# Sarah E. Reed

Environmental Scientist and Project Manager
Earth Science ◆ GIS & Spatial Analysis ◆ Science Education ◆ Project Management
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## SUMMARY

Environmental scientist with **exceptional analytical and organizational skills**. Proven leadership and outstanding credentials in environmental science research, data analysis, and science education. Skilled in designing, evaluating and delivering a range of **STEM educational programs and technologies**. **Adept at communicating scientific concepts** to a wide variety of audiences (various ages, educational and cultural backgrounds). **Thoughtful collaborator,** skilled at working effectively with a diverse range of community partners. **Committed to advancing scientific understanding of natural systems and connecting people with the environment** in order to conserve our natural resources and develop a culture of environmental stewardship.

## CORE COMPETENCIES

- Interdisciplinary ecologic research
- Ecosystem monitoring
- GIS & remotely-sensed data
- Data collection and management
- Soil science: field & lab techniques
- Project management
- Skillful written / oral presentations
- Python and R scripting
- Habitat restoration
- Conversational Spanish

## EDUCATION

Ph.D., **University of California – Berkeley,** 2013
Environmental Science, Policy, and Management
Advisors: Ron Amundson, Maggi Kelly, Bill Dietrich

B.S., **Saint Cloud State University**, 2003
Physics and Mathematics, ***Summa Cum Laude***

## PROFESSIONAL EXPERIENCE

**Research Scientist** (Consultant), ***Ecosystem Restoration*,** March 2019-Present*
*except for parental leave period May 2019-November 2019
Golden Gate National Parks Conservancy (San Francisco, CA)

- Conduct geospatial data analysis to support habitat restoration projects in San Francisco Bay Area national parks.
- Collate and analyze field data, including plant surveys, environmental data, LIDAR data.
- Conduct topographic and hotspot analyses to understand current invasive plant distribution and to model possible future distributions.

**Research Scientist** (Consultant), ***Biology & Data Science Education*****,** August 2018-Present*
*except for parental leave period May 2019-November 2019
The Concord Consortium (Emeryville, CA)

- Conduct science education research in high school classrooms, on topics such as inquiry-based science learning and computational thinking.
- Build frameworks in R for importing, cleaning, analyzing, and visualizing a variety of data – qualitative and quantitative, from audio, video, and text sources.
- Work collaboratively with a variety of partners, including curriculum developers, technology developers, researchers, assessment experts, teachers, students, and administrators.

**Marine Protection Coordination (Volunteer), *Ocean & Coastal Programs*****,** May 2017-Present
National Park Service – Pacific West Regional Office (San Francisco, CA)

- Coordinate marine protection initiatives, including research, outreach, grantwriting, and implementation.
- Lead author on NOAA grant ($150,105) for partner nonprofit (SurfriderSF) to implement marine debris prevention program. .
- Led outreach to other NPS agencies, partner organizations, and the public in order to design and implement marine conservation programs.

**Biological Technician, *Habitat Restoration,*** May 2017-March 2019
Point Reyes National Seashore Association (Point Reyes, CA)

- Engaged in native plant restoration projects at Point Reyes National Seashore.
- Evaluated treatment efficacy and adapted management plan accordingly.
- Developed and delivered curricula and educational materials related to tidal wetland habitats, wildlife, and geology of the Point Reyes National Seashore.

**Travel Sabbatical,** September 2015 – January 2017

- Travel across five continents, focused on manuscript preparation and volunteerism.

**Senior Educator, *Science and Technology Education,*** December 2013-August 2015
The Lawrence Hall of Science (Berkeley, CA)

- Project management and product development for project called LakeViz, which aims to increase public understanding and stewardship of freshwater ecosystems using interactive 3D visualizations (created using LIDAR and bathymetry data).
- Designed STEM (science, technology, engineering and mathematics) educational products and programs that use a wide range of laboratory-intensive experiments and technology experiences, aligned to best practices of current educational theory.
- Assisted in the development of interactive 3D visualizations created via large datasets such as LIDAR (light detection and ranging) and bathymetric data.
- Project manager of an inaugural conference aimed to increase awareness of STEM career possibilities for K-12 students with disabilities.

