Mariangelica Groves, PhD

Assistant Professor

Weber State University, Department of Geography

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(801) 915 - 1487

Education:

PhD Geography

University of Utah, Salt Lake City, UT 2019
GPA – 3.97
Paleoecology/Paleoclimatology
Advisors: Andrea Brunelle, Ph.D., Mitchel James Power, PhD
Dissertation: A Paleoeclogical Study of Range Creek Canyon, Utah

Post Baccalaureate Certificate in Geographic Information Systems (GIS)

The Pennsylvania State University, University Park, PA 2012 – 2014
Graduate GPA – 3.92

Master of Arts, Interdisciplinary Studies - Instructional Science and Technology

California State University Monterey Bay, Monterey, CA 2007 - 2009

Interdisciplinary program integrating information technology, learning theories, instructional design, andragogy, and performance technology.
Advisor: Bude Su, Ph.D.
Capstone: Interactive Biology and Oceanography Modules for The Living Planet Aquarium, Sandy, Utah
GPA – 3.7

Bachelor of Science, Earth Sciences

The Pennsylvania State University, University Park, PA 1993-1997

Undergraduate Research and Thesis*: South Cascade Glacier, Washington. A Hydrologic and Stratigraphic Study*
Analyzed ice cores from South Cascade Glacier, Greenland, and the Antarctic ice sheet as an intern at the USGS, Federal Center, Lakewood, Colorado *Advisor*: Dr. Richard Alley

University of Pittsburgh, Semester at Sea Program 1996

Research Experience

Paleoecology Range Creek Canyon, Utah
Supervisor: Dr. Andrea Brunelle, Dr. Mitch Power 2015 - 2019
University of Utah
Reconstructions of climate, vegetation, and fire variability on the northern Colorado Plateau, Range Creek Canyon, Utah

Paleoecology Research Fish Lake, Utah
Supervisor: Dr. Mitch Power 2015
University of Utah
Palynological studies of a freeze core from fish lake to assess climate, fire, and vegetation variability

Arsenic and Heavy Metals in Groundwater and Surface Water, Mali, West Africa
Supervisor: Dr. Steve Emerman 2014
Utah Valley University
Conducted water analysis using spectroscopy and ICP analysis

Paleoclimatology Research at National Ice Core Lab (NICL), Lakewood Colorado 1997
Supervisor: Dr. Richard Alley
Penn State University
Climate research analyzing the stratigraphy of South Cascade Glacier
Studied the gases and the physical properties such as tephra layers and seasonal bands from South Cascade Glacier, as well as logged, ice cores

Geologic Report of Whipple Dam, Rothrock State Forest, Pennsylvania
Supervisor: Dr. Gold, Dr. Fisher 1997
Penn State University
Surveyed and analyzed stratigraphic units, geomorphology, economic geology, and historical geology including evidence of glaciation

The Stratigraphy of South Cascade Glacier
Supervisor: Dr. Richard Alley 1997
Penn State University
Analyzed ice cores from South Cascade Glacier for tephra content and crystallography. Composed a thesis on the hydrologic components of the glacier.

Acid Mine Drainage in State College, Pennsylvania
Supervisor Dr. Rose 1996
Studied the uptake of heavy metals by plants in a synthetic wetland

Publications:
Professional Presentations:

Sayedi et. Al (2023). Assessing changes in global fire regimes. *Fire Ecology*.

Groves, M., Brunelle, A., Power, M., Petersen, K., Lundeen, Z. (2020). Late Holocene Seasonal Moisture Variability in Range Creek Canyon, UT. *The Holocene*. https://doi.org/10.1177%2F0959683620972769

Modern pollen assemblages and their relationship to contemporary vegetation in Range Creek Canyon, Utah
Biennial Conference, Flagstaff AZ 2017
Poster Presentation
Department of Geography, University of Utah

A Paleoenvironmental Reconstruction to Assess Anthropogenic and Natural Disturbances in Range Creek, Utah
PACLIM 2015 Reconstructing the past, monitoring the present, modeling the future – March 8 – 11, 2015 - Poster presentation
Department of Geography, University of Utah

Arsenic and Heavy Metals in Groundwater and Surface Water, Mali, West Africa
Geological Society of America (GSA) 2014,
Vancouver, Canada– Oral Presentation
Earth Science Department, Utah Valley University

