2025 Annual SWAAG Meeting

Conference Program

Hosted by the New Mexico State University
Department of Geography and Environmental Studies

Las Cruces, NM

October 29 - November 1, 2025

Welcome & Acknowledgments

Welcome to Las Cruces, New Mexico, for the 2025 Annual Meeting of the Southwest Division of the American Association of Geographers (SWAAG)! We are thrilled to host you and hope this year's meeting exceeds your expectations.

This event would not have been possible without the dedication, collaboration, and generosity of countless individuals and groups:

- SWAAG Treasurer Dr. Stephen O'Connell (University of Central Arkansas), for organizing this year's student competitions and skillfully managing our finances.
- SWAAG Secretary Dr. Rosalie Ray (Texas State University), for organizing the GeoBowl and superbly handling all secretarial duties.
- Editors of *The Southwestern Geographer*, Dr. Rory Hill (Oklahoma State University) and Ramona Malczynski (University of New Mexico), for their leadership in advancing the journal.
- Keynote speakers, Association of American Geographers (AAG) President Dr. Bill Moseley and Dr. John Paul Jones III (University of Arizona), for inspiring us with their insights and vision.
- Presenters and session organizers, whose contributions form the heart of our meeting.
- AAG staff—Becky Pendergast, Betsy Orgodol, Eddie McInerney, and Elin Thorlund—for managing registration, sharing timely updates, and assisting with a wide range of requests.
- The New Mexico Farm and Ranch Heritage Museum and Dickerson's Catering, for graciously hosting and feeding us during our gathering.
- The NMSU Department of Geological Sciences and Department Head Eric Ferré— —whose generous loan of departmental vehicles enabled our shuttles and field trips, exemplifying the spirit of collaboration that makes SWAAG possible.
- Faculty, staff, and students of the NMSU Department of Geography and Environmental Studies, for their exceptional effort in planning, organizing, and supporting this meeting: administrative assistant extraordinaire Karen Hancock; faculty Drs. Christopher Brown, Dan Dugas, Chao Fan, Eric Magrane, Alex Standen, and Shiyan Zhang; faculty emeriti Drs. Bob Czerniak and Jack Wright; and students William Acheampong, Albert Agyei, Crispin Ajugo, Abeiku Arhin, Janet Atanga, Matilda Bekoe, Hardt Bergmann, Luke Cutburth, Ashok Gahatraj, Atikul Hoque, Jakirul Islam, Parker Jones-Wirth, Saheed Oyetunji, Masud Raman, and Dara Saville.
- Our valued partners and supporters—featured on the following pages—whose generosity made this meeting possible.

Finally, thank you to each of you for traveling to Las Cruces and contributing to this year's meeting. Your dedication to advancing geographic research, education, and collaboration ensures that our time together will be an engaging and memorable experience for all. Here's to a great meeting!

Michaela Buenemann
SWAAG Chair
Head, NMSU Department of Geography and Environmental Studies

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Dr. John Paul Jones III, UA

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Table of Contents

Welcome & Acknowledgments 2
Our Partners and Supporters 3
Table of Contents 6
Helpful Links and Resources 9
Meeting Schedule at a Glance 10
Floor Plan 11
Detailed Meeting Schedule 12
- Wednesday, October 29 • 5:00 PM - ??? 12
  - Welcome Reception 12
- Thursday, October 30 • 7:30 AM – 5:00 PM 12
  - Conference Check-In, Registration, and Information 12
- Thursday, October 30 • 8:20 AM – 8:30 AM 13
  - Welcome Remarks 13
- Thursday, October 30 • 8:40 AM – 10:20 AM 13
  - Student Paper Competition I 13
  - Geohumanities and Creative Geographies I 13
  - GIS for Good Workshop 14
- Thursday, October 30 • 10:20 AM – 10:40 AM 14
  - Morning Break 14
- Thursday, October 30 • 10:40 AM – 12:20 PM 15
  - Student Paper Competition II 15
  - Geohumanities and Creative Geographies II 15
  - Intro to ArcGIS Online Workshop 16
- Thursday, October 30 • 12:30 PM – 2:00 PM 16
  - Luncheon and Keynote by Dr. John Paul Jones III 16
- Thursday, October 30 • 2:10 PM – 3:30 PM 17
  - GeoAI for Environmental Monitoring and Assessment 17
  - Geography Education and Collaboration 18
  - Student Poster Competition 18

Thursday, October 30 • 3:30 PM – 3:50 PM 19
Afternoon Break 19
Thursday, October 30 • 3:50 PM – 5:10 PM 19
Natural Hazards and Environmental Governance 19
Borders, Migration, and Trade 20
Thursday, October 30 • 6:00 PM – ??? 20
World Geography Bowl 20
Friday, October 31 • 8:30 AM – 12:00 PM 20
Conference Check-In and Registration 20
Friday, October 31 •9:00 AM – 10:20 PM 21
Geospatial Analyses of Urban Hydrological Risks 21
Mobility and Access in Built and Natural Environments 21
Building K12 Pathways into Geography 21
Poster Session I: Environmental Change and Natural Resource Management 22
Friday, October 31 •10:20 AM – 10:40 PM 23
Morning Break 23
Friday, October 31 •10:40 AM – 12:00 PM 23
Conservation and Environmental Stewardship 23
Historical and Archaeological Geographies 23
Building Community College Pathways into Geography 24
Poster Session 2: Urban and Cultural Landscape Dynamics 24
Friday, October 31 • 12:00 PM – 1:30 PM 25
Luncheon 25
Friday, October 31 • 1:30 PM – 2:50 PM 25
GIScience Applications and Thought 25
The Southwestern Geographer - Journal Q&A 26
Poster Session 3: Climate Systems, Environmental Health, and Resilience 26
Friday, October 31 •2:50 PM – 3:10 PM 27
Afternoon Break 27
Friday, October 31 • 3:10 PM – 4:30 PM 27
Safeguarding Academic Freedom 27
Friday, October 31 • 3:45 PM – 6:00 PM 28

Trick-or-Treating in the Alameda Historic District 28
Friday, October 31 • 5:00 PM – 6:00 PM 28
SWAAG Business Meeting 28
Friday, October 31 • 6:15 PM – 8:15 PM 29
Dinner Banquet, Awards Presentation, and Keynote by Dr. Bill Moseley 29
Saturday, November 1 30
Field Trips 30
Abstracts 31
Meeting Participants 69

Helpful Links and Resources

💡 Tip: Need to find a session fast? Open the Navigation Pane to jump to different parts of the schedule.

To help you make the most of your time at the 2025 SWAAG Annual Meeting, here are some quick links and highlights:

- 📘 2025 SWAAG Annual Meeting Hub site – Your one-stop location for all conference information, including:
  - Registration, Venues, and Travel Info – Details on getting around Las Cruces, plus interactive maps of our meeting venues.
  - Call for Participation – Information on session types and presentation guidelines.
  - Student Competitions and GeoBowl – Details on how to participate; events take place Thursday, and it's not too late to sign up for the GeoBowl!
  - Field Trips – Learn more about three local excursions. Seats are still available—stop by the check-in, registration, and information table if you'd like to join.
  - Sponsorship Opportunities – Explore the different levels of support. It's never too late to contribute—SWAAG funds student awards throughout the year and welcomes additional support.
  - Dining Guide – A list of 50 local restaurants to help you experience the best of Las Cruces, curated by the NMSU Department of Geography and Environmental Studies.
  - Regional Attractions – Coming soon! A guide to natural and cultural highlights across southern New Mexico, also curated by the NMSU Department of Geography and Environmental Studies.

- 🌐 SWAAG Website – Learn more about the Southwest Division of the AAG and sign up for our listserv to stay up to date on future events and opportunities.

- 📱 Stay Connected: SWAAG Social Media Sites – Follow SWAAG on social media for meeting updates, photos, and highlights, and share your own experiences from Las Cruces!
  - Facebook
  - Instagram
  - LinkedIn
  - X

  *Tag your posts with **#SWAAG2025LasCruces** to join the conversation!*

Contribute photos and videos

Help capture the spirit of SWAAG! Upload your favorite photos and short video clips to our shared Google Photos Album. You'll be able to browse, comment, and add your own contributions — and your moments may be featured in our post-meeting highlights.

Meeting Schedule at a Glance

Time	Ventana 1	Ventana 2	Ventana 3	Tortugas
Wednesday, 10/29/2025				
5:00 PM – ???	Welcome Reception (Monte Vista Hiking Trail Visitor Area)			
Thursday, 10/30/2025				
7:30 AM – 5:00 PM	Conference Check-In, Registration, and Information (Hall of Ventanas)			
8:20 AM – 8:30 AM				Welcome Remarks
8:40 AM – 10:20 AM	Student Paper Competition I	Geohumanities and Creative Geographies I	GIS For Good Workshop	
10:20 AM – 10:40 AM	Morning Break Conference Check-In, Registration, and Information (Hall of Ventanas)			
10:40 AM – 12:20 PM	Student Paper Competition II	Geohumanities and Creative Geographies II	Intro to ArcGIS Online Workshop	
12:30 PM –2:00 PM	Luncheon and Keynote by J.P. Jones (Tortugas)			
2:10 PM –3:30 PM	GeoAI for Environmental Monitoring and Assessment	Geography Education and Collaboration		Student Poster Competition
3:30 PM –3:50 PM	Afternoon Break Conference Check-In, Registration, and Information			
3:50 PM –5:10 PM	Natural Hazards & Environmental Governance	Borders, Migration, and Trade		
6:00 PM – ???	World Geography Bowl (NMSU Breland Hall Rooms 179, 185, 189, 192)			
Friday, 10/31/2025				
8:30 AM – 12:00 PM	Conference Check-In, Registration, and Information (Hall of Ventanas)			
9:00 AM – 10:20 AM	Geospatial Analyses of Urban Hydrological Risks	Mobility and Access in Built and Natural Environments	Building K-12 Pathways into Geography	Poster Session I
10:20 AM – 10:40 AM	Morning Break			
10:40 AM – 12:00 PM	Conservation and Environmental Stewardship	Historical and Archaeological Geographies	Building Community College Pathways into Geography	Poster Session II
12:00 PM – 1:30 PM	Luncheon (Tortugas)			
1:30 PM – 2:50 PM	GIScience Applications and Thought	*The Southwestern Geographer* - Journal Q&A		Poster Session III
2:50 PM – 3:10 PM	Afternoon Break			
3:10 PM – 4:30 PM	Safeguarding Academic Freedom			
3:45 PM – 6:00 PM	Trick-or-Treating in the Alameda Historic District			
5:00 PM – 6:00 PM	Business meeting (Organ View Terrace)			
6:15 PM – 8:15 PM	Dinner Banquet, Awards Presentation, and Keynote by Dr. Bill Moseley (Tortugas)			
Saturday, 11/1/2025				
8:00 AM – 4:00 PM	Field Trip: The Canalization Project			
8:00 AM – 1:00 PM	Field Trip: The Mesilla Valley			
9:00 AM – 4:00 PM	Field Trip: The Organ Mountains			

Floor Plan

Ventana Room
Catering Kitchen
To Dairy Barn
Para Vaquería
Tortugas Room
Espacio Tortugas
Adventure Corral
Corral de Aventura
Amphitheater
Anfiteatro
Heritage Gallery
Galería de Herencia
North Corridor
Corredor Norte
Courtyard
Patio
Organ View Terrace
Terraza con Vista al Órganos
Rio Hondo Room
Espacio Rio Hondo
South Arts Corridor
Corredor Sur de Arte
Theater
Teatro
To South 20
Para Sur 20
Administration
Administración
Conference Room
Sala de Conferencias
"The Friends" Office
"Los amigos" de Oficina
Kitchen Classroom
Aula de cocina
Traditions Gallery
Galería de Tradiciones
Legacy Gallery
Galería de Legado
Lobby
Vestíbulo
Eagle Ranch Gift Shop
Tienda de regalos
Entrance
Entrada
Main Entrance
Entrada Principal

Detailed Meeting Schedule

Note: Due to unavoidable scheduling constraints, a few papers appear in sessions that may not fully align with the sessions' thematic focus. We greatly appreciate the flexibility and understanding of both presenters and audience members.

*Asterisks indicate the following, when applicable: Presenter and First Author > *, Presenter Only > **, First Author Only > ***, Other Authors > No asterisk.*

Wednesday, October 29 • 5:00 PM - ???

Welcome Reception

We'll kick off our meeting with an informal gathering in the **Monte Vista Hiking Trail Visitor Area** on the east side of Tortugas (A) Mountain, just minutes from the conference hotels and main venue.

Our welcome reception features a vibrant spread of Southwestern favorites, including a variety of beverages, chips with green and red salsa and guacamole, green chicken enchiladas, green enchiladas, tamales, refried and pinto beans, rice, pico de gallo, chipotle, marinated jalapeños, corn tortillas, and empanadas for those with a sweet tooth.

To reach the venue, head east from the main venue on University Ave / Dripping Springs Road for about 2 miles, past Sonoma Ranch Road, and look for the sign, gravel lot, and pavilion on the south side of the road (Google Maps link).

