Anne Heggli

Staff Research Scientist · Desert Research Institute

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EDUCATION

University of Nevada, Reno   Reno, NV
PhD Atmospheric Sciences   2020 - 2023
   Advisor: Dr. Benjamin Hatchett
   Dissertation: "Improving Decision Support During High Impact Weather Through Data Analysis and Visual Communications"

California State University, Fresno   Fresno, CA
MS Water Resource Management   2015 - 2017

San Francisco State University   San Francisco, CA
BA International Relations and BA Spanish Language and Culture   2005 - 2009

GRADUATE & PROFESSIONAL EXPERIENCE

2023–Present	Staff Research Scientist, Desert Research Institute
2020–2023	Graduate Research Assistant, Desert Research Institute
2016–present	Co-Owner/Research Director, Alpine Hydromet
2015–present	Owner/Consultant, Unearth, Inc.
2010–2015	Technical Sales Manager, Latin America, Hydrological Services America
2007–2009	Technical Hydromet Assistant and Interpreter, Innovative Hydrology

Scholarships & Awards

2023	1st Place Graduate Student Poster Competition: Towards Snowpack Runoff Decision Support, Desert Research Institute	$500
2022	Jerry and Betty Wilson Scholarship, University of Nevada, Reno	$ 4,000
	2nd Place Poster Competition: Towards Snowpack Runoff Decision Support, Nevada NASA Space Grant Consortium	–
2021	Graduate Dean's Merit Scholar, University of Nevada, Reno	$ 3,570

PUBLICATIONS

In-Prep

Heggli, A., Hatchett, B., Bardsley, T., Moore, J., Anderson, J. The Application of Hourly SNOTEL Data to Produce Snowpack Runoff Decision Support for Midwinter Rain-on-Snow.

Peer Reviewed

Rhoades, A., Zarzycki, C., Díaz, H. A. I., Ombadi, M., Pasquier, U., Srivastava, A., Hatchett, B., Dennis, E., **Heggli, A.**, McCrary, R. R., McGinnis, S. A., Rahimi-Esfarjani, S. R., Slinskey, E. A., Ullrich, P., Wehner, M., Jones, A. D. (2023) Recreating the California New Year's flood event

of 1997 in a regionally refined Earth system model. Journal of Advances in Modeling Earth Systems. `https://doi.org/10.1029/2023MS003793`

Heggli, A., Hatchett, B., Tolby, Z., Lambrecht, K., Collins, M., Olamn, L., & Jeglum, M. (2023). Visual Communication for Probabilistic Information to Enhance Decision Support. Bulletin of the American Meteorological Society. `https://doi.org/10.1175/BAMS-D-22-0220.1`

Hatchett, B. J., Koshkin, A. L., Guirguis, K., Rittger, K., Nolin, A. W., **Heggli, A.**, et al. (2023). Midwinter dry spells amplify post-fire snowpack decline. Geophysical Research Letters, 50, e2022GL101235. `https://doi.org/10.1029/2022GL101235`

Heggli, A., Hatchett, B., Schwartz, A., Bardsley, T., & Hand, E. (2022). Toward snowpack runoff decision support. In iScience (Vol. 25, Issue 5, p. 104240). Elsevier BV. `https://doi.org/10.1016/j.isci.2022.104240`

Conference Proceeding

Heggli, A., Hatchett, B., Schwartz, A., Anderson, J. (2023). A Semi-Automated Approach to Clean Hourly Snow Depth and Snow Water Equivalent Data. 90th Annual Western Snow Conference Proceedings

Heggli, A., Hatchett, B., Schwartz, A., Bardsley, T., & Hand, E. (2023). Toward snowpack runoff decision support. 90th Annual Western Snow Conference Proceedings

Heggli, A., McGurk, B., Lea, J. (2022). Still Studying the Same Ol'Snow. 89th Annual Western Snow Conference Proceedings.

Heggli A., Heggli, M., & Trauman, T. (2018). Research and Development in Advancing Fluidless Snow Water Content Monitoring, 86th Annual Western Snow Conference Proceedings.

Heggli, A. (2013) Data Analysis of the Snow Pack Analyzing System Tested by UCAR. 81st Annual Western Snow Conference Proceedings.