**Vice President & Secretary, *Music Nonprofit*****,** Fall 2009-Present
Friends of Brad Memorial Foundation (Virginia, MN)

- Co-founder of nonprofit organization which supports young musicians in Minnesota.

- Oversee and direct (along with two other co-founders) all nonprofit operations, including scholarship and fellowship competitions, fundraising events, and partnerships with other local nonprofits.
- Logistics and project manager for annual regional music festival which hosts 20+ performance groups, a silent auction, and other programming.

**Graduate Research Fellow*, Biogeomorphology,*** 2006-2013
University of California – Berkeley (Berkeley, CA)

- Conducted research of seasonal wetlands called vernal pools in order to determine the origin of the ecosystems and to contribute to the development of a scientific-based management strategy for the wetland habitat and its rare and endangered species.
- Performed spatial analysis of GPS and LIDAR data using GIS software, including ArcGIS, Surfer, and eCognition.
- Designed, implemented, and maintained network of environmental monitoring sensors (including RFID, soil moisture, temperature, and oxygen monitoring).
- Managed logistics required for field work on remote sites, including coordinating transportation (e.g. all terrain vehicle) and ensuring safety of all research associates.
- Used geomorphic models to estimate rates of landscape-wide erosion and deposition and compare the downwearing with rates of biologic sediment transport.

**Graduate Student Researcher*, Desert Geomorphology*,** Summer 2006
UC Berkeley and Universidad Católica del Norte, Atacama Desert (Antofagasta, Chile)

- Conducted rain experiments to observe geomorphic processes in hyperarid environments.
- Managed GPS surveys of four field sites in Atacama Desert. Data used for geomorphic modeling.

**Educator, Construction Supervisor, *Americorps***, 2003-2005
Americorps - Minneapolis Public Schools & Habitat for Humanity (Minneapolis, MN)

- Provided intensive math & science instruction to at-risk students in Minneapolis Public Schools. (2003-2004)
- Supervised volunteer groups (up to 25 people at a time) and co-led the construction of affordable housing in the Twin Cities area (20 homes in a 1-year period). (2004-2005)

**Research Assistant, *Stable Isotope Ecology,*** Summers 2001-2003
U.S. Department of Energy and University of Utah, Global Change Education Program
(Salt Lake City, UT and Stevenson, WA)

- Designed and conducted study to measure isotopic composition of organic matter across a precipitation gradient; analyzed the results in the context of global climate change.
- Operated mass spectrometer (prepared and managed 200+ leaf and soil samples).
- Constructed and implemented environmental monitoring stations in old growth forests in Washington.

**Research Assistant, *Astronomy*,** 1998-2002
Dept. of Physics, Astronomy & Engineering Science, St. Cloud State University (St. Cloud, MN)

- Conducted research to determine an extinction coefficient for the university observatory. Results used to improve quality of all observatory data. Received award for this research.
- Operated and maintained campus observatory and equipment (including telescopes, digital cameras, and spectrographs).

## FIELD EXPERIENCE

Riparian & tidal wetland ecosystems, Point Reyes National Seashore (2017-2021)
Fynbos and riparian ecosystems, Nature's Valley South Africa (2016)
Amazon rainforest, Tambopata Reserve, Peru (2015)
Vernal pool wetlands, California grasslands (2006-2013)
Climosequence (5 sites across climate gradient), Sierra Nevada mountain range (2007)
Atacama Desert, Chile (2006)
OTTER Precipitation Gradient, Columbia River Gorge (2002-2003)
Canyonlands Grasslands, Utah (2002)
Wind River Canopy Crane Forest, Washington (2001)

## GRANTS

**NOAA Marine Debris Grant** (2018): Hold on to Your Butt - Preventing Cigarette Litter in San Francisco Bay Area National Parks and Ocean Sanctuaries (Lead Author, $150,000)

**Kearney Foundation of Soil Science Grant** (2011): The Feedbacks Between Soil and Biota in Vernal Pool Landscapes near Merced, CA (co-PI, $100,000)

**National Center for Airborne Laser Mapping (NCALM)** (2006): Graduate Student Seed Grant for LIDAR Data Acquisition (PI, $25,000)