Thursday, October 30 • 7:30 AM – 5:00 PM

Conference Check-In, Registration, and Information

Location: Hall of Ventanas

Thursday, October 30 • 8:20 AM – 8:30 AM

Welcome Remarks

Location: Tortugas

Thursday, October 30 • 8:40 AM – 10:20 AM

Student Paper Competition I

Room: Ventana 1

Session Chair: Stephen O'Connell

8:40 AM **Finding the Sweet Spot: Spatial Resolution and Feature Set Effects on Mapping Mesquite-Encroached Rangelands**
Atikul Hoque (New Mexico State University)* and Michaela Buenemann

9:00 AM **Regional Feasibility of Sustainable Aviation Fuel in the United States: A PADD-Scale Analysis Using Latin Hypercube Sampling**
Jaryd Hinch (University of South Florida)*

9:20 AM **Wildfire Severity in Los Angeles: Hydroclimatic–Vegetation Linkages From ECOSTRESS and Landsat**
Md Munir Mahmud (Texas State University)*, Soe Win Myint, Yuanhui Zhu, Su Yeon Han, Eunsang Cho

9:40 AM **Modeling Climate Change Impacts on Cotton Yield in Texas**
Ayomide Famewo (Texas State University)*

10:00 AM **Modeling the Current and Potential Future Spatial Distribution of Four Key Prosopis Species in the Southwestern United States and Mexico**
Janet Azure Atanga (New Mexico State University)* and Dr. Michaela Buenemann

Geohumanities and Creative Geographies I

Room: Ventana 2

Session Chair: Hardt Bergmann and Dara Saville

8:40 AM **Place, Placelessness, and Home in The Lord of the Rings and Howl's Moving Castle**
Rebecca Diane Asbury (New Mexico State University)*

9:00 AM **Developing Ghanaian Geopoetics**
Abeiku Arhin Tsiwah (New Mexico State University)* and Eric Magrane

9:20 AM **Rainwater Harvesting Geopoetics**
Eric Magrane (New Mexico State University)*

9:40 AM **Theorizing Blues Space: Flow and Fixity in Early Texas Blues**
Eric Sarmiento (Texas State University)*, Rosalie Ray, and Emily Rhodes

10:00 AM **Artist-in-Residence Programs and the Contemporary State of Art in U.S. Public Lands**
Hardt Bergmann (New Mexico State University)*

GIS for Good Workshop

Room: Ventana 3

Workshop Organizer: Frank Romo, Romo GIS

Description: This workshop focuses on teaching students how to use GIS and drone technology for community impact. Students will learn how to use ArcGIS online and other GIS tools to support community resiliency, urban planning, and disaster preparedness. This hands-on training will help students bridge the gap between GIS and real-world applications, offering them valuable skills in the GIS industry.

Thursday, October 30 • 10:20 AM – 10:40 AM

Morning Break

Location: Hall of Ventanas

Thursday, October 30 • 10:40 AM – 12:20 PM

Student Paper Competition II

Room: Ventana 1

Session Chair: Stephen O'Connell

10:40 AM **Turning Water to Wine: An Analysis of Texas Wine Industry Water Efficiency**
Brock Burford (Texas State University)*, Colleen C. Myles, Justin Scheiner, Michael Cook

11:00 AM **Rectifying a River: A Critical Case Study of Engineering Control on the Rio Grande in El Paso, Texas**
Adriana Montoya (Texas State University)*

11:20 AM **The Land-Water Nexus in South-Central Texas: An Analysis of Historical and Future Land Use and Water Use**
Elizabeth M. Kubacki (Texas State University)*

11:40 AM **For Peat's Sake? An Environmental Geography Analysis of Peatland Carbon Markets in Scotland**
Katie M. Dusek (Texas State University)*, Caroline P. Cambron**, Anupa Bhatta, and Jason P. Julian

Geohumanities and Creative Geographies II

Room: Ventana 2

Session Chair: Dara Saville and Hardt Bergmann

10:40 AM **Community Engagement in Post-Fire Landscapes: Lessons From the Communities of the Hermit's Peak Calf Canyon Fire**
Cassidy A. Tawse-Garcia (University of New Mexico)*

11:00 AM **Using Creative Methods of Traditional Plant Medicine to (Re)Conceptualize Environmental Change**
Dara Saville (New Mexico State University)*

11:20 AM **What Roles Might a White Settler Scholar Play in Indigenous Media Making?**
Laurel C. Smith (University of Oklahoma)*

11:40 AM **People of the Land: Gila Apache Corridors Beyond Captivity**
Ruben Quincy Leyva (New Mexico State University)*

12:00 PM **From Source to Mouth: Creative Methods for Holistically Engaging With Overlooked Waterways**
Erin Elder (University of New Mexico)*

Intro to ArcGIS Online Workshop

Room: Ventana 3

Workshop Organizer: Frank Romo, Romo GIS

Description: This workshop introduces students to the fundamentals of digital mapping and spatial analysis using one of the most powerful GIS platforms--ArcGIS Online. Participants will learn how to create interactive maps, analyze data, and tell stories through geography. This hands-on workshop is designed to make GIS accessible and relevant, guiding students step-by-step through map creation, data layering, symbology, and spatial thinking. By working with real-world community data, students will explore how mapping can reveal patterns, inform decision-making, and inspire action.

Thursday, October 30 • 12:30 PM – 2:00 PM

Luncheon and Keynote by Dr. John Paul Jones III

Room: Tortugas

John Paul "JP" Jones III is Professor in the School of Geography, Development and Environment at the University of Arizona. He previously served as the head of the department and as the dean of the College of Social and Behavioral Sciences. Before coming to the UA in 2003, he taught at the University of Kentucky and San Diego State University. He was a Fulbright Professor at University College Dublin and has held visiting appointments at the University of Nimegen in the Netherlands, the Universitat de Girona in Spain, and the London School of Economics. JP's disciplinary service includes editorships of the Annals of the AAG and Wiley's "Critical Introductions to Geography" series, which will soon publish its twentieth textbook. His research spans several subdisciplines within human geography, as well as the history of geographic thought and research methodology, with particular attention to the intersection between spatial and social theory. In 2015 he was honored with a Lifetime Achievement Award from the AAG.

Professor Jones will present on **Anomalistic Geographies: The Case for UAP.** Anomalous phenomena can be classified across several domains, including ufology (unidentified anomalous phenomena, alien witnessing, contact or abduction), cryptozoology (Sasquatch, sea-serpents), parapsychology (ghosts, telepathy, near death experiences), and earth mysteries (crop circles, earthlights). These phenomena are overlooked by most geographers, leaving them to the margins of the discipline based on a presumed irrelevance to the field or doubts about their very existence qua objects. Among those who have undertaken studies of anomalous phenomena, most have investigated not the objects and those

informants who bear witness to them, but their wider socio-cultural reception, thus permitting them to remain agnostic vis-à-vis the anomaly's ontic status. To broaden the study of these controversial phenomena, both on their own terms as well as in terms of their socio-cultural significance, we aim here for a more general accounting of such studies under the subfield of "anomalistic geographies," which we propose for inclusion within the extant interdisciplinary field of anomalistics. In reviewing the theoretical and methodological orientations and substantive concerns of existing anomalistic studies within geography, we provide something of an entry point for welcoming the much-neglected study of unidentified anomalous phenomena (UAP, also known as UFOs) within this nascent subfield. We then survey the rise of ufology in the contemporary era and suggest a theoretical pathway toward geographic inquiry – via ontological shock and ontological alterity – in what remains, despite huge scientific and popular interest, the least examined of all anomalous phenomena within the discipline.

And for lunch we'll enjoy *The New Mexican*:

- Baby Spring Mix with Cranberries, Pecans, and Bleu Cheese
- Smoked Beef Tri Tip, Carved
- Chicken Mesilla – Chicken in a Creamy Green Chile Sauce
- Broccoli Florets and Asparagus with Lemon Garlic Butter
- Lemon Chive Red Potatoes
- Tiramisu

Thursday, October 30 • 2:10 PM – 3:30 PM

GeoAI for Environmental Monitoring and Assessment

Room: Ventana 1

Session Chair: Yanan Wu

2:10 PM **Long-Term Monitoring of Chlorophyll-a and Net Primary Productivity in the Optically Complex Waters of Mississippi Sound Using Aqua-MODIS Imagery and Machine Learning Algorithms**
Mohammad Shakiul Islam (City of Las Cruces, NM)* and Padmanava Dash

2:30 PM **Analyzing Change in Dune Morphology in the South Texas Sand Sheets (STSS) 1974–2025**
Brent C. Hedquist (Texas A&M University-Kingsville)* and Colton Klatt

2:50 PM **Rice Yield Prediction Using UAV-Derived Vegetation Indices and Machine Learning Methods**
Sagar Rana (University of North Texas)**, Abhishek Adhikari, Jeshan Pokharel, Jiya Thapa, Shekhar Bhattarai, and Uma Shankar Pandey

3:10 PM **Digitizing the Past: Reconstructing Historical Cities Using Machine Learning**
Yanan Wu (The University of Central Arkansas)*, Chengbin Deng, and Yalin Yang; Yanan Wu**

Geography Education and Collaboration

Room: Ventana 2

Session Chair: Christopher Brown

2:10 PM **Empowering Collaboration Through GIS: The Las Cruces Nuisance Abatement Team**
Lucas M. Fellure (New Mexico State University)*

2:30 PM **Roadmap to Sustainability in Texas Wine**
Claryce Bosson (Texas State University)* and Colleen Myles

2:50 PM **Connecting the Classroom to Community Engagement: The Story of Planning a Sustainable World**
Christopher Brown (New Mexico State University)*

Student Poster Competition

Room: Tortugas

Session Chair: Stephen O'Connell

Hidden Costs of Distance: Contraceptive Access and Maternal Health in Texas
Mahboobe Safaei Mehr (University of Texas at Austin)*

Evaluation of Seasonal Hydroclimatic Variability Across the Southern Great Plains (SGP)
Farzana Afroz (University of Oklahoma)*, Saber Brasher, and Chengbin Deng

Influence of Climate Shifts and Anthropogenic Activities on Niche Shift Across Global Terrestrial Protected Areas
Nowshin Nawar (University of Arkansas)* and Brad G Peter

Using Suitability Models to Assess Potential Paleosol Locales Within the Stillwater Creek Watershed
Katelyn N. Cooke (Oklahoma State University)*

Landsat Study of Land Surface Temperature Dynamics in Texas (2020–2025)
Fabiha Shafi Mim (University of Arkansas)* and Mohamed H. Aly

Multi-Scale Analysis of Suspended Sediment via Remotely Sensed Data and Data-Driven Models Along the Upper Mississippi River
Sahar Rezaei (University of Arkansas)* and Brad G. Peter

Mapping and Managing Research Spaces: An ArcGIS Indoors Pilot at New Mexico State University
Ashok Gahatraj (New Mexico State University)*, Dr. Michaela Buenemann, Cortney Castle Chavez

Conservation and Recreation in Early Oklahoma State Parks
Helen Wagner (University of Oklahoma)*, Randy Peppler, and Angela Person

The Renovated Courthouse Square in Texas
Jaydon Allison (Texas State University)*

Thursday, October 30 • 3:30 PM – 3:50 PM

Afternoon Break

Location: Hall of Ventanas

Thursday, October 30 • 3:50 PM – 5:10 PM

Natural Hazards and Environmental Governance

Room: Ventana 1

Session Chair: Anne Lise-Boyer

3:50 PM **Evaluating Impacts of Urbanization and Climate Change on Water Quality in Two Adjacent Watersheds in Denton County, Texas**
Morgan George (University of North Texas)* and Feifei Pan

4:10 PM **Burn Severity Assessment and Mapping in the Hindu Kush Himalayan (HKH) Region**
Gayatri Paudel (Texas Tech University)* and Abinash Bhattachan

4:30 PM **Risk Assessment for Non-Meteorological Natural Hazards in Louisiana**
Rubayet Bin Mostafiz (Louisiana State University)***, Robert V. Rohli**, Carol J. Friedland, and Nazla Bushra

4:50 PM **Extreme Heat Governance in Rural and Remote Areas: Perspectives From Arizona and New Mexico**
Anne-Lise Boyer (The University of Arizona)*, Minwoo Ahn, Alekzander Ryan, Ladd Keith, and Heidi E. Brown

Borders, Migration, and Trade

Room: Ventana 2

Session Chair: Sarah Blue

3:50 PM **Urban Flood Risk Disparities Across Historic Redlining Neighborhoods: A Comparative Study of Chicago and Los Angeles**
Yujian Lu (University of New Mexico)* and Xi Gong

4:10 PM **U.S.–Mexico Trade in Feed and Livestock Products: A Case Study in Transportation Geography**
Michael S. Yoder (Univesity of Central Arkansas)*

4:30 PM **Migrant Deaths at the U.S.–Mexico Border: Who, When, Where, and What We Do Not Know**
Alberto Giordano (Texas State University)*, Molly Miranker, Rachel Daniell, Molly Kaplan, Veronica Flores-Guillen, Ivanna Robledo, Jasmine Hernandez, Heather Edgar, Kate Spradley, and Nicholas Herrmann

4:50 PM **Unintended Consequences of the U.S.' Short-Lived "Humane Border Enforcement" Policies**
Sarah A. Blue (Texas State University)*

Thursday, October 30 • 6:00 PM – ???

