Geoarchaeology

Geoarchaeology applies methods used in geosciences to archaeological questions. Geoarchaeology helps us understand: the source and transport history of artifacts, the age and spatial distribution of archaeological sites, factors that influence site preservation, and climate and environmental conditions that would have influenced human activities through time.

This short course is designed for archaeologists who want to better understand how the geological and geomorphic context of an archaeological site can inform our interpretations and sampling methodology, as well as our understanding of the broader regional cultural landscape.

Co-Instructors Dr. Teresa Wriston and Dr. Christina Neudorf will introduce fundamental concepts and methods, with topical contributing lectures by Dr. Amanda Keen-Zebert, Dr. Tom Bullard, JD Lancaster, Dr. Brad Sion, Dave Page, and Dr. Ken Adams.

Course Schedule

Monday, August 30th
Desert Research Institute, 2215 Raggio Parkway, Stout Conference Center
1:00 - 5:00 pm
Introduction (Teresa Wriston and Christina Neudorf)
Geoarchaeology
Geomorphology
Sediments and Soils
Sampling and Scale
Question for attendees:
What archaeological problems do you hope this class can help you with?

Tuesday, August 31st
8:00 am - noon
Geomorphology (Christina Neudorf and Teresa Wriston)
Geology
Tectonic Factors
Environmental Factors
Erosion and Deposition
Landforms
noon - 1:00 pm Lunch (provided) and DRI tour

Wednesday, September 1st
8:00 am - noon
Stratigraphy (Teresa Wriston and Christina Neudorf)
Sedimentology
Soils
Interpretation
Archaeological Description
Considerations: Deposition, Erosion, Soil Formation
noon - 1:00 pm Lunch (provided) and DRI tour
1:00 - 5:00 pm
Geochronology and Sampling Methodology, Laboratory Tours
Luminescence (Christina Neudorf & Amanda Keen-Zebert)
Radiocarbon Ages (Christina Neudorf & Teresa Wriston)
Tephra & Others (Teresa Wriston & Christina Neudorf)
Cosmogenic Nuclides (Brad Sion)
XRF (Dave Page)
Interpretation and Meaning of Ages

Thursday, September 2nd
Meet at DRI, Stout Conference Center prepared for Field trip
8:00 - 5:00 pm
Field trip along Truckee River Corridor
lunch provided
Friday, September 3rd
8:00 - 10:00 am
Regional Focus - Great Basin Pluvial Lakes (Ken Adams)
10:00 - noon
Discussion
Overview and Summary
Review of Attendee Questions
Dr. Wriston is a geoarchaeologist interested in how past cultures adapted to changing environmental conditions. She uses a broad interdisciplinary approach to build environmental contexts that show how prehistoric people used the landscape and what resources were targeted. Dr. Wriston's work often draws from geomorphology, soils, remote sensing, ecology, and isotope ecology.

Her recent/ongoing research includes reconstructing the lake level histories of pluvial Lake Warner in southcentral Oregon and pluvial Lake Coal in southwestern Nevada in relation to archaeological evidence; constructing archaeological sensitivity models for Meadow Valley Wash, NV and Willamette Valley, OR; and analyzing stratigraphic and geomorphic contexts of archaeological sites throughout Nevada.

Mr. Page is a geoarchaeologist with more than 20 years of diverse professional experience throughout western North America. He has acquired a varied skillset and an interdisciplinary focus in both academic and support of CRM at sites in NW New Mexico, SE Colorado, Great Basin, Mojave and Sonoran deserts, Catalina Island, Belize, and coastal areas of Alaska, Washington, and California. Dr. Bullard works to identify and characterize landscapes and landforms favorable to archaeological potential. He has led workshops on soil geomorphology for archaeologists sponsored by National Park Service, Army Research Office, and Nevada Archaeological Association.

Dr. Sion is a soil geomorphologist with a broad educational and research background in desert soils, neotectonics, hydrology, and cosmogenic dating. He received a PhD in 2018 from the New Mexico Institute of Mining and Technology and moved to DRI as a post-doctoral fellow to support basic and applied soil science research from various funding agencies. During that time he has established a contract laboratory that conducts preparation of samples for terrestrial cosmogenic nuclide analysis. The laboratory is engaged in a wide range of activities that involve the use of cosmogenic nuclides as environmental tracers, including radiometric dating and investigation of desert soil processes.

Dr. Adams is a Quaternary geologist and geomorphologist with more than 25 years of experience in studying the landscape history of the Great Basin. He received his Ph.D. in geology at the University of Nevada, Reno in 1997 and has been with the Division of Earth and Ecosystem Sciences at Desert Research Institute since 1998. Adams has authored multiple articles, technical reports, and presentations on the history of pluvial lakes in the Great Basin and the rivers that feed them as well as detailed geomorphic mapping of the changing Truckee River Basin.

Dr. Keen-Zebert is a geomorphologist and Quaternary geologist with more than 10 years of experience in geoscience research specializing in luminescence dating and fluvial geomorphology. She received her Ph.D. in 2007 at Texas State University and conducted a NSF funded post-doctoral fellowship at the University of Aberystwyth, Wales in 2008-2010. After spending three years as an assistant professor at Murray State University, Dr. Keen-Zebert moved to DRI as an assistant professor and the director of the DRI E.L. Cord Luminescence Laboratory. She has experience in luminescence dating in a range of geomorphological settings that include desert rivers and pluvial lakes.

Dr. Lancaster is a geoarchaeologist with more than 10 years’ experience in Oregon, Idaho, and Southern Nevada specializing in Quaternary geology and geomorphology. He has applied an interdisciplinary approach in support of cultural resources surveys and excavations, and conducted geoarchaeological research in alluvial environments including the Silvies River and the Salmon River in Idaho. He is experienced in sediment coring, core stratigraphy and geochemical analysis, soil geomorphology, and geomorphological mapping toward developing contextual frameworks, reconstructing paleoenvironments, prospecting for buried cultural materials, and constructing predictive models.

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BS Geology, College of Charleston
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MSc Physical Geography, Simon Fraser Univ.
PhD Earth and Environmental Sciences, University of Wollongong

Dr. Tom Bullard has worked in landscape evolution, arroyo systems, seismic geomorphology, and archaeology. He has applied soils and geomorphology at sites in NW New Mexico, SE Colorado, Great Basin, Mojave and Sonoran deserts, Catalina Island, Belize, and coastal areas of Alaska, Washington, and California. Dr. Bullard works to identify and characterize landscapes and landforms favorable to archaeological potential. He has led workshops on soil geomorphology for archaeologists sponsored by National Park Service, Army Research Office, and Nevada Archaeological Association.

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