Awards and Distinctions

▪ Nominated for the Joseph and Holly Nye Bauman Outstanding Faculty in Honors Award, Weber State University	Spring 2021
▪ Nominated for the Crystal Crest Award - Master in Teaching, Weber State University	Spring 2020
▪ Excellence in Teaching Award, University of Utah	
▪ Excellence in Teaching Award, University of Utah	Spring 2017
▪ SAC Award – Utah Valley University (Conference funding)	Fall 2014
▪ UVU Magazine Spotlight for Engaged Learning	Winter 2013
▪ Teaching Excellence Award, Utah Valley University	Spring 2012
▪ Teaching Excellence Award, Utah Valley University	Spring 2011
▪ Adjunct of the Year – College of Science and Health, Utah Valley University	Spring 2011

- The Pennsylvania State University Diversity Scholarship 1993 - 1997

Courses Taught

Assistant Professor, Weber State University, Ogden, Utah **2018 - Present**

GEOG 1000 Natural Environments of the Earth

GEOG 1500 Global Warming, Myths and Realities

GEOG 3080 Arid Lands

HNRS 1540 Science Communication (Honors)

SOC 2090 Pandemics and People, Medical Geography co-lecturer)

GEOG 1300 People and Places

GEOG 4950 Field Course in Rio Mesa, Utah

GEOG 3070 Geography of National Parks

GEO 1130 Meteorology

PhD, Candidate, University of Utah, Salt Lake City, Utah **2015-2019**

GEOG 1010 Earth Environments

GEOG 3270 Biogeography Writing Lab

GEOG 3400 Population Geography Writing Lab

Adjunct Instructor, Utah Valley University, Orem, Utah **2012-2017**

METO 1010 Introduction to Meteorology

GEO 1080 Oceanography

GEO 1010 Introduction to Geology

GEO 1015 Field Geology

GEO 3200 Geologic Hazards TA to Dr. Nathan Toke,

Salt Lake Community College, Salt Lake City, Utah **2011**

Geology 1010 Introduction to Geology

Instructional Designer **2007 - 2009**

Living Planet Aquarium Sandy, UT

Designed an interactive module for children for the aquariums website to instruct biological classification systems.

Open High School of Utah

Designed biology course and curriculum by incorporating the standards of high school biology and online learning pedagogy

Judge Memorial Catholic High School **2002 - 2007**

Teacher, Salt Lake City, Utah

Spanish Level 1, 2, 3

Judge Memorial High School, Salt Lake City, Utah

Taught traditional science classes as well as designed curriculum for a new Heritage Speakers class. Used interactive classroom technology to monitor pronunciation and fluency, and provided 30 students with the unique opportunity to travel to Spain.

French, Honors

Judge Memorial High School, Salt Lake City, Utah

Taught honors French with an emphasis on foreign language acquisition study skills and cultural awareness. Provided students with interactive classroom workshops, technology, and cultural field trips.

Teacher, Our Lady of Lourdes Catholic Junior High School **2002-2004**

Geography

American History

World History

Teacher, Edna Hills Middle School, Brentwood, California **2001**

Bilingual Life Science,

French,

Spanish

Research Interests / Future Career Development

- Soil Properties and Carbon Sequestration in Regenerative Farming
- Paleoecology and Paleoclimate studies of Range Creek Canyon, Utah
- Problem solving in the sciences using Geographic Information Systems and remote sensing
- Seasonal changes in air composition and quality along the Wasatch Front
- Socioeconomic implication radius of the Sherwood Hills Landslide Complex in Provo, Utah
- Paleoclimatology, science education, environmental disturbances, atmospheric chemistry, climate change

Professional Organizations

GSA Geological Society of America
AWG Association for Women Geoscientists
NESTA National Earth Science Teacher's Association
NARST National Association for Research in Science and Teaching

Community Involvement

- Latinos in Action
  Present the field of geography to Hispanic students in underserved areas of Utah.
- Editorial Writer, Pepperwood Magazine Sandy, UT
  Earth science and climate topics related to life in Utah
- Volunteer Science Teacher,
  Provide teachers with resources, teach special topics such as compositions of the atmosphere and the earth, rocks and minerals, how to predict the weather, how to read maps, and how to make scientific observations.
- State Science Fair Special Interests Judge – Salt Lake City, Utah
  Interviewed and awarded scholarships to science fair state finalists on behalf of the Association of Women Geologists.