World Geography Bowl

Friday, October 31 • 8:30 AM – 12:00 PM

Conference Check-In and Registration

Location: Hall of Ventanas

Friday, October 31 •9:00 AM – 10:20 PM

Geospatial Analyses of Urban Hydrological Risks

Room: Ventana 1

Session Chair: Binisha Shrestha

9:00 AM **Unplanned Urban Expansion and Its Impacts on Drainage Connectivity and Waterlogging in the Bil Baghil Basin, Dhaka District, 1953–2019**
Md Ashraful Habib (Texas Tech University)*, Faria Kabir, Md Shahedur Rashid, and Yunuen Reygadas

9:20 AM **Evaluating Land Use Change and Flood-Risk Hotspots in Floodplains of Southeastern Florida (2011–2021)**
Chandra Hada (Texas A&M University at Galveston)* and Samuel D. Brody

9:40 AM **Multi-Hazard Risk Assessment of Flooding and Heatwaves in Metro Manila, Philippines**
Binisha Shrestha (Texas Tech University)* and Abinash Bhattachan

Mobility and Access in Built and Natural Environments

Room: Ventana 2

Session Chair: Bryant Evans

9:00 AM **Toward a Hierarchy of Needs for Active School Travel: A Systematic Review of Correlates, Barriers, and Facilitators**
Matilda Ohenewaa Bekoe (New Mexico State University)*

9:20 AM **The Role of New Urbanism in Shaping a Market-Driven Urban Development in Austin, Texas**
Alborz Ebadi (Texas State University) *

9:40 AM **Navigating From Point P to Point C: The Recent Journey of Texas State Parks**
Bryant Evans (Houston Community College)*

Building K-12 Pathways into Geography

Room: Ventana 3

Session Chair: Michaela Buenemann (New Mexico State University)

Description: How can we inspire the next generation of geographers before they even reach college? In

this roundtable discussion with RomoGIS and AAG President Bill Mosely, we'll explore creative and practical ways to build a strong K-12 pipeline into college and university geography programs. Join us as we discuss strategies for engaging students and teachers, integrating GIS and spatial thinking into early education, and strengthening partnerships between schools, universities, and communities. Come ready to share ideas, challenges, and success stories that can help shape the future of geography education.

Poster Session I: Environmental Change and Natural Resource Management

Room: Tortugas

Session Chair: Md Jakirul Islam Jony Prothan

Spatiotemporal Variation in Water Storage Changes Across Lakes and Reservoirs in the Colorado River Basin Using GEDI and SRTM and Their Links to Climate Change
Babak Heidari (Texas State University)*, Soe W. Myint, and Yuanhui Zhu

Trends and Climate Controls of Streamflow in Perennial Streams in Southeastern Oklahoma (1990–2022)
Sylvia Mensah (Oklahoma State University)* and Thomas LaVanchy

A Preliminary GIS-Based Investigation of Adaptive Water Management Practices in the Arid Southwest United States: Past Environments and Future Challenges
Mason P. Miller (Texas State University)* and Samantha M. Krause

Spatial Analysis of NRCS Conservation Practices to Improve Water Access and Security on New Mexico's Working Lands
Md. Masudur Rahman (New Mexico State University)*, Atikul Hoque, Chao Fan, and Michaela Buenemann

A Geospatial Framework for Erosion Modeling and Restoration Planning in Drylands
Albert Opare Agyei (New Mexico State University)*, Michaela Buenemann, Connie M. Maxwell, Kaustuv R Neupane

Analyzing the Forest Fire of Suklaphanta National Park, Nepal Using GIS and Remote Sensing Techniques
Bimala Awasthi (University of North Texas)*

Enhancing Active Fire Detection With GeoAI: Case Study of the 2022 Calf Canyon–Hermits Peak Wildfires
Md Jakirul Islam Jony Prothan (New Mexico State University)*, Chao Fan

Geospatial Analysis of Land Use and Land Cover Changes in Akure, Nigeria (2004–2024)
Saheed Oyekunle Oyetunji (New Mexico State University)*, Johnson Ayomide Ibukun**

Friday, October 31 •10:20 AM – 10:40 PM

Morning Break

Location: Hall of Ventanas

Friday, October 31 •10:40 AM – 12:00 PM

Conservation and Environmental Stewardship

Room: Ventana 1

Session Chair: Jason Julian

10:40 AM **Invasive Species and Engineered Landscapes: Rethinking Oryx in the Tularosa Basin**
Augustus Guikema (University of New Mexico)*

11:00 AM **Middle Rio Grande Conservancy District: A Century of Service**
Timothy C. Pitts (Middle Rio Grande Conservancy District)*

11:20 AM **Protecting Biodiverse Private Land in the Southwest: A Case Study of the New Mexico Land Conservancy**
John B. Wright (New Mexico State University)*

11:40 AM **Damage Costs in Gila National Forest: What We Lose With Repeal of the Roadless Rule**
Jason P. Julian (Texas State University)*, Aspen Maning

Historical and Archaeological Geographies

Room: Ventana 2

Session Chair: Stephen O'Connell

10:40 AM **Canalization Project and the Rio Grande**
Mark Howe (New Mexico State University)*

11:00 AM **Traces on the Landscape of a Lost Migration**
Don Jonsson (Austin Community College)*

11:20 AM **Using Artificial Intelligence to Recover and Explore the Rhythms of Pioneer Farming in Oklahoma Territory**
Brad A. Bays (Oklahoma State University)*

11:40 AM **Wanderlust in the Classroom: Practical Insights Into Designing Virtual Reality Field Trips**
Jamie E. Spinney (Southern Utah University)* and Chris Joy

Building Community College Pathways into Geography

Room: Ventana 3

Session Chair: Michaela Buenemann (New Mexico State University)

Description: Community colleges play a vital role in shaping future geographers. This roundtable discussion invites educators, advisors, program leaders, and others interested in the topic to share ideas and experiences for strengthening transfer pathways from two-year to four-year geography and geospatial programs. Together, we'll explore examples of successful articulation agreements, curriculum alignment, and partnerships that help students smoothly continue their studies in geography.

Poster Session 2: Urban and Cultural Landscape Dynamics

Room: Tortugas

Session Chair: Masud Rahman

Remote Sensing-Derived Urban Heat Islands and Land Surface Phenology
Raihan Sorker (University of Arkansas)* and Jason Tullis

Mapping Urban Tree Mortality in Denton, Texas, With Multi-Temporal LiDAR Data and Multispectral Aerial Imagery
Veronica Briggs (The University of North Texas)* and Pinliang Dong

Exploring Spatiotemporal Patterns of Road Traffic Crashes in Chicago: A Network-Based Kernel Density Approach
Blessing Ankrah (Oklahoma State University)* and Hongbo Yu

Two Wheels to Town: Promoting Bicycle Infrastructure in Small-to-Midsized Texas Cities, a Spatial and Community-Based Analysis
Michael D. White (Texas State University)*

Using Satellite Imagery to Evaluate Contemporary Agricultural Threats to the Archaeological Sites of the Wadi Faynan 4 Field System in Faynan, Jordan

Michael P. Boyles (Texas State University)*

A Geoarchaeological Investigation of Agriculture at the Mesilla-Phase Creekside Village Site in Southern New Mexico
Tristan Goedert (Texas State University)*

Object-Based Image Analysis Approach to Map Animal Feeding Operations
Barira Rashid (University of Arkansas & Science and Technologies for Phosphorus Sustainability)*, Rebecca Muenich,Co-Author, and Argha Saha

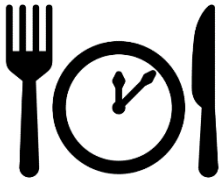
Friday, October 31 • 12:00 PM – 1:30 PM

Luncheon

Location: Hall of Ventanas

For lunch, we'll enjoy a selection of sandwiches and wraps, including:

- Southwest Turkey Sandwich
- Turkey, Bacon, and Guacamole Sandwich
- Chicken Wrap
- Corked Bat Wrap
- Vegan Patty Melt
- *All served with a Bag of Chips*



Friday, October 31 • 1:30 PM – 2:50 PM

GIScience Applications and Thought

Room: Ventana 1

Session Chair: Chao Fan

1:30 PM **Where Have All the Singularities Gone? From Alexander von Humboldt's "Alles ist Wechselwirkung." to a Nonrepresentationally Realist Geography of Singularities**
Charlie Jackson (New Mexico State University)*

1:50 PM **Quantifying Wildfire Smoke's Persistent Effects on PM2.5 Speciation Across U.S. Regions: Evidence From 2007–2023 Smoke Events**
Shiyan Zhang (New Mexico State University)*, Jiakai Zhang, Manzhu Yu

2:10 PM **Hydroclimatic Stress and LULC Changes Amplify Aerosol Burdens and Inequitable Exposure in Phoenix (2000–2020)**

Yuanhui Zhu (Texas State University)*, Soe Myint, and Yubin Li

2:30 PM **Urban Transformation and Thermal Patterns in a Desert Metropolis: A Two-Decade Analysis of Land Cover, Demographics, and Surface Temperature**
Chao Fan (New Mexico State University)*, Md Jakirul Islam Jony Prothan, Yuanhui Zhu, and Di Shi

The Southwestern Geographer - Journal Q&A

Room: Ventana 2

Session Chair: Rory Hill (Oklahoma State University) and Ramona Malczynski (University of New Mexico)

Description: In this session, the editorial team of *The Southwestern Geographer* (Rory Hill and Ramona Malczynski) will discuss the recently re-launched journal. The Southwestern Geographer is the peer-reviewed academic journal of SWAAG, and has been published for over twenty-five years. It serves as a home for geographical and related scholarship from across the region, and we especially welcome contributions from graduate students. This session is open to everyone, with no advance registration required, so come along to learn more about the journal and ask any questions you have about the submission, peer review, and publication process.

Poster Session 3: Climate Systems, Environmental Health, and Resilience

Room: Tortugas

Session Chair: Stephen O'Connell

The Spatial Representatives of Low-Resolution Sea Ice Concentration Products of Conditions at Coastal Sites Along the Central Western Antarctic Peninsula
Andrew G. Klein (Texas A&M University)* and Carly K. Casper

Mapping Global Wind Direction Variability From 1985 to 2025 Using ERA5 Reanalysis
Shipu Debnath (Texas Tech University)*, Jeff Lee, and Xuantong Wang

Geospatial Analysis of Radon Emission Potential Across Texas: Geological Features and Web-GIS Visualization
Sajad Ghafari (Texas Tech University)*, Omid Mansourihanis, and Chao Xu

Advancing Air Quality Action Through Local Public Engagement in West Texas: Opening a Path to Bridge Research and Policy
Zyanya I. Ramirez Diaz (Texas Tech University)* and Jen Henderson

GRAS-SES Research Coordination Network (RCN): Building a Community of Practice for Co-Producing Resilient Socio-Ecological Systems in Grasslands
Jacqueline M. Vadjunec (University of Oklahoma)* and Todd D. Fagin ***

Betting on Carbon Markets: Scotland's Approach to Climate Resilience

Fatema Tarin (Texas State University)* and Jason P. Julian

Plastic Waste Management and Green Innovations in Developing Cities: A Case Study in the Greater Accra Region of Ghana
Derrick Korblah Ahadzi (Texas State University)*

Flood Risk and Vulnerability Assessment in Ruidoso, New Mexico: A GIS and Remote Sensing-Based Approach to Mountain Community Resilience
William Acheampong (New Mexico State University0*

Friday, October 31 •2:50 PM – 3:10 PM

Afternoon Break

Location: Hall of Ventanas

Friday, October 31 • 3:10 PM – 4:30 PM

Safeguarding Academic Freedom

Room: Ventana 1

Session Chair: Stephen O'Connell (University of Central Arkansas)

Description: The AAG recently convened a panel on *Safeguarding Academic Freedom*, described as follows: "Members of the higher education community are facing pressures and threats surrounding the topics they engage with publicly, teach in their classrooms, and research. At the same time, budget cuts and institutional constraints are creating uncertainty and tension on campuses. How can universities protect academic freedom—the ability of professors to teach, research, and speak openly about their work—when there are increasing restrictions on classroom topics, the focus of campus research and service, and especially scholars' freedom to discuss their work clearly and honestly with the public?" Building on this important conversation, we will host a similar discussion featuring several panelists, including AAG President Bill Moseley, who will explore these challenges from regional and institutional perspectives. All are warmly invited to join the session and contribute to the dialogue.

Friday, October 31 • 3:45 PM – 6:00 PM

Trick-or-Treating in the Alameda Historic District

Session Chair: Eric Magrane (New Mexico State University)

Description: Happy Halloween! For those SWAAG attendees who bring children with them, we will organize an outing to the Alameda Historic District in downtown Las Cruces for a neighborhood Trick-or-Treat. Have your kids bring their costumes and be ready to stroll around to take in the neighborhood decorations, enjoy the fall air, and get some Halloween loot! We will arrange for transportation from the conference to and from the neighborhood. This event is for families; a parent or guardian needs to attend with their children. For questions, email Eric Magrane (magrane@nmsu.edu).

Friday, October 31 • 5:00 PM – 6:00 PM

SWAAG Business Meeting

Location: Ventana 1

Friday, October 31 • 6:15 PM – 8:15 PM

Dinner Banquet, Awards Presentation, and Keynote by Dr. Bill Moseley

Room: Tortugas

William G. Moseley is DeWitt Wallace Professor of Geography, and Director of the Food, Agriculture and Society Program, at Macalester College in Saint Paul, MN. His research focuses on tropical agriculture, food security, environment and development, particularly in Africa. He is the author or co-author of more than 100 peer reviewed journal articles and book chapters, as well as 12 books. His research has been funded by the US National Science Foundation, the US Fulbright-Hays Program, and the American Geographical Society. In 2022-2023, he was a Phi Beta Kappa scholar, in 2016 he was awarded the Kwadwo Konadu-Agyemang Distinguished Scholar Award by the AAG, and in 2013 he received the AAG media award. He currently serves as president of the Mande Studies Association (MANSA) and President of the American Association of Geographers (AAG). He previously served as a member of the United Nations High Level Panel of Experts for Food Security and Nutrition (HLPE-FSN). His commentaries have appeared in the New York Times, the Washington Post and Al Jazeera English.

