

# Hayley Joyell Smith

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## Education

- PhD, Forestry and Natural Resources** 2023  
University of Georgia  
Research: Social-Environmental Systems  
Graduate Certificate: Environmental Ethics  
Affiliations: Human-Environmental Change Lab, Forest Hydrology Lab, Biology Education Research Group, Scientist Engaged in Education Research  
Thesis: “Reimagining Human ‘Waste’ as a Natural Resource: Ethical and Educational Pathways to Sustainable Sanitation Systems”
- Permaculture Design Certificate** 2015  
Permaculture Research Institute  
Focus: Water, wastewater, and soil systems, natural building
- MSc, Marine, Earth, and Atmospheric Sciences** 2014  
North Carolina State University  
Research: Geoscience Education  
Thesis: “What do Students Find Relevant in an Introductory Geology Course? Implications for Changing Students’ Attitudes about the Relevance of Geoscience in Society.”
- BA, Geology and Philosophy** 2005  
Hanover College, Indiana  
Affiliations: President of People for Peace, Kappa Alpha Theta, Geology Club  
Thesis: “Environmental and Cultural Impacts of the Three Gorges Dam Project, China”

## Teaching Experience

### *University of Georgia*

- Facilitator: Governor's Teaching Fellows Summer Symposium** 2023
- Helped faculty develop teaching methods that engage students in problem-solving
  - Led group activities on using active learning techniques
- Co-Instructor: Graduate-level Teaching Practicum Course** 2023
- Managed online learning platform for communication and article archives
  - Responsible for co-leading class discussions regarding:
    - Professionalism, ethics, and effective communication
    - Pedagogy, teaching styles, active-learning techniques
- Lab Instructor: Soils and Hydrology Course** 2020 – 2022
- Created novel human-derived fertilizer and water and wastewater systems lab
  - Introduced student-centered and active-learning practices to senior faculty

- Prepared and facilitated field- and bench-based labs:
  - Soil characteristics and profiling, and determining fertility and toxicity
  - Water quality testing and stream velocity and geospatial analysis

**Co-Instructor: Intro to Sustainability Course**

2019 – 2020

- Co-lead lectures to ~65 students
- Helped switch to online format during the global pandemic
- Managed assessments and grading of assignments and exams
- Supported Sustainability Certificate Program credentialing

***Hanover College***

**Visiting Instructor of Geology**

2017 – 2018

*I was responsible for the curriculum for three courses with lectures and labs. Each class used student-centered, active learning techniques. Syllabi and course evaluations are available upon request.*

Course: Global Environmental Change

- Integrated social-ecological systems thinking for course topics:
  - Environmental anthropology and intentional communities
  - Global warming and the impact of climate change on agriculture
  - Sustainable building practices and green infrastructure
  - Water resources, conservation, water rights, policy, and conflicts
- Developed semester-long vermiculture composting lab
- Created a capstone project where students designed a sustainable site on campus

Course: Natural Hazards and Disasters

- Applied scientific understanding of Earth's processes to societal concerns
- Monitoring and forecasting of hazards
  - Climate Change and sea-level rise
  - Hurricanes and tornadoes
  - Subsidence and mass wasting
  - Tectonic activity: earthquakes, tsunamis, and volcanos
- Risk assessment and mitigation methods

Course: Physical Geology Courses (3 semesters)

- Provided the foundations for geology majors and established the relevance of geoscience for:
  - Interpretation of landscapes
  - Historical geology
  - Rocks and minerals
  - Seismic activity (built new models for labs)
  - Water and energy resources

**Mentored Students in Semester-Long Independent Studies (3 projects)**

2018

- Built an augmented reality sandbox
- Earth science literacy and food systems
- Geoscience education research for place-based learning in Iceland

## **Geology Club Advisor**

2018

- Established a new fundraising initiative involving alums and development administration
- Raised over \$8,000 to fund student field trips
- Hosted guest speakers and career events

## ***Other Teaching Experience***

### **Program Director: Ecovillage Training Center at The Farm, Tennessee**

2015 – 2017

- Developed and taught hands-on activities that met learning objectives for the Permaculture Design Certificate courses. Topics included:
  - Renewable energy and appropriate technology
  - Biochar (production and usage)
  - Natural building (cob, plaster, green roofs, recycled materials)
  - Wastewater reclamation
  - Soil building and ecosystem regeneration
- Collaborated with universities to provide immersion experiences for undergraduates
- Mentored residential interns and apprentices

