

Randall Holmes

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SUMMARY

Dedicated educator and researcher with a Stanford interdisciplinary PhD, committed to fostering collaborative learning environments where students develop critical thinking skills through hands-on engagement. I blend rigorous academic foundations with innovative teaching methodologies, having successfully instructed diverse student populations across multiple educational settings. My approach emphasizes partnership with colleagues, students, and community stakeholders to create meaningful learning experiences. Through collaborative research initiatives and team-based projects, I've demonstrated the ability to unite diverse perspectives toward common educational goals. I am passionate about creating inclusive academic spaces where knowledge is not simply transferred but co-created through dynamic interaction, preparing students for both academic success and real-world challenges.

EXPERIENCE

Graduate Lecturer

Stanford University Emmett Interdisciplinary Program in Environment and Resources (E-IPER) Joint and Dual Master of Science

(Courses: ENVRES 280, ENVRES 290)

September 2024 to Present

Professor Ines Azevedo, Professor Bruce Cain, and E-IPER Lecturer Dr. Anna Lee

- Collaborated with E-IPER staff to re-envision Master of Science program goals.
- Mentored 31 capstone students in ENVRES 290 and instructed 48 new E-IPER joint and dual MS students in ENVRES 280.
- Created and introduced new pre-capstone workshop series to help students jumpstart their projects.
- Revised ENVRES 280 weekly assignments and created a new final assignment process to prepare students for course planning and eventual capstone project.
- Piloted two methods for presenting capstone projects as alternatives to the Capstone Symposium.

Undergraduate Lecturer

Stanford University Civic, Liberal, and Global Education (COLLEGE)

September 2023 to September 2024

- Facilitated instruction for two sections of freshmen students (~30) quarterly on a broad range of philosophical, historical, and sustainability subjects.
- Designed, adapted, and adopted lectures and in-class activities to facilitate engagement with class materials and increase class participation.

Instructor and Grader

Stanford University Capstone Project Seminar in Environment and Resources (Course: ENVRES 290)
Winter 2024, Fall 2023, Winter 2023, and Fall 2022

Professor John Weyant and E-IPER Staff Lecturer Anna Lee, PhD

- Co-developed three class rubrics for final projects for the 2022-2023 E-IPER Capstone classes.
- Recommended revisions to research proposals for 40 students seeking the joint E-IPER Master of Science degree over four quarters.
- Evaluated projects to determine if Capstone research met Master of Science level work.

Course Administrator and Teaching Assistant

Stanford University Topics in Environment and Resources (Course: ENVRES 280)
Spring 2020 and Spring 2019

Professor Erica Plambeck and E-IPER Associate Director for Program Strategy Anjana Richards

- Initiated course revisions that incorporated the pedagogical recommendations of researchers specializing in interdisciplinary education.
- Co-designed and drafted course learning objectives and course assignments.
- Coordinated guest lecturers and recruited PhD candidates to mentor MS students.

Teacher and Courtesy Panelist

Stanford University Soil and Water Chemistry (Course: ESS 256)

Winter 2025, Winter 2024, Winter 2022, Winter 2020, and Winter 2018

Professor Scott Fendorf

- Mentored mix of undergraduate and graduate students through multiple team projects.
- Created an innovative teaching and learning game to forward course learning objectives.
- Facilitated class discussions.

Source Operations Instructor, United States Army

U.S. Army Human Intelligence Training – Joint Center of Excellence, Fort Huachuca, Arizona
September 2009 – October 2011

- Instructed over 900 students of all ranks and graded over 2000 reports.
- Accomplished command directives with little to no supervision required.
- Taught merits of cultural sensitivity during mission planning.

Noncommissioned Officer, United States Army

Defense Language Institute Foreign Language Center, Monterey, California
November 2007 – August 2009

- Won Installation Soldier of the Quarter.
- Trained enlisted members on combat operations and principles of Army leadership.

Team Leader for Human Intelligence Collection Team, United States Army

Ramadi, Al Anbar Province, Iraq

August 2006 – November 2007

- Mentored 7th Division Iraqi Army Intelligence Officers in bilateral intelligence program.
- Presented weekly oral briefing summaries and wrote over 200 assessments of conditions in Iraq.

- Developed and implemented team operation plans for 15 months in a high tempo Multi-National Forces battlefield environment.