Professor Moseley will present on **Nourishing Geography: Strengthening our Community in Challenging Times.** These are challenging times for American higher education and geography has not been immune to these headwinds. While times of turmoil are disconcerting, these can also be times of opportunity if the discipline is proactive and strategic. This talk discusses five such challenges that also represent opportunities for the AAG and geography. First, we need to actively build community and socialize newcomers into geography. Geographers from different types of institutions and backgrounds must all feel welcome. Second, despite cutbacks in public research funding, geography needs to continue to lead with sound, creative and cutting-edge scholarship focused on societally relevant questions. Geography must actively seek to communicate its research to broader publics and to connect its insights to the policy sphere. Third, American geography is situated in a broader intellectual network of geographers around the globe. Foreign born faculty and students have helped sustain and build geography in the US. International connections are also vital for scholarly advancement and mitigating nationalism. Fourth, a healthy discipline needs mechanisms and processes for thoughtfully and inclusively discussing divisive topics. The humanitarian crisis in Gaza, and a membership petition regarding the AAG response to this, is an example of such a difficult topic that is being discussed this fall via an inclusive and participatory process. Finally, American geography's Achilles' heal has been its relatively small number of undergraduate students. I argue that addressing this must be a priority for the discipline moving forward. The AAG Task Force on Geography Undergraduate Education, aka the Gen A Project, is actively working on developing strategies to address this problem. While some disciplines may be able to hide in the Ivory Tower during challenging times, geography does not have the luxury to do so. By leveraging its strengths and proactively addressing its weaknesses, geography will not only survive, but thrive.

And for dinner we'll enjoy *South of the Border*:

- Iceberg Lettuce & Romaine with Tomatoes, Cucumber, and Croutons
- Green Chile Enchiladas
- Chicken Taquitos

- Pinto Beans
- Spanish Rice
- Peach Cobbler

Saturday, November 1

Field Trips

All field trips will depart from the conference hotels at or just after the times noted below. For more info on field trips, check out our meeting hub page.

The Canalization Project: Taming a River From the 1930s to Today

Organizer: Led by Mark Howe, Ph.D. student, NMSU Geography and Environmental Studies, and crews from the U.S. Section of the International Boundary and Water Commission (USIBWC) and Elephant Butte Irrigation District (EBID).

Time: Saturday, November 1, 8 am – 3 or 4 pm

Description: Leaving NMSU, travel upriver on I-25 to Hatch (USIBWC Hatch Yard & Hatch Siphon; Montoya/Cervo Arroyo), then south along the river to USIBWC restoration sites and EBID structures; longer stop at Leasburg Dam & Fort Selden; return via Shalem Colony Bridge area, 1848 International Boundary Marker, and Mesilla Dam. Lunch stop (pay your own); light snacks and water provided.

The Mesilla Valley

Organizer: Led by Dr. John B. Wright, Professor Emeritus, NMSU Department of Geography and Environmental Studies

Time: Saturday, November 1, 8 am – 1 pm

Description: Visit Mesilla, a Mexican-era land grant village designed using the Laws of the Indies. We will explore the historical and cultural geography of this remarkable place on foot. The Treaty of Guadalupe Hidalgo, the Gadsden Purchase, Billy the Kid, agriculture, and Civil War occupation will be covered. We will briefly visit Tortugas Pueblo and Mesilla Valley Bosque State Park. The tour ends at Mesilla Plaza for lunch at La Posta de Mesilla (pay your own).

The Organ Mountains

Organizer: Led by Dr. Dan Dugas, Assistant Professor, NMSU Department of Geography and Environmental Studies

Time: Saturday, November 1, 9 am - 4 pm

Description: Join us for a physical geography tour of the Organ Mountains area. We'll explore the area's geology, geomorphology, and ecosystems through van stops and a short hike. Lunch, light snacks, and water are provided.

Abstracts

*Here are the abstracts for this year's presentations, sorted by the presenters' last-name initials. Asterisks indicate the following, when applicable: Presenter and First Author > *, Presenter Only > **, First Author Only > ***, Other Authors > No asterisk.*

Flood Risk and Vulnerability Assessment in Ruidoso, New Mexico: A GIS and Remote Sensing-Based Approach to Mountain Community Resilience

William Acheampong (New Mexico State University)*

Flood hazards, vulnerability assessment, GIS, resilience planning, Southwestern United States

Flooding is one of the most damaging and widespread natural hazards in the world, affecting more than 1.8 billion people each year. In the village of Ruidoso, New Mexico, flood hazards have intensified due to steep terrain, burn scars from wildfires, and heavy monsoon rains. The July 2025 flood displaced more than 300 residents and exposed the need for better local hazard assessment and preparedness. This study examines flood risk and community vulnerability in Ruidoso using geographic information systems to combine data on elevation, hydrology, land use, and infrastructure. Datasets from the Federal Emergency Management Agency, the United States Geological Survey, and the United States Forest Service were analyzed to identify flood-prone areas and evaluate exposure to hazards. Results show that flood hotspots are concentrated along the Rio Ruidoso and in low-lying neighborhoods where runoff from burned slopes increases flood intensity. The study recommends mitigation strategies such as reforestation, erosion control, green infrastructure, and improved drainage systems to reduce flood impacts. It also emphasizes the importance of community education and early warning systems to strengthen long-term resilience. This research demonstrates how spatial analysis can guide practical flood mitigation and support sustainable development in mountain communities of the southwestern United States.

Evaluation of Seasonal Hydroclimatic Variability Across the Southern Great Plains (SGP)

Farzana Afroz (University of Oklahoma)*, Saber Brasher, and Chengbin Deng

Southern Great Plains (SGP), hydroclimate, weather, season, ecosystem resilience

The Southern Great Plains (SGP) is a climate-sensitive U.S. region where hydroclimatic variation threatens water resources, vegetation, and agriculture. Though most studies assess individual weather indicators, this research applied a multivariate approach using the Gridded Weather Type Classification (GWTC-2). This incorporates six meteorological variables: temperature, dew point temperature, wind speed, wind direction, sea level pressure, and cloud cover. It categorizes daily conditions into 11 hydroclimatic regimes, offering a comprehensive view of surface weather. Using GWTC-2 data, this study analyzed seasonal hydroclimatic variability in the SGP from 2009 to 2023. Firstly, the study used Python to aggregate the dataset into winter, spring, summer, and fall. Then, it identified predominant weather types from modal values. To detect trends and significance, this study analyzed frequency percentages, Theil-Sen slope estimator, and Mann-Kendall tests ($p < 0.05$). Analysis revealed subtle shifts across seasons that may not be captured by isolated indicators. Summer showed increasing Humid and Humid Warm types, particularly in the southeast. Winter trends indicated rising Warm types across eastern and central SGP and Humid Warm in southern areas, especially Texas. Fall displayed broad increases in Warm and Humid Warm types, while Cool, Dry, Dry Cool, and Dry Warm types generally declined, particularly in winter and fall. Spring mirrored summer, with widespread increases in Humid types, especially in the east. These findings suggested that the SGP shifted towards increasing humidity

and warmth. Such shifts pose critical challenges for agriculture, water management, and ecosystem resilience. Future studies could enhance spatial precision through machine learning models.

A Geospatial Framework for Erosion Modeling and Restoration Planning in Drylands

Albert Opare Agyei (New Mexico State University)*, Michaela Buenemann, Connie M. Maxwell, Kaustuv R Neupane

USPED, erosion modeling, watershed restoration, drylands, GIScience

Soil erosion is a persistent challenge in drylands, where variable precipitation, sparse vegetation, and livestock grazing accelerate land degradation. Effective restoration demands knowing where to act first—which areas (e.g., specific sub-watersheds) and sites (e.g., specific headcuts) are most susceptible to erosion and most likely to cause downstream flooding and sedimentation. Yet a practical, transferable framework for moving from erosion risk to site-level action is lacking. We present a geospatial framework that (1) applies the Unit Stream Power Erosion and Deposition (USPED) model to estimate erosion and deposition across # sub-watersheds (HUC-#) in the Hatch and Mesilla Valleys, Chihuahuan Desert, New Mexico; (2) integrates rainfall erosivity, soil erodibility, vegetation cover, management, and topography using both locally detailed (e.g., SSURGO, high-resolution aerial imagery and elevation models) and globally accessible datasets (e.g., SoilGrids); (3) employs Multi-Criteria Decision Analysis (MCDA) to prioritize sub-watersheds based on erosion/deposition and other management-relevant factors; (4) refines priorities to site-level hotspots using local spatial context; and (5) links priority sites to restoration practices expected to yield the greatest benefit (e.g., vegetative treatments or runoff control with small check structures). This framework offers a scalable, transferable decision-support tool for erosion modeling and restoration planning in dryland settings. Add one or two anchoring results (e.g., percent area in high-risk classes or the top-ranked sub-watersheds).

Developing Ghanaian Geopoetics

Abeiku Arhin Tsiwah (New Mexico State University)* and Eric Magrane

Geohumanities, geopoetics, creative methods, Ghanaian poetry, Adinkra symbols

Ghanaian poetry demonstrates the connection between culture, place, and politics. In this presentation, I develop the concept of “Ghanaian geopoetics” to examine how Ghana’s cultural traditions and political histories shape its literary and poetic expression. The literary landscape of Ghana is influenced by several cultures including Akan, Ewe, and Ga, as well as the nation’s history from pre-colonial through post-colonial times. This presentation draws on my completed thesis, which has two parts. The first is a literary geographic analysis of poems by Ama Ata Aidoo, Kofi Awoonor, and Atukwei Okai. Aidoo’s poems examine Akan gender dynamics and cultural roles; Awoonor’s poems explores Ewe spirituality and the impact of colonialism; and Okai’s poetry critically examines Ga cultural heritage and political reflections. Their works shed light on Ghanaian cultural traditions, as well as their influence on my growth as a poet. The second part is a creative component. I composed five original poems that delve into Akan-Fante culture inspired by Adinkra symbols which are Nyame Nnwu Na Mawu, Asaase Ye Duru, Osram Ne Nsoroma, Owuo Atwedee, and Sankofa. These poems explore the philosophy, history, spirituality, and social roles within Akan traditions. My poems are not mere imitations of Aidoo, Awoonor and Okai but provide creative engagements with the cultural and geographical landscapes that I grew up in and continue to study. By advancing “Ghanaian geopoetics,” this project contributes to the geohumanities by showcasing how poetic expression helps in understanding how landscape, Indigenous ideas, and cultural knowledge come together to foster geographical study.

Plastic Waste Management and Green Innovations in Developing Cities: A Case Study in the Greater Accra Region of Ghana

Derrick Korblah Ahadzi (Texas State University)*

Environmental geography, waste management, plastic pollution, sustainability, urbanization

Plastic waste is a global problem, with impacts on both humans and the environment. Integrating the best plastic waste management practices has become necessary to reduce plastic pollution. In this case study of the Greater Accra region, I assess the environmental geography of plastic pollution and highlight some sustainable measures for effectively managing discarded plastics. I used a mixed methods approach to: (1) assess the prevailing solid waste management practices in the Greater Accra region, (2) examine environmental policies governing plastic waste management, and (3) investigate the environmental impact of waste management practices on stakeholders in the most affected communities. My study revealed that there is an over-reliance on informal waste collectors as opposed to deliberate government intervention in managing waste. Though there were over 100 waste recycling stations in Accra alone, a large portion of Ghanaians (about 22%) did not know where to locate these recycling services. The study also showed that residents living in the coastal communities of Accra showed frequent illnesses of diarrhea, linked to waste. The environmental geography of effective waste management practices is underexplored in Ghana, which makes it difficult for policymakers and environmental organizations to address its consequences for communities, particularly the poorer communities that are most affected by plastic pollution. The findings from this study shed new light on plastic problems in developing countries and support Ghana's dream of making Accra the cleanest city in Africa while achieving the United Nations' sustainable development agenda.

The Renovated Courthouse Square in Texas

Jaydon Allison (Texas State University)*

Urbanization, public spaces, urban geography

Why is the Denton courthouse square so popular? There are hundreds of courthouse squares in Texas, but not every square sees the same vitality. The Texas courthouse is an important aspect to a county seat, and each square gives insight to the value it has in a community (Veselka, 2000). Understanding what allows a courthouse square to thrive will help other courthouses and improve the makeup of their towns. The Texas Historical Commission believes there is merit to renovating and restoring historic courthouses, and that they have a positive effect on a town’s square (Texas Historical Commission, 2025). Various Texas cities employ a Main Street program, with the goal of improving historic downtowns and implementing positive change for at-need communities (Texas Main Street Program). I will conduct comparative case studies to see any trends in economic vitality created resulting from the output of these programs, including the Main Street program and the THC. My analysis will be used to determine what facets of these programs help courthouse squares the most in improving and protecting these squares. I will select my cities from those that employ a Main Street program and/or have undergone some sort of restoration or renovation from the Texas Historical Commission’s Courthouse Preservation program. I hypothesize that there will be a positive trend in economic activity following any renovations, and that the more investments into a Main Street program, the more successful a courthouse square will be.