Funded Grants & Fellowships ───────────────────────────────

Under Consideration

PI Decision Support for Enhanced Water Resource Management Planning of Rain-on-Snow Events in the Mokelumne Watershed, US Bureau of Reclamation WaterSMART	$ 574,902.

Awarded

2023	Co-PI Developing a Cooperative Snow Temperature Survey, US Bureau of Reclamation	$ 729,521
	PI Enhancing Decision Support for Runoff Events in Snow-Covered Watersheds, COMET Outreach Program	$ 14,999
	PI Developing Quality-Controlled Datasets and Methods to Assess the Impact of Rain on Snow Events on Nevada Highways, State of Nevada - Department of Transportation	$ 99,952
2022	Long Science Fellowship, The Long Now Foundation	$ 35,000

	Natural Resources Workforce Development (NRWD) Fellowship, Southwest Climate Adaptation Science Center (SW CASC)	$ 5,000
	Towards Snowpack Runoff Decision Support, Nevada NASA Space Grant Graduate Research Opportunity Fellowship	$ 20,000
2020	Co-PI Towards Improved Decision Support for Snow Covered Watersheds: A Snowmelt Risk Advisory (SRA), UCAR COMET Outreach Program Grant	$ 14,999
	Co-PI Towards Improved Decision Support for Snow Covered Watersheds: A Snowmelt Risk Advisory (SRA), Desert Research Institute's Institute Project Assignment Grant	$ 15,000
	Student Fellowship, Desert Research Institute	$ 10,000
	Instrumentation Discovery Grant, CUAHSI	$ 2,000
2019	PI Application Research of Cosmic Ray Attenuation Principal for Snow Water Content, NIFA Small Business Innovation Research Grants Program	$ 99,740

PRESENTATIONS

Invited Oral Presentations and Panel Discussions

Heggli, A. 2023. *Developing Sensor Based Decision Support Tools at the Western Regional Climate Center*. Southwest Higher Education Knowledge and Technology Exchange (SHEKATE), Salt Lake City, UT.

Heggli, A. 2023. *Theme Session Panel: Practicing and Rewarding Co-production of Knowledge Within Universities*. Ecological Society of America, Portland, OR.

Heggli, A. 2022. *Theme Session Panel: Science for Decision Making in Mountain Systems*. MtnClimb, Crested Butte, CO.

Heggli, A. 2022. *Observing Rain-on-Snow: The value of observational networks in a changing climate*. Invited talk: Science Distilled, Reno, NV.

Heggli, A, Hatchett, B., Schwartz, A., Bardsley, T., & Hand, E. 2022. *Towards Improved Decision Support*. Invited talk: Southern California Academy of Sciences Annual Meeting, California State University, Fullerton, CA.

Heggli, A. 2020. *Observing Rain on Snow: Using Existing Networks and New Technologies to Improve Forecasts*. Invited talk: California Extreme Precipitation Symposium, virtual, CA.

Conference Presentations and Posters

Heggli, A. 2023. The Use of Hourly SNOTEL Data to Produce Snowpack Runoff Decision Support for Midwinter Rain-on-Snow, Oral Presentation: American Geophysical Union, San Francisco, California.

Heggli, A. 2023. Towards Snowpack Runoff Decision Support, Oral Presentation: Western Snow Conference, Flag Staff, Arizona.

Heggli, A. 2023. A Semi-automated Approach to Clean Hourly Snow Depth and Snow Water Equivalent Data, Poster: Western Snow Conference, Flag Staff, Arizona.

Heggli, A., McGurk, B., Lea, J. 2022. Still Studying the Same Ol'Snow, Oral Presentation: Western Snow Conference, Salt Lake City, Utah.

Heggli, A. 2020. Towards Improved Decision Support in Snow-dominated Watersheds During Extreme Weather. Poster: International Atmospheric River Conference, Santiago, Chile.

Heggli, A., Heggli, M., Trauman, T. 2018. Research and Development in Advancing Fluidless Snow Water Content Monitoring. Oral Presentation: Airborn Snow Observatories Workshop, Mammoth Lakes, CA.

Heggli, A. 2013. Data Analysis of the Snow Pack Analyzing System Tested by UCAR. Oral presentation: Western Snow Conference, Jackson Hole, WY.