EDUCATION

- Ph.D. **Stanford University**, Emmett Interdisciplinary Program in Environment and Resources (E-IPER)
Dissertation: Strategies for Managing Naturally Occurring Contaminants in Groundwater Basins of the Central Valley, California. August 2023
Co-advisers: Professor Scott Fendorf and Professor Richard Luthy
- M.S. **Stanford University**, Earth System Science
Soil, Water, and Biogeochemistry, 2018
- B.S. **Stanford University**, Civil and Environmental Engineering
Atmosphere and Energy, 2015

PUBLICATIONS

- [13] **Holmes, R.T.**, Reinhart, C., Lai, H., Wagner, C.H., Avila, C., Luthy, R., Fendorf, S., Wong-Parodi, G. Adapting and Defining the DPSIR Framework for Sustainable Groundwater Management as a Coupled Infrastructure System in the Central Valley, California. In prep.
- [12] **Holmes, R.T.**, Lai, H., Reinhart, C., Wagner, C.H., Selent, D., Avila, C., Babbitt, C., Ying, S., Luthy, R., Fendorf, S., Wong-Parodi, G. Farmer Perceptions of Groundwater Quality and Quantity in Sustainable Groundwater Management in California's Central Valley. In prep.
- [11] **Holmes, R.T.**, Sherris, A., Gile, B., Luthy, R., Fendorf, S. Considerations for Agricultural Managed Aquifer Recharge with Respect to Anthropogenic and Naturally Occurring Contaminants in the Central Valley of California. In prep.
- [10] *Lopez, A. M., ***Holmes, R.T.**, Fendorf, S. Predicting Geogenic Groundwater Hazards Using Random Forest Modelling in the Central Valley of California. *Equal authorship. In prep.
- [9] Gile, B., **Holmes, R.T.**, Sherris, A., Fendorf, S., Luthy, R. Assessing Regional Strategies to Cope with Drought, Climate, and Environmental Flow Policy Impacts for a Sustainable Water Supply: A Case Study of the Bay Area. In prep.
- [8] Gile, B., Sherris, A., **Holmes, R.T.**, Luthy, R., Fendorf, S. Water Supply Planning in the Face of Drought and Ecosystem Flows: Examining the Impact of the Bay-Delta Plan on Bay Area Water Supply, *ES&T*. **2024**.
- [7] Oze, C., Beisel, J., Dabsys, E., Dall, J., North, G., Scott, A., Lopez, A.M., **Holmes, R.T.**, Fendorf, S. Perchlorate and Agriculture on Mars. *Soil Systems*, **2021**.
- [6] **Holmes, R.T.**, Al Jaaman, H., Rupp, E., Vishal, V., Kovscek, A., Wilcox, J. Idealized shales for Rigorous Shale Experiments. *Energy Fuels*, **2019**.
- [5] **Holmes, R.T.**, Rupp, E., Vishal, V., Wilcox, J. Selection of shale preparation protocol and outgas procedures for applications in low-pressure analysis. *Energy Fuels*, **2017**.
- [4] Psarras, P., **Holmes, R.T.**, Vishal, V., Wilcox, J. Methane and CO₂ adsorption capacities of kerogen in the Eagle Ford shale from molecular simulation. *Acc. Chem. Res.*

- [3] Al Jaaman, H., **Holmes, R.T.**, Vishal, V., Wilcox, J., Kovscek, A. CO₂ Storage and Flow Capacity Measurements on Idealized Shales from Dynamic Breakthrough Experiments. *Energy and Fuels*. **2017**.
- [2] He J., To J. W. F., Psarras P. C., Yan H., Atkinson T., **Holmes R. T.**, Nordlund D., Bao Z., Wilcox J. Tunable Polyaniline-Based Porous Carbon with Ultrahigh Surface Area for CO₂ Capture at Elevated Pressure. *Adv. Energy Mater.* **2016**.
- [1] Jacobson, M.Z., *et al.* (2016). A 100% wind, water, sunlight (WWS) all-sector energy plan for Washington State. *Renewable Energy*. **2016**.

RESEARCH EXPERIENCE

Doctoral Researcher

Dissertation: Strategies for Managing Naturally Occurring Contaminants in Groundwater Basins of the Central Valley, California.

Soil and Environmental Biogeochemistry Laboratory, Stanford University, Stanford, California

Advisers: Professor Scott Fendorf and Professor Dick Luthy

September 2015 – Present

- Co-developed interview protocol and conducted 30 semi-structured interviews of farmers and groundwater managers and analyzed qualitative data using NVIVO.
- Co-designed and implemented random forest models to predict naturally occurring threats to groundwater in California's Central Valley.
- Analyzed soil and water samples using X-Ray fluorescence and ICP-MS, respectively.

Stanford Ignite Full-time Session

Graduate School of Business, Stanford University, Stanford, California

June 2016 – July 2016

- Designed and pitched a non-profit venture, Brick Sanitation Solutions, with Stanford Ignite team.
- Co-developed a portfolio of sanitation solutions for refugee camps.
- Conducted marketing, financial, and social analyses to provide culturally appropriate and economically viable solutions to sanitation crises at refugee camps in Kenya and Ethiopia.