### **Lab Instructor: Physical Geology, North Carolina State University**

2012 – 2014

- Implemented best practices for student learning during lab sections
- Led field trips and lab exercises that supported physical geology lectures. Topic examples:
  - Plate tectonics and weathering
  - Geologic time and geomorphology
  - Stream velocities and sediment transport

### **Resident Teacher: Eco Escuela El Manzano (Permaculture Institution), Chile**

2012 & 2016

- Conducted biological and chemical testing on wastewater systems
- Facilitated the design process and construction of grey and black water systems
- Taught natural building techniques for seismically active zones

### **Watershed Education Coordinator: RiverLink, Western North Carolina**

2009 – 2011

- Led over 100 water-based programs for schools (K-16) and community groups
- Mentored three undergraduate interns
- Trained over 20 volunteers to facilitate hands-on environmental programs
- Invented a 3D model for teaching about water and wastewater infrastructure
- Educational outreach and river cleanup events
- Riparian buffer restoration and invasive species control
- Terrestrial and paddle trail construction and maintenance

### **Science Teacher: Hanger Hall Middle School for Girls, North Carolina**

2007 – 2009

- Conducted weekly STEM-focused field trips
- Established curricula to meet NC State standards for science
- Facilitated inquiry-based labs for physical and life sciences

### **Wilderness Guide: American Youth Foundation**

Summers, 2005 – 2008

- Led an 11,000-mile self-supported bike trip
- Led over 100 miles of canoeing and 10 miles of hiking trails with campers ranging in age
- Wilderness First Responder and Lifeguard certifications
- Facilitated leadership development and team building

## Research Experience

### **Research Scientists: Department of Environment and Sustainability, University of Buffalo** 2024

- Supported data collection and analysis for NSF Convergence Accelerator Track K, Grant: “Advancing Equitable and Circular Water Solutions Through Source Separation”
- Contributed to the grant writing for Phase 2

### **Post-Doctoral Research Fellow: Michigan State University** 2024

- Coordinate the Quantitative Microbial Risk Analysis IV Program
- Conduct an assessment of the educational program
- Develop the “train-the-trainer” program for faculty

### **Research Assistant: University of Georgia** 2023

- Developed, tested, and disseminated online survey into a large-lecture-based course
- Conducted focus-group interviews
- Developed codebook and performed the qualitative analysis

### **Field Researcher: Michigan Technological University, El Salvador** Summer, 2021

- Completed “Ethnographic Methods in International Residency”
- Conducted community-based research on water resources and agriculture
- Led community mapping project and conducted geospatial analysis of natural resources

### **Research Assistant: Southern Highlands Reserve and University of Georgia** 2020

- Wrote a literature review on the influence of nature-based experiences on student learning
- Composed, collected, analyzed, and synthesized a survey for elementary students
- Reported on the findings and made suggestions for future research

### **Project Associate: Center for Geoscience and Society at American Geosciences Institute** 2015

- Composed technical and interpretive portions for a National Science Foundation report
- Designed surveys to determine the effectiveness of building a network of interdisciplinary collaborators working to increase the geosciences in public education
- Analyzed quantitative and qualitative results and created data visualizations

### **Research Assistant: North Carolina State University** 2012 – 2014

- Contributed to “Environmental Justice in the Geosciences,” InTeGrate Workshop
- Collected and analyzed data using “just-in-time” and “flipped-classroom” techniques

### **Field Research Assistant: Las Cuevas Research Station, Belize** Summer, 2009

- Supported field research efforts to characterize trophic level and predator-prey relationships
- Participated in trapping, tagging, and recording small rodents in a tropical rainforest

## Consulting Experience

### **Consultant: Islamabad Wildlife Management Board, Pakistan** 2019

- Collaborated with Organic Farm to create best practices for sustainable management
- Facilitated workshops on the function and production of biochar for soil and water filtration

- Consultant: Global Interfaith WASH Alliance, India** 2019
- Reviewed and revised water and sanitation education strategy for government-funded schools
  - Advised on the design and construction of a twin-pit toilet system
- Consultant: Solheimar Ecovillage, Iceland** 2018
- Lectured on topics of geology, natural building, toilet systems, and concepts of sustainability
  - Assessed the ecological sanitation system and made recommendations to restore functionality
  - Facilitated team-building activities with interns, volunteers, and community members
- Science Communicator: Climate Alive, North Carolina, USA** 2013
- Worked with scientists and film producers to create a public engagement video
  - Identified and communicated relevant climate change findings for local online resource
- Program Developer and International Trip Coordinator, Jubilee! Community** 2013
- Developed and taught environmental philosophy programs to over 200 adults
  - Led a group of adults on a 2-week environmental and cultural tour through Ireland