Exploring Spatiotemporal Patterns of Road Traffic Crashes in Chicago: A Network-Based Kernel Density Approach

Blessing Ankrah (Oklahoma State University)* and Hongbo Yu

Traffic crashes, spatiotemporal analysis, Chicago, network kernel density estimation, road safety

Urban traffic crashes remain a major public-health challenge in U.S. cities, where dense street networks, multimodal activity, and disproportionate exposure to traffic risks across neighborhoods often lead to increased crash burdens. Understanding the spatial and temporal patterns of crashes is essential for improving road safety and guiding resource allocation. To emphasize the influence of road structure, this study employed the Network Kernel Density Estimation (NKDE) method to investigate the spatiotemporal distribution of traffic crashes along road segments in the City of Chicago. The analysis utilized crash data from 2019 to 2023, categorized into multiple temporal subsets (e.g., annual, seasonal, weekday vs. weekend) to facilitate the identification and comparison of spatial crash patterns across different timeframes. Both unweighted crash frequencies and severity-weighted crashes were analyzed to distinguish areas with frequent minor incidents from those associated with serious injuries or fatalities. Based on the density outputs generated from the NKDE method, a Getis–Ord Gi* hotspot analysis was conducted to identify statistically significant clusters of crashes. Preliminary findings reveal consistent hazardous corridors and intersections that persist across different timeframes. Incorporating severity-weighting enhances the contrast between low-impact and high-impact locations, offering a clearer distinction between areas with frequent minor incidents and those with serious injuries or fatalities. These insights can support policymakers and planners in prioritizing interventions, assessing the effectiveness of Vision Zero initiatives, and strategically allocating resources to improve road safety equitably across urban neighborhoods.

Place, Placelessness, and Home in The Lord of the Rings and Howl's Moving Castle

Rebecca Diane Asbury (New Mexico State University)*

Geohumanities, literary geography, creative geographies, fantasy literature, place

Just as the physical spaces we inhabit shape our understanding of the world from childhood, so too can the imagined spaces within fantasy literature shape our real-world perceptions. Using The Lord of the Rings (LotR) by J.R.R. Tolkien and Howl's Moving Castle (HMC) by Diana Wynne Jones as boundary objects, and situating this paper within the geohumanities, I explore the interconnected concepts of space, place (and placelessness), and "home." It investigates how characters navigate space, how they define home, and how readers engage with these representations and shape (or reshape) their own perceptions of the world. LotR's impact on popular culture and media in the last seventy years is undeniable with the novels remaining just as relevant and popular as their major motion picture counterparts, and the highly developed geographic elements of Tolkien's world-building being a major draw to the series. While Howl's Moving Castle is often recognized and praised through Hayao Miyazaki's animated adaptation, the original 1986 novel is a perfect place to explore similar themes and serve as an interesting foil to LotR. Through a literary geographic and creative geographies approach, this paper examines how fantasy literature contributes to the formation and interpretation of spatial identity and meanings of place, placelessness and home in both the real and imagined worlds.

Analyzing the Forest Fire of Suklaphanta National Park, Nepal Using GIS and Remote Sensing Techniques

Bimala Awasthi (University of North Texas)*

Burn severity, forest fire, geographic information science, remote sensing, Sentinel-2

Habitat Management in protected areas (PAs) using fire is crucial; however, uncontrolled and frequent burning can negatively impact native vegetation and wildlife. Therefore, understanding frequency and distribution of fires in PAs improve fire and habitat management. This study examines spatio-temporal patterns of forest fires, forest fire risk zone and burn severity in Shuklaphanta National Park, Nepal between 2012 and 2022 using GIS and remote sensing techniques. The study used Visible Infrared

Imaging Radiometer Suite VIIRS active fire data, Sentinel-2 and landsat-8 imagery, Aster GDEM for geo-spatial analysis. Multi-criteria weighted overlay was applied to derive a forest fire risk zone map using risk variables like land use land cover, land surface temperature, road and settlement data, slope, aspect, and elevation. Results showed 4,264 fire events, with 88.8% concentrated in park's core area and 11.2% in buffer zone. Fire frequency was highest during spring season (March–May), and 2021 recorded the greatest number of fire events. Burn severity analysis mapped using differenced Normalized Burn Ratio (dNBR) indicated spring fires were more intense than winter fires, affecting 53.43% and 22.81% of parks' area, respectively. Fire risk mapping revealed 32.5% of park area falls in high-risk, 58.6% in moderate-risk, and 8.9% in low-risk zone. In conclusion, study showed vulnerability of park's core area to fire, especially during spring season. Thus, these findings highlight importance of GIS and satellite imagery for fire monitoring and need for comprehensive fire management plan and pre-fire season preparedness to reduce fire risks and maintain ecological integrity in PAs.

Using Artificial Intelligence to Recover and Explore the Rhythms of Pioneer Farming in Oklahoma Territory

Brad A. Bays (Oklahoma State University)*

Historical geography, digital humanities, agricultural history, spatial humanities, settlement geography

This paper presents the approach and methods of a pilot study that applies artificial intelligence (AI) to the handwritten diaries of an Oklahoma Territory farmer to identify the daily rhythms of life and work in the initial years of a developing agricultural region. The study examines 14 months (1901-02) of a journal kept by homesteader James K. Hastings on his 160-acre farm in north central Oklahoma. His entries record weather, labor, crops, livestock, and household activities, and offers a rare glimpse into the work required to get a mixed crop-and-livestock operation going at the turn of the century. I use handwriting recognition software (Transkribus) and AI-assisted text analysis (ChatGPT 5) to create a digital version of the diary that can be searched, queried, and spatially interpreted. This approach is intended to allow identification of recurring cycles of work and adaptation, and reconstruct the farm's spatial organization as described in the text. The paper demonstrates how AI can build on our understanding of the lived experience of pioneer farming and suggests how digital tools can recover fine-grained evidence of agricultural changes otherwise missing from the historical record.

Toward a Hierarchy of Needs for Active School Travel: A Systematic Review of Correlates, Barriers, and Facilitators

Matilda Ohenewaa Bekoe (New Mexico State University)*

Active school travel, built environment, travel behavior, children's mobility, walkability

Active school travel (AST) is widely recognized for promoting physical activity, health, and social development among children. Despite its benefits, rates of AST remain low globally, influenced by a complex interplay of individual, social, environmental, and policy factors. This systematic literature review aims to synthesize existing research from 2015 to 2025, focusing on the correlates, barriers, facilitators, and frameworks influencing AST across various dimensions, including infrastructure, safety, social dynamics, policy environments, and psychological factors. This work will draw exclusively from peer-reviewed literature sourced from reputable databases, ensuring the rigor and relevance of the findings presented. By employing a PRISMA-style methodology, this review will categorize findings systematically and present a comprehensive overview that maps relevant studies to these identified categories. Furthermore, the study proposes a conceptual Hierarchy of active school travel needs, paralleling established frameworks such as Maslow's hierarchy of needs and Alfonzo's walking

hierarchy. This study will extend to future research directions and policy recommendations, ultimately aiming to enhance the understanding and facilitation of active school travel among children.

Artist-in-Residence Programs and the Contemporary State of Art in U.S. Public Lands

Hardt Bergmann (New Mexico State University)*

Geohumanities, art and the environment, artist-in-residence, public lands, parks and protected areas

Active at over 70 federally protected areas across the United States, artist-in-residence (AIR) programs have become a common outreach and education tool for U.S. public lands administrators and non-profit partners. Often billed as a continuation of historical art-environment traditions that initially helped spearhead the American conservation movement, these programs aim to aestheticize public lands sites while also engaging visitors and local communities through artist-led demonstrations, exhibitions, talks, and participatory programs. Despite the capacity of U.S. public lands AIR programs to both reflect and reinforce evolving attitudes toward nature, conservation, and the environment, little existing research has examined some of the key questions surrounding them. Why have they become so popular? Why does the tradition of making art in public lands persist so strongly, especially given the colonial underpinnings of early U.S. public lands artwork? What new forms has contemporary public lands artwork taken on? What kinds of new ideas do these forms—as well as the embodied practice of observing and representing nature—inspire? Drawing on an inventory of existing research and data, as well as the presenter's ongoing ethnographic work at several southwestern parks and protected areas, this paper takes stock of what we know so far about U.S. public lands AIR programs—where they come from, how they function, and who runs and participates in them. In doing so, it explores how studying AIR programs, and the practice and production of environmental artwork more generally, can produce useful insights about modern society's relationship with the environment.

Unintended Consequences of the U.S.' Short-Lived "Humane Border Enforcement" Policies

Sarah A. Blue (Texas State University)*

Immigration, borders, asylum, immigration policy

From January 2021 to December 2024, more than 8.6 million migrants arrived at the US-Mexico border. In contrast to Trump I's unilateral and draconian enforcement measures, the Biden administration promised a new humanitarian approach to unsolicited border arrivals that adopted principles from the UN Global Compact on Migration. In January 2025, Trump again closed the US' southern border to asylum seekers, pausing this wave of arrivals. It is in this pause that we reflect on the effectiveness and consequences of the poorly understood and widely criticized US attempt under the Biden administration's (2021-2024) re-working of the US' asylum system. This paper uses interviews conducted during the peak years of migrant arrivals at the US' southern border, in 2023-2024, to illustrate how implementation of Biden's 'humane border enforcement' policy resulted in the hemispheric-wide illegalization of transit, leading to unintended consequences such as increased migrant vulnerability and the enrichment of criminal actors.

Roadmap to Sustainability in Texas Wine

Claryce Bosson (Texas State University)* and Colleen Myles

Sustainability, Texas wine, fermented landscapes, regional application, community collaboration

The study of fermented landscapes allows for the exploration of ways that literal and figurative processes of fermentation drive cultural and environmental landscape change. One such exploration is an ongoing community-based, actionably oriented research project with Texas wine producers to explore sustainability issues in the industry focusing on effective regional application. For over a year

now, the Fermented Landscapes Lab has been working alongside Texas winegrowers and winemakers to conceptualize and, crucially, operationalize sustainability in their practices and process. With this small group of Texas wine producers, we have been working to identify shared goals for sustainability; and helping to conduct a baseline assessment of sustainability practices within those organizations; and identify specific barriers to this region of Texas. Moreover, we have been pursuing an opportunity for Texas wine growers and wine makers to earn a formal sustainability certification, as desired. The ad hoc group of participants in the project selected a well-regarded certification regime from California to use as a starting point for their efforts—and the work has evolved from there. Since a rigorous and effective sustainability paradigm must be based in place, part of our collective efforts have been targeted toward preparing a proposal of necessary adjustments to the certification program selected to ensure the eligibility of Texas participants.

Extreme Heat Governance in Rural and Remote Areas: Perspectives From Arizona and New Mexico

Anne-Lise Boyer (The University of Arizona)*, Minwoo Ahn, Alekzander Ryan, Ladd Keith, and Heidi E. Brown

Extreme heat; rural resilience; local governance; Arizona; New Mexico

Extreme heat is a growing public health and governance challenge, yet most research and policy initiatives have centered on urban environments. This paper examines how heat is governed in rural and remote areas of the U.S. Southwest, with a focus on Arizona and New Mexico. Rural and remote communities contend with unique vulnerabilities, including geographic isolation, sparse infrastructure, limited healthcare access, and socio-economic marginalization, while also possessing strengths such as social cohesion and place-based knowledge. Drawing on a mixed-methods approach that combines semi-structured interviews, a county-level survey, and policy document analysis, this study investigates how institutions and communities navigate heat resilience in the absence of formalized plans or dedicated offices. Findings highlight two main dynamics: (1) the persistence of urban bias in heat governance, which leaves rural areas underserved and ill-equipped to scale conventional strategies such as cooling centers or public awareness campaigns across low-capacity, geographically dispersed, and culturally specific jurisdictions; (2) emerging efforts at equity, including state-level initiatives in Arizona and New Mexico that seek to integrate rural and Tribal perspectives into heat resilience across sectors such as public health, emergency management, and planning.

Using Satellite Imagery to Evaluate Contemporary Agricultural Threats to the Archaeological Sites of the Wadi Faynan 4 Field System in Faynan, Jordan

Michael P. Boyles (Texas State University)*

GIS, archaeology, remote sensing, Jordan, site conservation

Below the Khirbet Faynan archaeological site in the braid-plain valley of the Wadi Faynan lies a vast and complex system of ancient agricultural fields documented by the Wadi Faynan Landscape Survey (WFLS) in the 1990s and catalogued as Wadi Faynan 4 (WF4). While in the distant past a more temperate climate allowed for subsistence farming in this 209-hectare field system, today the process of desertification has rendered the fields unproductive without extensive irrigation. In just the last few years, there has been a resurgence in agricultural activity in the Faynan unseen in the region in decades, as precious water resources are diverted away from supplying a burgeoning population towards the cultivation of watermelons as a cash crop. This research tracks the spread of modern agricultural activity in the Faynan over the last few years to estimate its impact on the numerous archaeological sites in and around the WF4 field system. Time-series analysis of data from Landsat and Sentinel satellites shows that wide-spread and permanent changes to the long-standing layout and structure of WF4 have been

made in recent years, most likely to accommodate larger-scale, mechanized farming. These changes, such as the dismantling of field walls to merge fields, come at the risk of damaging or destroying the hundreds of multi-period archaeological sites of WF4. This study is intended as a guide for predicting future trends in agricultural growth in the Faynan so that steps can be taken to ensure the safety of the region's archaeological record.