## AWARDS AND HONORS

- National Science Foundation (NSF) Graduate Research Fellowship (2008-2011)
- UC Berkeley Outstanding Graduate Student Instructor Award (2013)
- National Park Service & George Wright Society, Park Break Fellowship (2012)
- UC Berkeley ESPM Graduate Research Symposium 'Best Poster' Award (2007)
- Department of Energy (DOE) Global Change Education Program's Graduate Research Environmental Fellowship (2006-2008)
- National Center for Airborne Laser Mapping (NCALM) Graduate Student Seed Award (2006)
- Saint Cloud State University (SCSU) Mathematics Scholarship (2001, 2002, 2003)
- SCSU Excellence in Leadership Award (2001)
- SCSU Women's Studies Dept.—Outstanding Feminist Scholarship Award (2000)

## SKILLS AND INTERESTS

**Computer skills**: ArcGIS, ArcCollector, Python, R, Google Earth, Google Docs/Sheets, Trello; Basic proficiency in Wordpress and Photoshop; Adept in Windows, Mac and Linux

environments
**Field and lab experience**: Wildlife surveys (birds and fish), Soil description and sampling, Plant identification and sampling, Stable isotope preparation and analysis (plant and soil), Design and implementation of in situ soil monitoring system, RFID tracking of bioturbated sediments, Invasive plant management.
**Language**: Intermediate Spanish, Beginning American Sign Language
**Interests**: Expert whistler. Floundering kitesurfer.

## PEER-REVIEWED PUBLICATIONS

Hsi, S. and **S.E. Reed** (*In prep*) Integrating Computational Thinking in High School Biology with Tools for Data Production: The InSPECT Project, *Journal of Science Education and Technology.*

**Reed, S.E.** and Amundson, R.G. (*In prep*) High-Resolution Measurements of Vernal Pool Soils Reveal Role of Mammal Burrowing on Hydrological Connectivity and Water Budget, *Hydrological Processes*.

Womack, M., O. Curtis, D.A. Rabson, O. Harrington Pinto, K. Wierzchos, S. Cruz Gonzalez, G. Sarid, C. Mentzer, N. Lastra, N. Pichette, N. Ruffini, T. Cox, I. Rivera, A. Micciche, C. Jackson, A. Homich, S. Escoto, T. Erdahl, M.P. Goldschen-Ohm, A. Tollison, **S.E. Reed**, J. Zilka, B. Henning, M. Spinar, W.T. Uhl. (*In press*). The visual lightcurve of comet C/1995 O1 (Hale-Bopp) from 1995 – 1999, *Planetary Science Journal*.

**Reed, S.E.**, Hsi, S., Kreylos, O., Yikilmaz, M.B., Kellogg, L.H., Schladow, S.G., Segale, H., and Chan, L., 2016. Augmented Reality Turns a Sandbox Into a Geoscience Lesson, *Eos*. https://eos.org/project-updates/augmented-reality-turns-a-sandbox-into-a-geoscience-lesson

Woods, T.L., **Reed, S.E.**, Hsi, S., Kreylos, O., Woods, J.A., Woods, M.R., 2016. Using the Augmented Reality Sandbox to Teach Topographic Maps and Surficial Processes in Introductory Geology Labs, *Journal of Geoscience Education*.

**Reed, S.E.** 2013. (PhD) Pedologic-biologic feedbacks on the Merced River chronosequence: The role of pocket gophers (*Thomomys bottae*) in Mima mound-vernal pool ecosystems of the San Joaquin Valley. University of California, Berkeley / Pro-Quest. [Advisor: R.G. Amundson]

**Reed, S.E.** and R.G. Amundson. 2012. Using LIDAR to model Mima mound evolution and regional energy balances in the Great Central Valley, California. *in* J.L. Horwath and D.L. Johnson (Editors), Mima Mounds: The Case for Polygenesis and Bioturbation, Geological Society of America Books. (*Received G.K. Gilbert Award for Excellence*) DOI: 10.1130/2012.2490(01)

**Reed, S. E.** and R.G. Amundson. 2007. Sediment, gophers, and time: A model for the origin and persistence of Mima mound-vernal pool topography in the Great Central Valley. Pages 15-27 *in* R.A. Schlising and D.G. Alexander (Editors), Vernal Pool Landscapes. Studies from the Herbarium, Number 14. California Statue University, Chico, CA.