Other Relevant Work Experience:

Demonstrator, Department of Educational Services, St. George's University School of Medicine, Grenada, West Indies 1999 -2001

Organized educational resources and tutoring sessions for medical students. Hired and managed student tutors, managed their payroll, and assisted in the setup and organization of the St. George's University Veterinary School's Education Department.

References:

Dr. Andrea Brunelle
Department of Geography, University of Utah
260 South Central Campus Dr. Rm. 270
Salt Lake City, Utah 84112-8218 801-585-5729
Andrea.brunelle@geog.utah.edu

Dr. Mitchel Power
Department of Geography, University of Utah
Curator Garrett Herbarium, Utah Museum of Natural History
260 South Central Campus Dr. Rm. 270
Salt Lake City, Utah 84112-8218
801-581-8281
Mitchell.power@geog.utah.edu

Dr. Danny Horns Professor
Associate Dean College of Science and Health
Utah Valley University 800 West University
Parkway Orem, Utah, 84058
Hornsda@uvu.edu
(801) 863 - 8582

Mariangelica Groves

SCHOLARSHIP, RESEARCH, AND/OR CREATIVE WORKS See PPM 8- 11, E.

Peer-reviewed scholarship, research, and/or creative works.

Groves, M., Brunelle, A., Power, M., Petersen, K., Lundeen, Z. (2020). Late Holocene Seasonal Moisture Variability in Range Creek Canyon, UT. The Holocene.https://doi.org/10.1177%2F0959683620972769

The Holocene

Impact Factor: **2.4** / 5-Year Impact Factor: **2.7**

Restricted access | Research article | First published online December 10, 2020

Late-Holocene seasonal moisture variability: Range Creek Canyon, Utah, USA

Mariangelica Groves, Andrea R Brunelle, [...], and Zachary J Lundeen +2 View all authors and affiliations

Volume 31, Issue 3 | https://doi.org/10.1177/0959683620972769

Abstract

A 3300 year-long reconstruction of paleoenvironmental moisture conditions was constructed from a sediment core from North Gate Bog (NGB) in the northern section of Range Creek Canyon within the Colorado Plateau. The methods used to analyze the record include loss on ignition (LOI), magnetic susceptibility (MS), elemental analysis with X-ray fluorescence (XRF), charcoal influx, isotopic analysis, elemental ratios and pollen percentages, influx, and ratios. This study adds two new insights to the paleoenvironmental record of the northern section of the Colorado Plateau. First, four climatic zones were established. Zone 1 (3300–2750 cal yr BP) had 100-year wet to dry variations with droughts recorded from 3300–3200, 3000–2900, and 2800–2700 cal yr BP. Zone 2 (2750–1600 cal yr BP) had an overall dry period with an 800-year transition to increased warmth and winter moisture. Zone 3 (1600–850 cal yr BP) had an overall warm, wet, summer precipitation climate conducive to the establishment of *Zea Mays* and *Pinus edulis*, two staple foods of the Fremont culture. The Medieval Climate Anomaly (MCA) registered warm and wet in this part of the Colorado Plateau. Zone 4 (850–0 cal yr BP) had a sharp transition to a drier climate from 850 to 400 cal yr BP. During the Little Ice Age (LIA), wetter climate taxon increases such as Artemisia, Cyperaceae, and Pinus edulis. The second overall finding in this study was that NGB was a place of human activity including Fremont farming. The identification of a *Zea mays* pollen grain confirms the archeological presumptions that this higher elevation site was used to farm corn along with other sites in Range Creek Canyon (RCC). The post Fremont occupation period was marked by a sharp increase in organic material and a return of pinyon-juniper woodlands.