Mapping Urban Tree Mortality in Denton, Texas, With Multi-Temporal LiDAR Data and Multispectral Aerial Imagery

Veronica Briggs (The University of North Texas)* and Pinliang Dong

Remote sensing, urban forestry, tree mortality, LiDAR

Mapping urban tree mortality through remote sensing is an important process in supporting urban forest monitoring and management. Past research has centered on non-urban forests typically characterized by a more homogenous canopy in terms of species composition and structure. Few studies have examined the estimation of tree mortality with remote sensing in urban forests where canopy structure and composition are highly diverse and fragmented by urban structures, as well as subject to complex human pressures. Classification of tree mortality based on both changes in individual tree structural (crown height) and spectral properties (greenness) was tested in a multi-sensor approach using multi-temporal LiDAR data, aerial imagery, and field survey data in Denton, Texas, from 2011–2020. Canopy height models from each LiDAR year were segmented into individual tree crowns using marker-controlled watershed segmentation (Accuracy = 56–64%, F1 = 0.67–0.75). Mortality was then classified using changes in structural and spectral features by tree from 2011–2020 using Random Forest, Support Vector Machine, and XGBoost machine learning models. Initial results show that Random Forest performs the best in mortality classification (Accuracy = 94–99%). The combination of both spectral and structural features minorly improved classification performance over using structural features alone for both Random Forest and XGBoost, however leaf-on aerial imagery was also valuable in reducing errors resulting from incorrect LiDAR point cloud classifications which would otherwise propagate downstream in the process. Future work will include further improvement of tree segmentation accuracy and analysis of spatial mortality trends.

Connecting the Classroom to Community Engagement: The Story of Planning a Sustainable World

Christopher Brown (New Mexico State University)*

Environmental planning, community engagement, team-based learning

In my Planning a Sustainable World class, I successfully link class concepts and exercises to opportunities for community engagement that have benefitted community partners and students. In this paper, I share ingredients to this effort and successful outcomes. Early in class, I launch a Library Lunge exercise in which students do literature reviews on select topics that support environmental planning efforts. I then help students build teams where students with similar interests work on "Torn from the Headlines" applied exercises and a Team Project in a shared area of interest. To support these exercises, I invite subject matter experts to class, and our visitors share real-world experiences about planning challenges they work to solve. The knowledge our visitors share is highly informative to students working on their team projects, and the outcome is students do applied research on real world challenges. Students then build StoryMaps in which they share their literature review, research questions, data, methods, and results. In the last few years, several graduate students have engaged with community partners as they do their research. Two students leveraged their team projects into thesis proposals and research that both informed their community partners and allowed them to develop research skills that have supported them securing fully funded offers for PhD research at R01 institutions. The end result of this

approach is students connect with subject matter experts that inform their research, and the products of their research informs community partners with whom students have worked on their research.

Modeling the Current and Potential Future Spatial Distribution of Four Key Prosopis Species in the Southwestern United States and Mexico

Janet Azure Atanga (New Mexico State University)* and Dr. Michaela Buenemann

Species distribution modeling, BIOMOD2, ensemble modeling, woody plant encroachment, Prosopis, mesquite

Woody plant encroachment (WPE)—the replacement of grasses by woody plants in drylands—poses a significant threat to human and environmental well-being across desert, grassland, and savanna ecosystems globally. Effective conservation and restoration require knowing where species are encroaching, why, and how distributions may shift. However, mapping and modeling tend to target single species, operate at local to landscape scales, and rely on narrow predictor sets, thus generating case-specific rather than generalizable findings. We modeled the current and potential future distributions of four key Prosopis species across the contiguous United States and Mexico. Occurrence points were acquired from the Global Biodiversity Information Facility and subsequently cleaned and spatially thinned, resulting in 2,411 records for 2014–2024: 1,860 P. glandulosa, 132 P. velutina, 388 P. juliflora, and 62 P. pubescens. We sampled 10,000 background points spaced ≥10 km apart. Of the originally considered 111 environmental variables, 25 remained after collinearity screening—5 bioclimatic, 12 topographic, and 8 edaphic. We considered SSP1-2.6, SSP3-7.0, and SSP5-8.5 to make predictions for the 2050s and 2070s. Using BIOMOD2, we trained nine algorithms (GLM, GAM, GBM, RF, MaxEnt, MARS, ANN, FDA, CTA) and created performance-filtered ensembles. Climate ensembles performed strongly on their own (TSS=0.806, AUC=0.957), and adding topography and soils further improved skill (AUC=0.964, TSS=0.816). Species responses differed markedly. Under future climates, P.velutina and P.pubescens are projected to expand, P.glandulosa to contract, and P.juliflora remains uncertain. These shifts reflect warming that opens cooler habitats, rising aridity, and changing precipitation, indicating that WPE management must be species- and location-specific.

Turning Water to Wine: An Analysis of Texas Wine Industry Water Efficiency

Brock Burford (Texas State University)*, Colleen C. Myles, Justin Scheiner, Michael Cook

Wine, water efficiency, sustainability, drought, climate change, policy

The Texas wine industry is expanding in both scale and reputation. In 2017, there were 4,600 acres of grapevines in Texas, growing to 10,160 acres by 2022. Sustainability concerns are increasingly visible and valuable to grape growers and wine producers in Texas. Most vineyard acreage in Texas is in the High Plains and Hill Country American Viticulture Areas (AVAs), which rely on regional aquifers for water. With climate change predictions projecting more frequent droughts, water level decline in the Ogallala Aquifer, and legal restrictions on the Edwards Aquifer, understanding water usage in the wine industry is crucial to its ongoing success. This study examines Texas grape growers' water use and perceptions of water management, focusing on the adoption of water-efficient techniques such as drip irrigation, soil moisture monitoring, drought-tolerant grape cultivars, and cover crops. By gathering technology and management strategy data as well as data on the motivations, challenges, and perceived benefits of these techniques, this research employs survey and interview methodologies to provide needed insights into the state of water management in the Texas wine sector. Results demonstrate that drip irrigation was used by all respondents and water efficiency technologies and strategies, such as deficit irrigation, are underutilized by growers. Results also reveal a lack of concern among most growers about both current and future water resource availability. Recommendations include increased promotion and

awareness among growers of the benefits of water-efficient technologies and strategies. Further research should examine the role of education in the implementation of water efficiency strategies.

Using Suitability Models to Assess Potential Paleosol Locales Within the Stillwater Creek Watershed

Katelyn N. Cooke (Oklahoma State University)*

Geoarchaeology, geomorphology, radiocarbon dating, ArcGIS, modeling, erosion

Incised channels within the Stillwater Creek watershed can expose the Caddo paleosol, a pedogenic horizon dating to c. Cal 2500-1000 before present, which may have been the agricultural soil of the Woodland and Plains Village communities. To date, however, the fluvial geoarchaeology of north-central Oklahoma has been underexplored. This study aims to bridge this archaeological and geomorphological gap by developing a suitability model that can help identify locales within the Stillwater Creek watershed that contain the Caddo paleosol and possible archaeological sites. Using ArcGIS, a geospatial analysis compared geomorphological controls across multiple recorded paleosol locales, after which a model was devised to test a locale's potential for bearing the Caddo paleosol. Preliminary results suggest that floodplain width, channel sinuosity, and slope are strong predictors of exposures of the Caddo paleosol, and chi-square and Fisher's exact tests confirmed a significant association between landform type and paleosol presence. Applying this model to other locations in north-central Oklahoma may assist in the reconnaissance of the Caddo paleosol and associated archaeological sites. Beyond this region, these geomorphological suitability models can assist in more efficient and targeted site reconnaissance, especially in areas that face erosion risk.

Mapping Global Wind Direction Variability From 1985 to 2025 Using ERA5 Reanalysis

Shipu Debnath (Texas Tech University)*, Jeff Lee, and Xuantong Wang

Wind direction, ERA5 reanalysis, atmospheric circulation, climate variability, circular statistics

Wind direction is a key driver of atmospheric circulation, yet it has received far less attention in climate research than wind speed. Shifts in wind direction control the transport of heat, moisture, and pollutants, influencing agriculture, renewable energy, air quality, and environmental risk. This study investigates global wind direction at 10 meters over 40 years (1985–2024) using ERA5 reanalysis data. Monthly wind fields are grouped into meteorological seasons and ten-year intervals and analyzed with circular statistical methods that address the angular nature of directional data. Vector-based averaging and angular normalization are applied to assess clockwise and counterclockwise shifts, while geographic information systems are used to map spatial and temporal patterns. The goal of this ongoing work is to develop a replicable framework for analyzing climatological wind direction and to identify long-term variability across major circulation systems. By highlighting the value of wind direction analysis, this research aims to provide new perspectives for climate diagnostics, renewable energy planning, and environmental risk assessment.

For Peat's Sake? An Environmental Geography Analysis of Peatland Carbon Markets in Scotland

Katie M. Dusek (Texas State University)*, Caroline P. Cambron**, Anupa Bhatta, and Jason P. Julian

Peatland restoration, natural capital, climate change

Peatlands are vital ecosystems in Scotland, serving as globally significant carbon sinks and habitats for biodiversity. Yet, centuries of drainage, burning, and agriculture have degraded large areas, turning them into sources of carbon emissions. In response, Scotland established the Peatland Code, a voluntary carbon market standard that allows landowners to generate credits by restoring degraded peatlands. This study analyzes all 252 Peatland Code projects registered between 2011 and 2024, covering 35,280 hectares. A cross-reference analysis of this dataset along with the Who Owns Scotland landholding

database and United Kingdom's business registration database was used to assess investor geography. Results show that projects remain modest in scale, averaging less than 2% of estate areas. While most projects were tied to Scotland-based addresses, a significant share were linked to England and offshore jurisdictions. This pattern underscores the growing involvement of global financial networks in local land management. Our findings indicate that the Peatland Code is contributing to climate mitigation and biodiversity restoration, but the dominance of investment-oriented ownership and offshore interests raises questions about equity and long-term sustainability. As carbon markets expand, understanding these dynamics will be essential for designing policies that balance ecological benefits with fair governance.

The Role of New Urbanism in Shaping a Market-Driven Urban Development in Austin, Texas

Alborz Ebadi (Texas State University)*

New urbanism, smart growth, cultural political economy, Austin

New Urbanism (NU) is a movement that emerged to counter urban sprawl and promote diverse, accessible neighborhoods through public policies and design. Its core principles prioritize walkability, architectural coherence, and community diversity, aiming to create humanistic urban environments (Beauregard 2002; Hanlon 2010). However, a disconnect exists between NU principles and practice, as local government and private stakeholders often influence implementation, leading to market-driven policies instead of community-focused developments. This study explores the interplay between urban economy, policy, and New Urbanism, particularly regarding socioeconomic and environmental challenges, as well as the impact of NU principles on gentrification in communities.

From Source to Mouth: Creative Methods for Holistically Engaging With Overlooked Waterways

Erin Elder (University of New Mexico)*

Geohumanities, creative methods, urban waterways, collaborative project, community engagement

What kind of place is a creek? How does it shape the people and lands through which it flows and how do they shape it? How can creative research methods help to reveal the complex nature of small, intermittent, overlooked, overworked and otherwise marginalized waterways? How can the geohumanities represent these waterways as alive, whole, and essential? From Source to Mouth was a community-informed creative research project that engaged with Monument Creek, a 27.2 mile stream that flows along Colorado's Front Range. Cutting through the heart of Colorado Springs, this waterway is a source of local drinking water and a habitat for many plants and animals. Overlooked by most residents and visitors, the creek is also a highly engineered public resource, a site of much restoration and repair, a place of recreation, and home to a growing population of unhoused people. In this paper, I discuss my approach to understanding this creek and its complicated presence in my hometown, how I incorporated elements of geology, hydrology, ecology, land use, and history, as well as personal memory and sensory awareness to explore multiple, overlapping, and sometimes contradictory perspectives about Monument Creek. Resourced by a fellowship at Colorado College, the 2.5-year project resulted in 55 field drawings, a collection of oral histories, a 16-minute soundscape, a nontraditional map form, and an exhibition at the Colorado Springs Fine Arts Center activated by a series of community-led public programs. As an artist-turned-geographer, I'm curious how creative methods can help us connect with the lesser-known waterways and landscapes in our midst.

Navigating From Point P to Point C: The Recent Journey of Texas State Parks

Bryant Evans (Houston Community College)*

Visitation, COVID-19, Texas state parks

This paper explores how recent events have impacted visitation patterns within the Texas State Park system. The Coronavirus (COVID-19) pandemic impacted all corners of societies around the globe when it first emerged in 2020. One of the many effects the pandemic had - at least on a temporary basis - was on decision-making and sites that tourists choose to visit. Since its inception, the Texas State Parks system has historically been a collective of natural and cultural sites popular with visitors. Before the onset of COVID-19, the popularity and visitation to Texas' state parks was rapidly ascending, corresponding with population growth and greater awareness of these protected state treasures. While 2023 marked the official end to COVID's status as a Global Public Health Emergency by the World Health Organization, it simultaneously served as a milestone year for Texas State Parks for another reason as it marked the park system's 100-year anniversary. Through examining visitation data, this paper looks at what impacts the pandemic and centennial had on visitation numbers to Texas State Parks. It will also touch upon the future prospects of the Texas State Park system based on these and other recent events.