## SELECT PRESENTATIONS

*Oral Presentations*

"LakeViz: 3D Visualization Tools for Enhancing Public Understanding and Stewardship of Freshwater Ecosystems." **Geospatial Innovation Facility's Geolunch Series**, UC Berkeley, April 2015. (*Invited*)

"Shaping watersheds exhibit: An interactive, augmented reality sandbox for advancing earth science education." **American Geophysical Union (AGU) Annual Meeting**; San Francisco, CA, December 2014. Paper ED34A-01.

"Vernal pools – California's ephemeral wetlands." Guest lecture for ***The World at Home* (CORE 001), University of California – Merced undergraduate course** (Instructor: M. Fabros), Merced, CA, April 2012. (*Invited*)

"Pedologic-biologic feedbacks in seasonal wetlands: does biologic response to soil weathering lead to biodiversity in Mima mound-vernal pool ecosystems?" **International Biodiversity Conference**; Baños, Ecuador, July 2011.

"Using Airborne-Based LIDAR to Test a Biologic Hypothesis of Mima Mound Formation in the Great Central Valley, California." **Geological Society of America Annual Meeting**; Houston, TX, October 2008.

"Sediment, gophers, and time: A hypothesis for the origin and persistence of Mima mound-vernal pool topography." **University of California-Berkeley College of Natural Resources Dean's Advisory Board Meeting**; Berkeley, CA, November 2007. (*Invited*)

"Determining the effect of the hydrostatic gradient on the water column." **Minnesota Area Physics Teachers Meeting;** Tower, MN, October 2002.

*Poster Presentations*

"Evidence for biologic response to pedogenesis along the Merced River chronosequence, Central Valley, California." **American Geophysical Union (AGU) Annual Meeting**; San Francisco, CA, December 2010. Abstract EP21B-0751.

"Investigating the role of bioturbation in the origin and evolution of Mima mound-vernal pool ecosystems in California's Central Valley." **Environmental Science, Policy, and Management Department's annual Graduate Research Symposium**; Berkeley, CA, April 2007. Received 'Best Poster Award'.

"Analyzing stable isotopic variation across a precipitation gradient in Oregon." **U.S. Department of Energy's Global Change Education Program Workshop**; Washington, D.C., August 2003.

"Correlations between CO and HCN production rates and absolute visual magnitude of Comet Hale-Bopp." **St. Cloud State University Student Research Colloquium**; St. Cloud, MN, March 1999.

## MEDIA

UC Merced Vernal Pool Grassland Reserve Blog
"Making mounds out of molehills?: The role of pocket gophers in the Mima mounds and vernal pools of the San Joaquin Valley", February 2015 (Parts 1 & 2)
https://tinyurl.com/jccec3f
https://tinyurl.com/hl64zc9

Berkeley Science Review
"Disability No Barrier to Science", April 2015
Coverage of the STEM Career Showcase for Students with Disabilties, an event for which I served as the project manager.
http://berkeleysciencereview.com/blindness-no-barrier-to-science/

UC Berkeley's Knight Digital Media Center
"Kai Sandbox", November 2014
Featured in a video exploring the Augmented Reality Sandbox.
https://www.youtube.com/watch?v=X3rkl6k86w0

BBC Earth
"The Strange Origins of Mima Mounds", October 2014
Research featured in an article investigating the origin of Mima mound topography
http://www.bbc.com/earth/story/20141028-the-strange-origins-of-mima-mounds

Scientific American
"Laser Mapping Reveals New Details of Earth's Surface", March 2009
Research featured in an article highlighting applications of LIDAR technology
http://www.scientificamerican.com/article.cfm?id=airborne-laser-mapping

LakeViz.org
Maintained the blog of the Lake Visualization 3D project, a project aimed at increasing public understanding and stewardship of freshwater ecosystems using 3-D visualizations.

3DH2O.org
Developed and maintained this anthology of resources for education professionals, covering stereoscopic 3D and augmented reality visualizations, related to freshwater ecosystems.