Sayedeh Sara Sayedi; Benjamin Abbott; Boris Vannière; Bérangère Leys; Daniele Colombaroli; Graciela Gil-Romera; Michał Słowiński; Julie Aleman; Olivier Blarquez; Angelica Feurdean; Kendrick Brown; Tuomas Aakala; Teija Alenius; Kathryn Allen; Maja Andric; Yves Bergeron; Siria Biagioni; Richard Bradshaw; Laurent Bremond; Elodie Brisset; Joseph Brooks; Sandra Brugger; Thomas Brussel; Haidee Cadd; Eleonora Cagliero; Christopher Carcaillet; Vachel Carter; Filipe X Catry; Antoine Champreux; Emeline Chaste; Raphaël D Chavardès; Melissa Chipman; Marco Conedera; Simon Connor; Mark Constantine; Colin Courtney Mustaphi; Abraham Dabengwa; William Daniels; Erik De Boer; Elisabeth Dietze; Joan Estrany; Paulo Fernandes; Walter Finsinger; Suzette Flantua; Paul Fox-Hughes; Dorian M Gaboriau; Eugenia M Gayo; Martin P Girardin; Jeffrey Glenn; Ramesh Glückler; Catalina González-Arango; **Mariangelica Groves;** Douglas Hamilton; Rebecca Jenner Hamilton; Stijn Hantson; K. Anggi Hapsari; Mark

Hardiman; Donna Hawthorne; Kira Hoffman; Jun Inoue; Allison T Karp; Patrik Krebs; Charuta Kulkarni; Niina Kuosmanen; Terri Lacourse; Marie-Pierre Ledru; Marion Lestienne; Colin Long; José Antonio López-Sáez; Nicholas Loughlin; Mats Niklasson; Javier Madrigal; S. Yoshi Maezumi; Katarzyna Marcisz; Michela Mariani; David McWethy; Grant Meyer; Chiara Molinari; Encarni Montoya; Scott Mooney; Cesar Morales-Molino; Jesse Morris; Patrick Moss; Imma Oliveras; José Miguel Pereira; Gianni Boris Pezzatti; Nadine Pickarski; Roberta Pini; Emma Rehn; Cecile Remy; Jordi Revelles López; Damien Rius; Vincent Robin; Yanming Ruan; Natalia Rudaya; Jeremy Russell-Smith; Heikki Seppä; Lyudmila Shumilovskikh; William T Sommers; Çağatay Tavşanoğlu; Charles Umbanhowar; Erickson Urquiaga; Dunia H Urrego; Richard Vachula; Tuomo H Wallenius; Chao You; Anne-Laure Daniau. (2023) Assessing changes in global fire regimes. *Fire Ecology*. (This is in final stages of edits).

Abstract

Background

The global human footprint has fundamentally altered wildfire regimes, creating serious consequences for human health, biodiversity, and climate. However, it remains difficult to project how long-term interactions among land use, management, and climate change will affect fire behavior, representing a key knowledge gap for sustainable management. We used expert assessment to combine opinions about past and future fire regimes from 99 wildfire researchers. We asked for quantitative and qualitative assessments of the frequency, type, and implications of fire regime change from the beginning of the Holocene through the year 2300. AQ1

Results

Respondents indicated some direct human influence on wildfire since at least ~ 12,000 years BP, though natural climate variability remained the dominant driver of fire regime change until around 5,000 years BP, for most study regions. Responses suggested a ten-fold increase in the frequency of fire regime change during the last 250 years compared with the rest of the Holocene, corresponding first with the intensification and extensification of land use and later with anthropogenic climate change. Looking to the future, fire regimes were predicted to intensify, with increases in frequency, severity, and size in all biomes except grassland ecosystems. Fire regimes showed different climate sensitivities across biomes, but the likelihood of fire regime change increased with higher warming scenarios for all biomes. Biodiversity, carbon storage, and other ecosystem services were predicted to decrease for most biomes under higher emission scenarios. We present recommendations for adaptation and mitigation under emerging fire regimes, while recognizing that management options are constrained under higher emission scenarios.

Conclusion

The influence of humans on wildfire regimes has increased over the last two centuries. The perspective gained from past fires should be considered in land and fire management strategies, but novel fire behavior is likely given the unprecedented human disruption of plant communities, climate, and other factors. Future fire regimes are likely to degrade key ecosystem services, unless climate change is aggressively mitigated. Expert assessment complements empirical data and modeling, providing a broader perspective of fire science to inform decision making and future research priorities. AQ2

A. **Scholarship, Research, and/or Creative Works not subjected to peer-review.**

- AUTHOR - The Sign-Post article/interview “Fires in the West” 2018

- AUTHOR - I am writing a book for ABC-Clio publishing titled - Extreme Weather, and Climate Change. This book will be written for a high school/college audience as a reference book. The book is 50% completed and will be published in December of 2024.

