Statement of Research or Professional Works

My research integrates Geographic Information Science (GIScience), environmental studies, and digital geospatial technologies to investigate how environmental change, hazard vulnerability, and climate adaptation shape, and are shaped by, human and ecological systems. I specialize in combining remote sensing, spatial modeling, and GeoAI to address pressing socio-environmental challenges, particularly those that disproportionately affect marginalized and climate-vulnerable communities.

Research Focus and Contributions

Over the past decade, I have led and collaborated on interdisciplinary projects across environmental science, climate risk assessment, and geospatial analytics. My work bridges field-based ecological research with advanced computational tools, applying UAV imagery, LiDAR, and SAR data alongside machine learning to develop predictive models and actionable insights.

Selected contributions include:

- Predictive GeoAI models for drought and flood vulnerability in agricultural and coastal regions.
- Drone-assisted ecological monitoring of wetlands and riparian zones to track habitat change.
- Spatial justice assessments evaluating equity in climate adaptation policies.
- Community-engaged GIS projects that integrate local knowledge with technical data for policy-making.

This body of work has informed regional resilience planning and environmental management strategies, with findings published in peer-reviewed journals and presented at national and international conferences.

Future Research Directions

At Deep Springs College, I envision a place-based, hands-on research program that leverages the unique ecological setting of the White Mountains and Owens Valley while integrating student-led inquiry. My agenda will revolve around four interconnected themes:

1. Computational Environmental Modeling: Building scalable models that simulate climate extremes such as heat waves, drought, and wildfire risk, incorporating local biophysical and socio-economic variables.
2. Remote Sensing for Agricultural and Rangeland Health: Using UAV, LiDAR, and hyperspectral data to assess crop health, soil moisture, and invasive species patterns on ranch lands.
3. Community-Driven and Participatory GIS: Engaging students and local stakeholders to co-produce geospatial datasets that inform sustainable land and water management.
4. Interdisciplinary Environmental Policy Research: Evaluating the ecological, economic, and cultural impacts of adaptation strategies, with a focus on equity and resilience in rural communities.

Integration of Research, Teaching, and Mentorship

I see research as a collaborative, immersive process that thrives when students are directly involved in data collection, analysis, and interpretation. I have mentored undergraduates and graduate students on projects ranging from urban heat island mapping to agroecological resilience modeling, equipping them with skills in Python programming, GIS analysis, field survey design, and scientific writing.

At Deep Springs, I would create opportunities for students to participate in real-world, place-based research, whether through monitoring water resources, mapping vegetation shifts, or developing digital story maps of local environmental history. These projects would not only develop students' technical competencies but also deepen their understanding of the interdependence between humans, land, and climate systems.

Institutional Fit and Broader Impact

Deep Springs College's integration of academics, labor, and self-governance aligns perfectly with my approach to environmental research and education. My work thrives in small, collaborative communities where teaching and scholarship are mutually reinforcing, and where the land itself becomes both a subject and partner in learning.

I envision forging partnerships with local farmers, conservation agencies, and regional environmental organizations to expand research possibilities and connect student projects to tangible community needs. By blending rigorous environmental science with the College's unique ethos, I aim to foster in students both scientific literacy and a lifelong commitment to stewardship and service.

My research program, rooted in computational environmental science, geospatial technology, and place-based inquiry, is designed to advance knowledge while equipping students with the skills and perspective needed to navigate and shape a rapidly changing world. At Deep Springs, I would bring technical expertise, field-based passion, and a collaborative spirit to help sustain and enrich the College's tradition of transformative education.