardship · Fusion Energy ·
Resilient Infrastructure · Critical Resource Protection ·
Water Reuse · Water Treatment





University of Nevada, Reno

RESEARCH THAT IMPROVES LIVES ACROSS NEVADA

Cybersecurity & Artificial Intelligence

Banking · Health Care · Transportation ·
Communications · Network Security · Energy Grids ·
Manufacturing · Complex Decision Making ·
Wildlife Monitoring & Conservation





University of Nevada, Reno

RESEARCH THAT IMPROVES LIVES ACROSS NEVADA

Robotics, Drones & Autonomous Systems

**Wildfire Assessment · Assistive Robots ·
Critical Infrastructure Assessment ·
Medical Supply Delivery · Quality of Life ·
Integration of Drones in Manned Airspace**



University of Nevada, Reno

RESEARCH THAT IMPROVES LIVES ACROSS NEVADA

Working Together to Reduce Wildfire Risk in Nevada