RESEARCH EXPERIENCE

Staff Research Scientist Supervisor: Dr. Dan McEvoy

Desert Research Institute Aug. 2023 - Present

Co-PI Developing a Cooperative Snow Temperature Survey, PI Enhancing Decision Support for Runoff Events in Snow-Covered Watersheds, Co-PI CSSI: Innovating for Edge-to-Edge Climate Services, PI Developing Quality-Controlled Datasets and Methods to Assess the Impact of Rain on Snow Events on Nevada Highways, Co-PI Employing Rhetoric to Improve Probabilistic Forecast Communication, Co-PI Mountain Rain or Snow — Citizen Science Project. Assisting with the following projects: Snow-Covered and Mountain Environment Sensing Research and Understanding the Evolving Threat of Snow Loads and Rain on Snow Events to Structural Safety

Graduate Research Assistant Advisor: Dr. Benjamin Hatchett

Desert Research Institute Aug. 2020 - Present

Expand testable Snowpack runoff decision support framework to Nevada to improve pattern recognition of high-impact antecedent basin and imminent weather conditions producing hazardous floods. Collaborate with stakeholders to guide the development of the snowpack runoff decision support system. Improve visual and verbal communication of probabilistic forecast information and impact-based decision support.

Principal Investigator

Alpine Hydromet 2019–present

Small Business Innovation Research Grant (SBIR) for snow water content monitoring through cosmic ray detection. Lead for CalTestBed Grant in collaboration with the University of California Riverside for 3rd party testing of the snow water content sensors.

Research and Development Consultant Advisor: Dr. Paul Kucera

University Corporation for Atmospheric Research 2016 - Present

Market study for low-cost and low-power water level sensing technologies. Pilot study for 3D printed water level and snow depth sensors designed to observe and communicate weather and climate information to rural communities.

SKILLS

Computer

Data Management: Python, ArcGIS, crbasic.

Graphic Design and Typesetting: Adobe Creative Suite, LaTeX, Microsoft Office Suite.

Data workflow development: Experienced with developing QA/QC workflow from data acquisition to establishing a verified historical data record for numerous hydro-meteorological parameters.

Fieldwork

Monitoring stations: Design, integration, and installation of horological and meteorological stations transmitting with GOES and cellular radios in desert, jungle, forest, and snow environments.

Data collection platforms: Experience installing solar power-operated data collection platforms with GOES satellite transmission. Experience with off-the-shelf data loggers such as Campbell Scientific and CRbasic programming language as well as custom single-board computer data logging systems (e.g. RaspberryPi and Arduino).

Snow monitoring: Experience digging snow pits and federal snow sampler observations.

Vehicles: Experience with offroad 4WD.

Other Skills

Languages: Spanish (written and spoken).

TEACHING EXPERIENCE

Guest Lecture:
•Climatology (ATMS 421/621), University of Nevada, Reno, Spring 2022. Lecture title: *How do we use snow data?*
•Measurement in the Atmosphere (ATMS 748), University of Nevada, Reno, Spring 2022. Lecture title: *Research & Development in Advancing Snow Water Content Monitoring*

OUTREACH & PROFESSIONAL DEVELOPMENT

Media

A Place to Dig in The Snow. Article - Light and Seed Magazine. Winter/Spring 2024.

Scientist explains how 'rain-on-snow' events can interact with California's snowpack. TV Interview - KCRA. March 2023.

New System Built to Better Predict Runoff During Historic Storm Season. Article - Sierra Nevada Ally. March 2023.

'High risk' of dangerous flooding as major storm bears down on California. Article - The Washington Post. March 2023.

Understanding Rain-on-Snow Events with Anne Heggli. Blog pose - DRI. March 2023.

Next few weeks critical for conserving good snowpack, new research shows. TV Interview - KSNV. February 2023.

Study develops framework for forecasting contribution of snowpack to flood risk during winter storms. Article - DRI. May 2022.

Service and Outreach

2021–present	California Extreme Precipitation Symposium, Moderator
2021–present	Sierra Nevada Journeys Girls in STEM program, Volunteer
2018–present	Protect America River Canyons (PARC), Volunteer
2015–2019	Friedreich's Ataxia Research Alliance (FARA) rideATAXIA, Volunteer

Reviewer Journal of Applied Meteorology and Climatology, NSF EPSCoR Undergraduate Research Opportunity

Professional Memberships

American Meteorological Society, American Geophysical Union

Development

Forecast Informed Reservoir Operations (FIRO) Colloquium
Enabling Interdisciplinary and Team Science Workshop