## **Community Leadership and Service**

- Director: Public Hygiene Lets Us Stay Human (PHLUSH), International** 2016 – Present
- Responsible for the governance of the 501c3 organization
  - Develop educational resources for the public and municipalities
    - Sanitation Justice and Equity
    - Disaster Sanitation Preparedness
    - Public Toilet Design and Access
- President: American Water Resource Association, University of Georgia Chapter** 2019-2021
- Organized river clean-up events
  - Participated in graduate association's events
- Session Chair: Geological Society of America Conference, Indiana** 2018
- Session: “Barriers, Misconceptions, and Progress in Improving Climate and Earth Science Literacy and Strategies for Communicating about Climate Change”
  - Hosted GSA 2017 Gold Medalist
- USAID Volunteer: Farmer-to-Farmer Program, Source Ecovillage, Jamaica** 2017
- Evaluated sanitation practices and wastewater systems of a rural farming community
  - Made recommendations for container-based sanitation options as a way to increase sustainability and disaster preparedness
- Project Leader: Kajsia Community, Laos** 2014
- Built a culturally appropriate toilet system for a Hmong community
  - Resourced volunteers, funding, and materials in a remote region of Laos
- Science Educator, Toledo Institute for Development & Environment, Belize** 2009
- Worked with villagers to develop a strategy for improving water quality
  - Directed a place-based environmental education day camp for Creole students

## **Academic Awards and Grants**

<b>Three Minute Thesis Finalist</b> , University of Georgia	2023
<b>Warnell Teaching Assistant Award</b> , University of Georgia	2022
<b>Scientist Engaged in Education Research Travel Award</b> , University of Georgia	2022
<b>Consortium of Universities for the Advancement of Hydrologic Science</b> , Student Research	2021
<b>Kleiner Fellowship Award for Environmental Ethics</b> , University of Georgia	2019
<b>Best Student Paper</b> : Geological Society of America Geoscience and Society Division	2016
<b>Best Poster</b> : Diversity, Cultural Competence, and International Education Symposium	2015
<b>River's Institute and Richter Grant</b> , Research Along the Yangtze River	2005
<b>Center for Free Inquiry Project Grant</b> , Study of Intentional Communities	2003

## **Invited Guest Lectures**

**“Biophilic Desing for Public Toilets,”** Public Toilet Design Course, Pratt Institute School of Design, New York, June 2024

**“Sustainable Sanitation Solutions for Developing Countries,”** Global Public Health Course, University of Massachusetts, Amherst, March 2023

**“Ecovillages: The Farm as a Case Study of Intentional Communities in the United States,”** First Year Odyssey Course: Water and Humanity, University of Georgia, February 2022

**“The Science and Ethics of Water and Wastewater Systems,”** Environmental Ethics Seminar, University of Georgia, February 2022

**“Ethnohydrology: An Exploration of Water Ritual and Cultural Perspectives of Earth's Vital Liquid,”** Water Sustainability in the Anthropocene Course, Odem School of Ecology, December 2022

**“How our Water and Wastewater Systems Interact with Food and Energy Systems,”** Water Sustainability in the Anthropocene Course, Odem School of Ecology, September 2022

**“Water Rights and Concepts of Personhood for Rivers,”** Water Resources Course, University of Georgia, April 2021

**“Toilet Access and Sustainable Sanitation,”** Global WASH Course, Loyola University, April 2021

**“Designing Public Toilets for Global Pandemics,”** Sustainability Committee, Association of University Architects, August 2020

**“Urban Water and Wastewater Infrastructure: People, Promises, Perils, and Possibilities,”** Urban Planning Course, College for Environment and Design, April 2021

**Basics of Biochar: How to Make Biochar and its Possible Applications for Soil and Sanitation”** Environmental Ethics Lecture Series, University of Georgia, September 2019

**“Breaking Taboos, Building Resilience, and Finding the Sacred: A Story of America’s Hippie Community and the Global Ecovillage Movement”** Hanover College, March 2018

## **Conference Presentations**

**“Transforming the Wastewater Paradigm by Scaling a System for Recycling Our Nutrients”**, National Sustainability Society Inaugural Conference, Seattle, WA, 2024

**“Undergraduates Value Learning about Regenerative Sanitation Systems: Insights for Teaching about Urine-derived Fertilizers”**, Rich Earth Summit, Virtual, 2022

**“Insights and Learning Gains from a Novel Water and Wastewater Systems Module,”** Earth Educators Rendezvous, University of Minneapolis, MN, 2022

**“Ethnohydrology: Analysis of Water Systems in Monseñor Romero, El Salvador,”** Warnell School of Forestry and Natural Resources, Graduate School Symposium, Athens, GA, 2022