B. **Unpublished manuscripts, thesis, dissertation, within institution reports, community-based research reports, etc. Include author(s), title, date, intended future of the work.**

I have been working with Christy Cottrell for 3 semesters on a soil health research project which we hope will be a published paper in the near future.

Groves, M and Cottrell, C (2024). Soil Health Assessment before the Regenerative Process, Harmony Ranch, UT (Publisher to be determined).

Professional Presentations:

2024 PRENSENTATION - Earth Science & Society Seminar Series, Weber State University "Greenhouse Gases, too Much of a Good Thing"

2023 PRESENTATION - Climate Teach-in 2023 "Extreme Weather and Climate Justice"

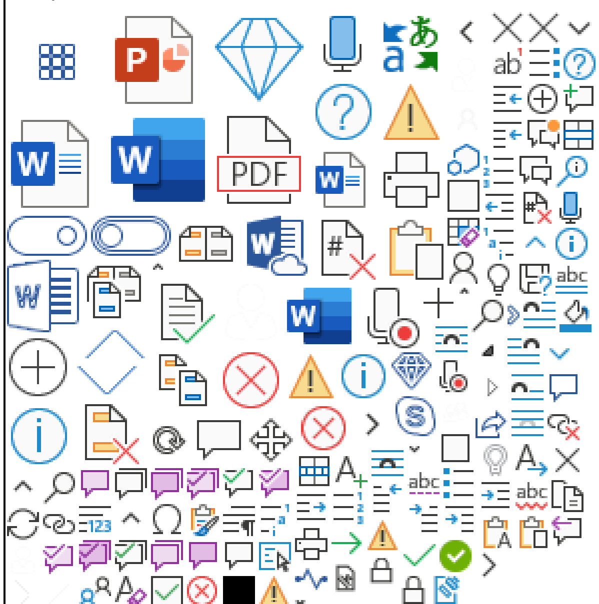
2021 PRESENTATION - Flash talk, "Climate impacts and regenerative farming" World- Wide Teach-In 2021

2021 PRESENTATION - Teaching Climate Change Solutions in the Sustainability Practices and Research Center's Sustainability Snapshot series 2021

Research projects and grants. Describe and indicate dates.

Award/Grant	Description	Date
WSU Provost Research Funding	Funding for research/teaching time for Harmony Ranch research with Christy Cottrell $3,000	Summer 2023
Nominated for RISE Emerging Researcher Award	Nominated by Dean Rich of CSBS for research in paleogeography and soil geochemistry	Summer 2023
PDG Grant	Professional Development Grant for ESRI Course in GIS to update my knowledge of ArcGISPro $1, 400	Fall 2022
PDG Grant	Professional Development Grant for purchase of Dendrochronology Equipment $2,200	Fall 2021

Post-terminal degree professional education and/or professionally related work experience. For each experience provide the institution, work description, and dates.

Professional Education	Date
ACUE Certification	Summer 2023
We can't paste this image from the Clipboard, but you can save it to your computer and insert it from there. 	
ESRI Course in GIS to update my knowledge of ArcGISPro	Fall 2022

H. **Meaningful connections between scholarship and teaching.**

Bridging scholarship and teaching is evident in the examples given above. In all of my upper-level courses, I provide an opportunity for students to complete a research project. In GEOG 3080, students complete a student research poster using GIS and spatial analysis tools to answer a local problem related to the sustainability of arid land ecology. Several of the posters are presented by students at the WSU sustainability conference every year. I have also mentored 3 senior research projects which have lead to students pursuing graduate school opportunities. Over the period of this review, I have published two peer-reviewed articles (one is in final stages). The research methods used for the paleoecological work was attractive to one of my students, Hafid Bahena who then spent the summer completing research at the Records of Environmental Disturbance Lab at the University of Utah. I also present my scholarship in the classroom. During the paleoclimate section of GEOG 1500, I talk about my research methods and bring in a microscope and other tools used in the research, such as tree borers used in dendrochronology. Students then do "mock" dendrochronology activities for two lecture days to see hands-on how scientists complete a project. I aim to give students an idea of what practicing physical geography is in the "real world".

I. **Other scholarly activities. Describe and include dates.**

Other Scholarly Activity	Description	Date
Book reviewer of Cambridge University Press <u>The Science of Our Changing Climate</u>	Reviewed 3 chapters for content clarity and scientific accuracy	Summer 2023