Graduate Researcher

Low Pressure Adsorption Properties of Shale

Clean Energy Conversions Laboratory, Stanford University, Stanford, California

Adviser: Professor Jen Wilcox

September 2013 – August 2016

- Researched low pressure adsorption isotherms to find pore volume, pore size distributions, and surface areas in shales for applications in estimating capacity for geologic sequestration of CO₂.

The Solutions Project

Adviser: Professor Mark Z. Jacobson

Autumn 2013

- Researched and identified dispatchability of hydroelectricity on the Columbia River, accounting for water rights and the legal constraints of Washington State.

Undergraduate Research Assistant

Center for Global and Regional Environmental Research, University of Iowa, Iowa City, Iowa
Summer 2013

Advisers: Professor Gregory Carmichael, Professor Sara E. Mason, Professor Witold Krajewski, and Iowa Flood Center Project Engineer Dan Ceynar

- Conducted computational chemistry researching Mulliken population analyses, keggin structures, ab initio DFT applications, and optimized molecular geometry in DMol3/COSMO.
- Maintained, assembled, and installed high precision rain and stream gauges across Iowa for ongoing research at Iowa Institute for Hydraulic Research (IIHR).

CONFERENCES AND PRESENTATIONS

- 2022 **Fig Garden Rotary Club.** Invited Speaker. “Groundwater Management Research: Considerations for Balancing Water Quality and Quantity”
Fresno, California
- 2019 **2nd Annual Western Groundwater Congress.** Presenter. “Protecting Groundwater Quality from Geogenic and Emerging Contaminants”
Sacramento, California
- 2016 **Groundwater Resources Association of California 25th Annual Meeting.** Attendee.
Concord, California
- 2015 **Gordon Research Conference: Carbon Capture, Storage, and Utilization.** Poster: “Idealized Shale Sorption Isotherm Measurements to Determine Pore Volume and Surface Area”
Easton, Massachusetts
- 2014 **American Geophysical Union Fall Meeting.** Poster: “Adsorption Isotherm Measurements for Shales”
San Francisco, California
- 2014 **Stanford Symposia of Undergraduate Research and Public Service.** Poster: “Sorption Isotherm Measurements to Determine Surface Area and Pore Volume for Shales”
Stanford University, Stanford, California

AWARDS

Stanford Centennial Teaching Assistant Award – Awarded for tremendous service and dedication in providing excellent classroom instruction for E-IPER PhD and joint-MS degree students. 2023

Bronze Star Medal – United States Army. Awarded for mentoring Iraqi security forces.
Ramadi, Iraq. 2007

City of Monterey Mayor’s Outstanding Leadership Award. Presented by Mayor Della Salla.
Monterey, California. 2009

Outstanding Speed Talk – Symposia of Undergraduate Research and Public Service Poster.
Stanford University, Stanford, California. 2014

GRANTS

Stanford Sustainability Accelerator. 2025 - \$185,000

Professor Dick Luthy (Co-PI) Professor Scott Fendorf (Co-PI) Professor Bruce Cain (Co-PI)

Stanford McGee/Levorsen Graduate Research Grant. 2022 - \$3000

Stanford School of Earth Sciences Undergraduate Research Grant. 2014 - \$7000

University of Iowa Center for Global and Regional Environmental Research Grant. 2013 - \$5000

CERTIFICATES

Stanford Ignite Full-time Session, Graduate School of Business, Stanford University. 2016

United States Army Instructor, Fort Huachuca, Arizona. 2010

VOLUNTARY SERVICE

Undergraduate Application Ambassador for Veterans of the United States Armed Forces

Service2School.org, Stanford University, Stanford, California

January 2014 – August 2016

- Mentored 8 veterans of the United States Armed Forces through undergraduate college applications.
- Applicants were accepted to Stanford University; Rensselaer Polytechnic Institute; University of California - San Diego; University of California, Davis; and Williams College.

Radio Announcer and DJ

Global Entrepreneurship Summit 2016, Stanford University, Stanford, California

June 2016

- Live radio coverage of President Obama as announcer for KZSU Stanford, 90.1 FM.

Marketing Research Team Volunteer

Berkeley-Stanford Cleantech Conference, Stanford, California

Autumn 2011 – Spring 2012

SKILLS

NVIVO, PHREEQC, MINTEQA2, MATLAB, R, Microsoft Excel, Cubase Audio Software, Athena Suite, and CrunchTope

Column Flow Experiments, XRF, XRD, XAFS, XANES, Rubotherm High Pressure Adsorption,
Quantachrome Autosorb iQ2, Carlo Erba C/N Analyzer, SSRL Badge,

LANGUAGES

Modern Standard Arabic (Level 1/1+/1+)