**“Using Social-Ecological Systems Framework to Assess Adaptive Capacity for Regenerative Sanitation Systems,”** Rich Earth Summit, 2021

**“An Exploration of Students’ Perception of Water and Wastewater Systems,”** Georgia Water Resource Conference, Athens, GA, 2021

**“GeoCamp Iceland’s Integration of the Earth Science Literacy Principles into its Experiential Educational Programming.”** Geological Society of America. Indianapolis, IN, November 2018

Keynote Speaker: **“When a Flush Toilet System Isn’t an Option: The Need for Resilience and Innovation”** Jamaica Toilet Summit, University of Technology, Kingston, Jamaica, November 2017

**“Building Resilience through Disaster Preparedness.”** Intentional Communities Conference. Twin Oaks, VA, September 2017

**“A Call for More Experiential Earth Systems Education: Connecting Education Centers with the Demand for Place-based Learning.”** Geological Society of America. Denver, CO, October 2016

**“Perceptions of the Relevance of Geoscience and Society: The Human-Earth Related Earth Science Literacy Principles? Students Identify Certain Topics as Applicable for Decision-making for a More Sustainable Future.”** Geological Society of America. Baltimore, MD, November 2015

**“The Relevance of Geoscience as Viewed by Undergraduate Students of Varying Cultural Perspectives.”** Diversity, Cultural Competence, and International Education Symposium. Raleigh, NC, November 2014

**“Starting to Flip the Class: Quality of Student’s Pre-class Work Improves with the Use of Online Just-in-Time Teaching Methods.”** Geological Society of America. Charlotte, NC, November 2013

**“Women of the Americas Sustainability Initiative.”** Center for Research, Development, and Teaching of Permaculture (CIDEP). El Bolson, Argentina, February 2012

**“Ethnohydrology in an Urban Environment: A New Working Model and Curriculum of the Urban Water System.”** Sustaining the Blue Planet: Global Water Education. Bozeman, MT, 2011

## **Publications**

Smith, Hayley Joyell, Jamina Shupack, and Donald Nelson, “Personal Values Inform Student Preference for Household Toilet Systems That Use Human ‘Waste’ as a Natural Resource.” PLOS Water, In-review

Smith, Hayley Joyell. “What Do Students Find Relevant in an Introductory Geology Course? Implications for Changing Students' Attitudes About the Relevance of Geoscience in Society.” MSc thesis., North Carolina State University, 2014

Smith, Hayley Joyell. "Reimagining Human ‘Waste’ as a Natural Resource: Ethical and Educational Pathways to Sustainable Sanitation Systems." PhD diss., University of Georgia, 2023.

Wahla, Saadia Sultan, Jamil Hasan Kazmi, Alireza Sharifi, Safdar Ali Shirazi, Aqil Tariq, and **Hayley Joyell Smith**. "Assessing spatio-temporal mapping and monitoring of climatic variability using SPEI and RF machine learning models." Geocarto International 37, no. 27 (2022): 14963-14982.

Smith, Hayley Joyell. “A Call for More Comprehensive Disaster Sanitation Preparedness.” Public Hygiene Lets Us Stay Human Website. October 2017

# **Skills**

## **Computer Software**

- Google Suite
- Microsoft Office Suite
- Geographical Information Systems
- Moodle and ELC (Course Platforms)
- SPSS (Statistical Analysis)
- Squarespace (Website Building)
- QuickBooks (Bookkeeping)
- Endnote and Mendeley

## **WASH**

- Biological and Chemical Water Testing
- Onsite Wastewater Assessment
- Water System Education
- Ethnographic Field Methods
- Sanitation and Hygiene Education

## **Research**

- Data Visualization
- Statistical Analysis
- Survey Development,
- Research Design
- Interviewing and focus groups
- Data Collection and Analysis

## **Non-technical (social)**

- Public Speaking
- Active Listening
- Cultural Broker
- Time and Project Management
- Team Building and Group Facilitation
- Spanish-Limited Working Proficiency

## **Geoscience Field Work**

- Soil Texturing and Profiling
- Macroinvertebrate Indexing
- Basic Surveying
- Ground Water Flow Monitoring
- Geospatial Analysis (GIS)

## **Certifications**

- Wilderness First Responder
- Permaculture Design, 90 hr.
- Red Cross Natural Disaster Responder
- First aid and CPR
- Environmental Ethics

## **References**

**Dr. Cathy Manduca**

Dissertation Committee Member and Mentor  
Founder of Science Education Resource Center, Carleton College  
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**Carol McCreary**

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Founder of PHLUSH  
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