Modeling Climate Change Impacts on Cotton Yield in Texas

Ayomide Famewo (Texas State University)*

Climate change, cotton yield, climate variables, Mann-Kendall test, Sen slope test

While Texas remains the leading cotton-producing state in the US. Yet, current trends such as extreme heatwaves, drought, flood, and other climate change impacts increase the susceptibility of cotton yield, threatening its sustainability. Several studies have attempted to address climate change impacts on critical crops, but these studies have been conducted in an experimental setting. On one hand, experimental research can help to identify climate stress and resilient genotypes. Yet, they are limited in scope, often small-scale, and do not offer results that can be applied widely. Thus, it creates the need for a comprehensive assessment of climate change impacts on cotton yields. Thus, this study analyzed Texas climate trends during the cotton growing season (CGS) from 1984 to 2024. Two objectives were tested by the study. First, to assess the direction of the climate trend and the magnitude of the slope, which were tested using Mann-Kendall and Sen slope tests, respectively. Second, the study examined the impact of climate change on cotton yield in Texas using the autoregressive distributed lag (ARDL) model. Five climatic variables were considered: maximum temperature (Tmax), Minimum temperature (Tmin), precipitation (PR), windspeed (WS), and solar radiation (SR). Expectedly, all pre-analysis diagnostic tests and post-analysis tests were performed. Results show variation in cotton-climate relationships over the short term and long term. Thus, there is a need to reevaluate climate mitigation strategies adopted in Texas with a view to enhancing the resilience of Texas cotton production systems in changing climate conditions.

Urban Transformation and Thermal Patterns in a Desert Metropolis: A Two-Decade Analysis of Land Cover, Demographics, and Surface Temperature

Chao Fan (New Mexico State University)*, Md Jakirul Islam Jony Prothan, Yuanhui Zhu, and Di Shi

Land use/land cover change, socio-demographic change, land surface temperature, multiscale geographically weighted regression

This research examines two decades of land use and land cover (LULC) change and shifting socio-demographic conditions to understand their combined effects on land surface temperature (LST) across the Phoenix metropolitan region from 2001 to 2021. Drawing on summer Landsat LST, demographic indicators, and land cover datasets, we assess the pace and pattern of urban growth and population change. To capture spatial variability, we employ Multiscale Geographically Weighted Regression (MGWR), which accommodates distinct spatial scales for different explanatory variables, offering advantages over traditional regression approaches. Our analysis indicates that 2001–2011 was marked

by extensive suburban expansion, particularly the conversion of cropland and open space into high-intensity development, whereas 2011–2021 featured slower growth concentrated in infill and redevelopment areas. Correlation results suggest that agricultural and open space loss were linked to housing and population increases, while densification within existing urban zones often coincided with socio-demographic decline. MGWR findings further demonstrate that cropland conversion is strongly associated with localized warming, while shrub/scrub development contributes to cooling effects at larger scales. By integrating spatial sampling, interpolation, and MGWR, this work delivers a detailed perspective on urban thermal patterns in a rapidly urbanizing desert city. The results provide valuable guidance for urban planners and decision-makers aiming to foster climate-resilient and sustainable growth in arid environments.

Empowering Collaboration Through GIS: The Las Cruces Nuisance Abatement Team

Lucas M. Fellure (City of Las Cruces & New Mexico State University)*

Data design, ArcGIS Online, local government, enhanced user experience, collaborative workflow

This presentation describes the background and tools that have led to supporting the City of Las Cruces Nuisance Abatement Team (NAT) with their GIS needs. NAT's goals are to address properties that pose a risk to the community and to abate those risks. Many of these nuisance structures pose a danger due to structural issues, trash, drugs, etc. The goal is to either rehabilitate or demolish these structures for the overall wellbeing of the City. The team consists of staff from multiple departments across the City and requires a central, authoritative, real-time dataset for everyone involved to access and update. This presentation shows many of the GIS tools that are being utilized to support this project. Instant Apps are used to offer a guided viewing and editing experience for the project's data experts to utilize. Survey 123 allows other internal staff and the public to contribute to the data collection. Microsoft's Power Automate helps notify the review team when a survey is submitted. ESRI's Arcade coding language is used to provide important contextual information within the main data. Smart Forms are used to guide the editing experience and ensure that data stays consistent between editors. My GIS contributions, along with the Connect Las Cruces initiative, have organized and streamlined the team's efforts in accomplishing their goals by integrating multiple complex tools into a cohesive, user-friendly project platform allowing for universal access among team member's individual contributions to the entirety of the project.

Mapping and Managing Research Spaces: An ArcGIS Indoors Pilot at New Mexico State University

Ashok Gahatraj (New Mexico State University)*, Michaela Buenemann, and Cortney Castle Chavez

ArcGIS Indoors, space management, floor-aware maps, ArcGIS dashboards, ArcGIS Hub

Effective management of research space is essential for resource planning, safety, and to support productivity in higher education institutions. Despite the importance of space management, most universities still depend on old-fashioned systems such as static and manual paper-based databases. This effectively limits the analysis of how space is used, tracking impacts of funding, and making accurate plans for future expansion. To address this gap, we performed a pilot project using the ArcGIS platform to build a spatially aware database and visualization system for one of the university's research buildings. This project involved organizing the building's CAD data into an Indoor Information Model, producing floor-aware maps, and finally creating a routable network for indoor navigation. We developed an interactive ArcGIS dashboard to track space occupancy, funding per square foot, and student distribution under each professor. A complementary ArcGIS Hub prototype was built that integrated dashboards, the new floor-aware maps, and a Survey123 form for reporting facility problems, making the system practical for everyone from planners to occupants. The findings of this project

demonstrate the effectiveness of ArcGIS Indoors, as it allows users to visualize how space is used, identifying underutilized areas, and directly tie research funding to physical space. This work highlights the potential for scaling ArcGIS Indoors beyond a single building to support campus-wide space management, significantly enhancing decision-making and transparency. The findings ultimately highlight how using geospatial technology turns research facility planning into a dynamic, data-driven system that is easily applicable across various universities and research organizations.

Evaluating Impacts of Urbanization and Climate Change on Water Quality in Two Adjacent Watersheds in Denton County, Texas

Morgan George (University of North Texas)* and Feifei Pan

Urbanization, climate change, specific conductance, water temperature, dissolved oxygen

Urbanization usually leads to degradation of water quality in streams, especially when combined with changes in climate such as increased temperatures and precipitation intensity. However, distinguishing between the effects of climate change and urbanization on water quality remains difficult, since water quality responses may differ depending on regional characteristics. This research evaluates impacts of land use and land cover (LULC) change on water quality in Denton County, Texas by studying discharge, specific conductance, dissolved oxygen, and water temperature patterns in two adjacent watersheds, Doe Branch and Little Elm Creek, from 2012 to 2021. Statistical methods including trigonometric regression, trend analysis, and correlation analysis were used to analyze National Centers for Environmental Information (NCEI) hourly temperature and precipitation data, United States Geological Survey (USGS) annual LULC datasets, and USGS hourly stream monitoring data. Results indicated a close relationship between air temperature, water temperature, and dissolved oxygen at annual, seasonal, and daily timescales. Notably, water temperature in the urbanizing watershed (Doe Branch) had a stronger relationship to air temperature for annual mean, amplitude, and phase ($p<0.01$), indicating that contact with impervious surface alters response to air temperature variation. Furthermore, results showed a strong linear relationship between percentage of urban land in the Doe Branch watershed and specific conductance at the stream monitoring site ($p<0.01$, $r = 0.8395$). Values for all water quality parameters met acceptable standards. However, this study highlights the risk of further increases in specific conductance and water temperature with future urban growth, warranting continued monitoring in Denton County.

Geospatial Analysis of Radon Emission Potential Across Texas: Geological Features and Web-GIS Visualization

Sajad Ghafari (Texas Tech University)*, Omid Mansourihanis, and Chao Xu

*Radon, geospatial analysis, hotspot analysis, environmental health, Texas, GIS, Getis-Ord Gi**

Radon, a naturally occurring radioactive gas from uranium-bearing rocks and soils, is the leading environmental cause of lung cancer and the second overall after smoking. Despite known risks, Texas mapping has been limited and rarely integrates geology with human vulnerability. We conducted a statewide geospatial analysis of radon emission potential, combining geological, demographic, and socioeconomic data to pinpoint high-risk regions and populations. Using USGS, EPA, and Census Bureau datasets, soil and rock units were classified for radon emission potential and normalized on a 0–1 scale, then overlaid with demographics (under 18, ≥65) and social indicators. Spatial statistics Global Moran's I, Getis-Ord Gi* hotspot analysis, and local bivariate relationships with false-discovery-rate (FDR) correction showed strong spatial autocorrelation, with 24.04% high-exposure hotspots and 65.51% low-exposure cold spots across 6,883 census block groups. After FDR adjustment, no significant local associations were detected between radon levels and vulnerable-age populations ($r = 0.0109$), indicating

exposure patterns are largely geology-driven rather than demographically clustered. To improve accessibility, results are delivered via a Web-GIS (ArcGIS Dashboard and StoryMaps) that allows interactive exploration of emission potential, demographic overlays, and testing outcomes. These findings reveal gaps in awareness, testing, and mitigation statewide and support geology-informed, spatially targeted public-health strategies to reduce radon-related lung-cancer burden while keeping environmental-justice priorities in view.

Migrant Deaths at the U.S.–Mexico Border: Who, When, Where, and What We Do Not Know

Alberto Giordano (Texas State University)*, Molly Miranker, Rachel Daniell, Molly Kaplan, Veronica Flores-Guillen, Ivanna Robledo, Jasmine Hernandez, Heather Edgar, Kate Spradley, and Nicholas Herrmann

Migrant deaths, necrosilence, positional accuracy, mapping as accountability

Over the last forty years, thousands of people have died along the U.S.–Mexico border while fleeing poverty, armed conflict, violence, and disasters. This presentation shares the results of a three-year project aimed at creating a comprehensive census of this tragedy on the U.S. side of the border. We begin with a series of maps that visualize spatio-temporal trends in migrant deaths between 1982–2023 at multiple scales—across the entire border, by state, and locally. Our analysis focuses not only on where deaths occur, often represented as "dots on a map," but also on causes and manners of death, who finds the remains, which agencies—local, state, or federal—handle cases, and the spatio-temporal patterns of these factors. An important aspect of our work is attention to data accuracy. Because records vary in reliability, we adjusted the scale of analysis to reflect the accuracy levels of the original data. We identify key obstacles to an accurate census: differing state legal frameworks, overlapping jurisdictions, reluctance of agencies to release data, and other institutional barriers. Local actors, including individuals, play an outsized role in whether deaths are documented at all. This explains why Arizona data have long been—and remain—the most comprehensive, while records from Texas are fragmented, rendering a leopard-like scatter of data points. We conclude that establishing a more accurate count of migrant deaths is the essential first step toward understanding both the scale of this humanitarian crisis and the factors driving it.

A Geoarchaeological Investigation of Agriculture at the Mesilla-Phase Creekside Village Site in Southern New Mexico

Tristan Goedert (Texas State University)*

Geoarchaeology, agriculture, environment, water management, Mogollon

Many archaeological sites in the American Southwest date from the late Archaic period to the early Formative period though they remain relatively understudied. This has limited our understanding of both past human occupations in the region and its archaeological history. One of these emerging important sites is Creekside Village (Mesilla phase, approximately 600-900 CE) in the Tularosa Basin, New Mexico. This site encompasses human-constructed canals, reservoirs, and agricultural terraces associated with the Indigenous Jornada Mogollon occupation of the area. Our ongoing geoarchaeological investigation of the canals at the site represent some of the first analyses in the area that aid archaeologists to better understand the development of agriculture across the Southwest. This poster showcases recent results from geoarchaeological investigations at Creekside Village. Here we present excavation and preliminary analysis of canals and reservoirs at the site, showcasing potential future research such as magnetic susceptibility, elemental analysis, and other palaeoecological reconstructions. These results will refine our understanding of the Creekside Village site and the extent

of agriculture and water management used by the Jornada Mogollon over the course of their occupation of Creekside Village.

Invasive Species and Engineered Landscapes: Rethinking Oryx in the Tularosa Basin

Augustus Guikema (University of New Mexico)*

Political ecology, New Mexico, invasive species, wildlife conservation

This paper examines the introduction of the South African oryx (Oryx gazella) to White Sands Missile Range in southern New Mexico in 1969 for exotic big game hunting. Since their release, oryx populations have drawn scrutiny from conservation organizations and the National Park Service as an invasive species, with growth driven by aseasonal breeding, competitive grazing, disease transmission to native ungulates, and the historic culling of predators. While previous research has documented the ecological consequences and absurdities of this process, less attention has been paid to the social dimensions of oryx today. The oryx are likely here to stay, and this reality must inform how we understand their ecological and cultural entanglement with New Mexico's landscapes. This paper situates oryx introduction within broader environmental, economic, and social processes of land dispossession and the colonial imagination of "empty" deserts by the state. It also examines a key moment in the late 1990s, when the National Park Service's failure to contain the oryx called preservationist environmental politics into question. Today, more oryx are hunted on public and private lands beyond the missile range than within it, with most hunters from New Mexico. Considerable political effort sustains the animal's cultural and economic significance for southern New Mexicans. The oryx's status remains complex, embedded in livelihoods that depend on its subsistence, aesthetic, and symbolic value. Ultimately, this study argues for a more nuanced, collaborative approach to managing invasive species that acknowledges the intertwined histories of humans and oryx in the Tularosa Basin.

