Division of Atmospheric Sciences

The Division of Atmospheric Sciences (DAS) conducts basic and applied research, services related to air quality and associated health risks, cloud and aerosol physics, atmospheric chemistry, climate, renewable energy, fire science, atmospheric dynamics, and STEM Education.

DAS researchers develop instrumentation for observations from the ground, unmanned and human-piloted aircraft, and satellites in addition to techniques for observational programs. Inorganic and organic chemistry laboratories provide trace analysis of atmospheric pollutants, supporting assessments of human impacts on air quality. The Division has extensive capabilities in numerical modeling of atmospheric and air pollution processes for meteorology, atmospheric dynamics, precipitation processes, atmospheric chemistry, aerosol formation, visibility assessments, urban air quality, and transport of pollutants in complex terrain.

DAS personnel operate primarily from office and laboratory facilities in Reno and Las Vegas, Nevada. Faculty and staff maintain $25–35 million in active projects for federal, state, and local governments, tribes, private industry, foundations, and universities.

As part of the Nevada System of Higher Education, DAS faculty administer and teach in the Atmospheric Sciences Graduate Program at the University of Nevada, Reno, where students conduct their research under the supervision of DAS faculty while working toward an M.S. or Ph.D. degree.

RESEARCH AREAS

- Air quality
- Atmospheric processes
- Characterization of pollutants
- Climatology & meteorology
- Wildland fire
- Modeling of the atmosphere
- Weather modification
- Exposure health effects
- STEM Education

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CLOCKWISE:
Xiaoliang Wang, Ph.D., research includes physical and chemical characterization of aerosols, pollution source characterization, air quality measurement, and aerosol instrument development; George Nikolich, M.S., pictured with the Portable In-Situ Wind Erosion Lab (PI-SWERL), a portable device developed at DRI, to test and measure the potential for wind erosion and dust emissions from real-world surfaces.

SERVICES & CAPABILITIES

AIR QUALITY MONITORING
- Automated filter-based samplers for aerosol and gas sampling
- Continuous aerosol mass, size distribution, optical properties, and composition
- Automated and passive sampling of volatile organic compounds
- Analysis of over 400 individual gas- and particle-phase organic compounds
- Comprehensive characterization of PFAS and other emerging contaminants
- Mobile measurements of spatial distribution of pollutants in urban areas

ATMOSPHERIC MODELING
- Photochemical air quality modeling
- Weather Research & Forecasting (WRF) model
- Computational fluid dynamics models
- Coupled atmospheric and hydrologic models
- Regional downscaling of climate/weather models
- Source apportionment and dispersion modeling
- Modeling of dust and atmospheric interactions at various scales

ENVIRONMENTAL HEALTH EFFECTS
- Characterization of first- and second-hand exposure to e-cigarette and cannabis aerosols
- Biomarkers of exposure assessment
- Air quality toxicology studies

METEOROLOGY
- Use of satellite radiances to infer atmospheric structure
- Surface, column, and aircraft measurements of atmospheric motion and thermodynamics
- Wind & solar forecasting
- Cloud radiative properties from satellites and radars
- Particle size distribution and imaging by insitu microphysical probes

POLLUTANT EMISSIONS CHARACTERIZATION
- Dilution chamber sampling of stationary source emissions
- Fugitive and area source emission sampling
- Emission factor and inventory development for modeling purposes

SOCIAL SCIENCE
- Experienced team leads for integrated physical-social projects
- Evaluation of projects, web tools, and research products
- Focus on use-inspired science and stakeholder engagement

CLIMATE RESILIENCY
- Climate risk assessment
- Urban heat
- Climate adaptation

WEATHER MODIFICATION
- Cloud seeding for snowfall enhancement
- Ultra-trace chemical analysis of snow
- UAS applications for applied atmospheric research

WILDLAND FIRE
- UAS applications for fire management support
- Wildfire visualization
- Climate and weather applications

STEM EDUCATION
- Workforce development using robotics
- K-12 computer science education

WESTERN REGIONAL CLIMATE CENTER

DAS is home to the Western Regional Climate Center (WRCC), one of six regional centers across the United States supported by the National Oceanic and Atmospheric Administration.

CLIMATE INFORMATION SERVICES
- Archiving historical climate data/information for the western U.S.
- Disseminating high quality climate data and information
- Engaging in applied research related to climate issues and resource management
- Coordinating climate-related activities at state, regional, and national scales

DRI

dri.edu

We are Nevada's non-profit research institute, founded in 1959 to empower experts to focus on science that matters. We work with communities across the state — and the world — to address their most pressing scientific questions. We're proud that our scientists continuously produce solutions that better human and environmental health. At DRI, science isn't merely academic — it's the key to future-proofing our communities and building a better world. For more information, please visit www.dri.edu.

Science that matters now.™

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