Unplanned Urban Expansion and Its Impacts on Drainage Connectivity and Waterlogging in the Bil Baghil Basin, Dhaka District, 1953–2019

Md Ashraful Habib (Texas Tech University)*, Faria Kabir, Md Shahedur Rashid, and Yunuen Reygadas

Unplanned urban expansion, waterlogging, satellite imageries, digital elevation model (DEM), natural lowlands (Baid)

Rapid and unplanned urbanization in peri-urban Bangladesh has disrupted natural drainage and intensified seasonal waterlogging. The objective of this study is to quantify unplanned urban expansion in the Bil Baghil Basin, Dhaka, Bangladesh, and assess its impacts on local drainage networks and monsoon season waterlogging. We combined multi-temporal imagery and Digital Elevation Model (DEM) based analyses to map land-cover change using manual digitizing techniques, delineate drainage networks using ArcGIS hydrological tools, and model inundation scenarios through a DEM-based surface volume analysis driven by seasonal precipitation. The results show that built-up areas increased sharply while agricultural and wetland areas declined and identified 125 critical locations where settlements and roads obstruct natural lowlands (Baid), severely reducing drainage connectivity and creating a waterlogging situation. Under the peak monsoon rainfall scenario, modeled water volumes exceeded 2.68 million cubic meters, leading to widespread inundation of all land below 4.1 meters in elevation. We recommend including planning measures such as the provision of culverts and bridges, protection of khals, and designation of strategic retention areas, alongside methodological enhancements including calibration with observed flood extents, incorporation of hydraulic routing, and systematic uncertainty analysis.

Evaluating Land Use Change and Flood-Risk Hotspots in Floodplains of Southeastern Florida (2011–2021)

Chandra Hada (Texas A&M University at Galveston)* and Samuel D. Brody

Land use change; flood risk; geospatial analysis; urbanization; resilience

This study investigates how land use changes have affected flood risk across 109 cities in Miami-Dade, Broward, Palm Beach, and Martin counties in southeastern Florida from 2011 to 2021. These counties face increased flood vulnerability due to their low-lying terrain, proximity to the Atlantic Ocean, and extensive river systems. Using geospatial techniques, the research combines United States Geological Survey (USGS) land cover datasets with Federal Emergency Management Agency (FEMA) flood zone maps, focusing on the 100-year and 500-year floodplains. The analysis examines development patterns in flood-prone areas. It employs hotspot analysis to identify clusters of significant land use change, pinpointing areas of intensified urbanization (hotspots) and minimal activity (cold spots). Results reveal notable trends: high-intensity development increased by 16.57% in the 100-year floodplain and 9.25% in the 500-year floodplain, while medium-intensity development grew by 13.46% and 7.33%, respectively. Conversely, low-intensity development slightly declined, indicating a shift toward denser, more urban land use in flood-susceptible regions. These findings underscore critical concerns about the resilience of ongoing urban expansion in high-risk zones. The growth of high- and medium-density development in flood-prone areas highlights the urgent need for stronger policies, including stricter zoning, resilient infrastructure planning, and adaptive land use strategies. The study emphasizes the importance of continuous spatial monitoring and long-term assessments to guide decision-making and reduce future flood risks in rapidly urbanizing coastal regions.

Analyzing Change in Dune Morphology in the South Texas Sand Sheets (STSS) 1974–2025

Brent C. Hedquist (Texas A&M University-Kingsville)* and Colton Klatt

Coastal dunes, geomorphology, remote sensing, machine learning

The South Texas Sand Sheets (STSS) are located near the Gulf of Mexico and mainly in Kenedy County. In Kenedy County, Texas, sand dune dynamics are a concern due to their potential impacts on land use, habitats, and ecosystem services. In this study, a portion of the STSS is analyzed using historic Landsat and aerial imagery from 1974-2025 to assess change in dune movement and morphology over fifty years. With dune movement detected at ~30 m per year using ArcGIS Pro change detection machine learning tools, it was determined to analyze movement in five- year increments, and utilizing higher resolution imagery when available. This included Landsat RGB at 30 m from 1984-1999, Panchromatic at 15 m from 1999-2016, and Sentinel-2 at 10 m from 2016-2024. Two dunes were analyzed for change over the forty-year period and then normalized to detect greatest change. In addition, UAV surveys were conducted on the two selected dunes located in the Marana Camp area of Kenedy Ranch, to observe seasonal differences in dune morphology in high resolution from 2024-2025. Results from the study indicate that dune movement is fairly consistent during times of wet periods versus drought, with greatest movement during heavy wind events, such as tropical storms and hurricanes. Hurricane Brett, making landfall over the STSS in August 1999, was a key factor in abrupt change in the dunes. Findings from this study will aid local ranchers in determining how herd migrations and prescribed burns are impacted by dune morphology.

Spatiotemporal Variation in Water Storage Changes Across Lakes and Reservoirs in the Colorado River Basin Using GEDI and SRTM and Their Links to Climate Change

Babak Heidari (Texas State University)*, Soe W. Myint, and Yuanhui Zhu

Colorado River Basin, water storage change, lakes and reservoirs, GEDI, SRTM

Lakes and reservoirs serve as sentinels of climate change by functioning as early warning systems for detecting both environmental changes and human activities. The Colorado River Basin (CRB), a semi-arid watershed in the southwestern United States that supplies water to over 40 million people and irrigates 5.5 million acres of farmland, is among the most climate-vulnerable regions. During 2020-2021, the CRB experienced pronounced impacts from a broader megadrought affecting the southwestern United States, which has been identified as the most severe in at least 1,200 years. In this study, we assessed water storage changes in 20 lakes and reservoirs (>10 km^2) across the CRB from 2000 to 2021 by integrating data from the Global Ecosystem Dynamics Investigation (GEDI), the Shuttle Radar Topography Mission Digital Elevation Model (SRTM-DEM), and the Global Surface Water (GSW) dataset. Results revealed a significant reduction in surface water area (~551 km^2) and a net water volume loss of 23.598 km^3, with major reservoirs like Lake Mead and Lake Powell experiencing the largest reductions. Validation against in-situ observations showed strong agreement (average accuracy ~75.9%), confirming the reliability of GEDI-based estimates for monitoring lake and reservoir dynamics in data-scarce areas. Attribution analysis using climatic and environmental factors indicates that rising land surface temperature, increased evapotranspiration, and limited precipitation are the primary drivers of the observed water loss. These findings highlight the urgent need for adaptive water management strategies and infrastructure planning to strengthen resilience in the face of ongoing climate change.

Regional Feasibility of Sustainable Aviation Fuel in the United States: A PADD-Scale Analysis Using Latin Hypercube Sampling

Jaryd Hinch (University of South Florida)*

Aviation decarbonization, Jupyter Notebook workflow, Python-based stochastic modeling, uncertainty and sensitivity analysis, sustainable transitions

The aviation industry currently contributes about 3–4% of global anthropogenic carbon emissions and rising. In response, international governing organizations have set net-zero targets by 2050. Among decarbonization strategies, sustainable aviation fuels (SAFs) are the most feasible near-term option, though deployment is limited by infrastructure gaps and geographic disparities. This study evaluates SAF production feasibility across the seven Petroleum Administration for Defense Districts (PADD) in the US using Latin Hypercube Sampling. Three groups (economic, logistical, and environmental) with three variables each were weighted across 50,000 different weight-scenarios to assess regional feasibility rankings and tested through sensitivity analysis. Results showed no single PADD region consistently dominates; instead, feasibility shifted depending on variable emphasis. Economic and logistical factors tended to determine higher rankings, while environmental factors tended to differentiate middle rankings. Most regions were stable across sensitivity tests; however, the Rocky Mountain region was notably volatile under energy price changes, indicating that some variables and regions carry potential long-term investment risks. These findings suggest feasibility is better framed as a threshold determination than a ranking contest (e.g., identifying where SAF can viably scale under specified conditions). The framework also identifies SAF barriers (e.g., low jet fuel demand) to help capitalize on regional strengths while considering weaknesses. Additionally, under-performing regions may warrant investment to serve as transportation bridges or distribution hubs rather than direct producers. This work lays the groundwork for future studies that qualitatively assess political viability, conduct feedstock-specific life cycle assessment in viable regions, or extend granularity to state-level site planning.

Finding the Sweet Spot: Spatial Resolution and Feature Set Effects on Mapping Mesquite-Encroached Rangelands

Atikul Hoque (New Mexico State University)* and Michaela Buenemann

Remote sensing, unoccupied aerial systems (UAS), accuracy, drylands

Shrub encroachment is transforming semi-arid grasslands worldwide, with profound implications for ecosystems and people. Remote sensing-based shrubland mapping is essential for timely, spatially explicit monitoring, yet clear guidance on optimal spatial resolution and feature set choice remains limitedproducing the most accurate maps. We addressed this gap using 3-cm UAS imagery from a DJI Matrice 210 with a MicaSense Altum [blue, green, red, red-edge (RE), near-infrared (NIR] across three ecologically distinct sites (sandy loam, sandy drainage, shallow sandy) at the Jornada Experimental Range, New Mexico, USA. We evaluated five spatial resolutions (3 cm, 15 cm, 30 cm, 1 m, 3 m) and four feature sets (RGB, RGB+NIR, RGB+NIR+RE, RGB+NIR+RE+NDVI). Classes were photosynthetic vegetation (primarily mesquite), non-photosynthetic vegetation, and bare soil, classified with Random Forest. Across sites, 1 m imagery delivered the highest overall accuracies (0.90-0.98), while 3 m was lowest (0.78-0.87). Fifteen-cm and 30 cm performed similarly (0.89–0.95 and 0.88–0.94, respectively), and 3 cm yielded intermediate results (0.87-0.94). Feature-set tests revealed consistent gains in training accuracy with increasing feature complexity (RGB: 0.87; RGB+NIR and beyond: 0.91). Validation accuracy varied by site: the sandy-drainage site benefited markedly from full band combinations (0.74-0.90 vs. RGB: 0.62-0.86), whereas the shallow-sandy and sandy-loam sites showed comparable performance between RGB and richer feature inputs. These results indicate a practical "sweet spot" for landscape-scale shrubland mapping in semi-arid systems: 1 m spatial resolution with RGB+NIR bands, while recognizing that optimal feature sets can be site-dependent.

Canalization Project and the Rio Grande

Mark Howe (New Mexico State University)*

Rio Grande River, canalization project, sediment, water resources, floods

Canalization Project was constructed from 1938 to 1943 on the Rio Grande River by the International Boundary Commission, forerunner of the current United States Section, International Boundary and Water Commission (IBWC). This presentation will discuss the upcoming field trip on November 1st and locations of site visits. Discussion will center on the Canalization Project and how it changed a meandering, seasonally flooding river to one confined by levees as it flows south from Percha Dam to El Paso ending at American Dam, just north of the U.S. – Mexico border. Designed as a flood control project of the 1930s New Deal programs, over time many of the original structures, bridges and side canals have been replaced with new structures several times since. Laterals and irrigation water are controlled by Elephant Butte Irrigation District (EBID) who maintain much of the infrastructure outside of Canalization Project. Sediment control dams are on both sides of the Rio Grande north of Las Cruces and maintained by the IBWC that catches sediment from entering the river. Other points of interest are the Hatch Siphon, and IBWC Restoration Sites that bring native vegetation back to the river. As part of the many moving parts of water deliveries, EBID maintains Leasburg Dam and Mesilla Dam which have dynamic histories along the river. Final discussion is on the original U.S. – Mexico border monument west of Las Cruces before the Gadsden Purchase of 1853 which extended the border south to its location today and other stops of interest.

Long-Term Monitoring of Chlorophyll-a and Net Primary Productivity in the Optically Complex Waters of Mississippi Sound Using Aqua-MODIS Imagery and Machine Learning Algorithms

Mohammad Shakiul Islam (City of Las Cruces, NM)* and Padmanava Dash

Chlorophyll-a, net primary productivity, vertically generalized production model, Aqua MODIS, machine learning algorithms

Accurate estimation of Chlorophyll-a (Chl-a) and Net Primary Productivity (NPP) is essential for monitoring coastal ecosystem health and understanding biogeochemical dynamics. This study presents a data-driven framework for retrieving Chl-a concentrations from MODIS Aqua imagery and modeling NPP using the Vertically Generalized Production Model (VGPM) in the optically complex waters of the Mississippi Sound. In-situ Chl-a measurements collected via an autonomous surface vessel (ASV) were matched with MODIS-derived remote sensing reflectance (Rrs), and 95 spectral variables were initially generated through band ratios, vegetation indices, and three-band combinations. After dimensionality reduction using Sequential Backward Floating Selection (SBFS) and Exhaustive Feature Selection (EFS), nine machine learning algorithms were evaluated. The Decision Tree (DT) model emerged as the best-performing algorithm, achieving an R^2 of 0.8538 and the lowest error metrics. The final model was applied to MODIS data from 2005 to 2024 to generate high-resolution Chl-a maps, which were subsequently used to estimate NPP. Spatiotemporal analysis revealed strong seasonal patterns, with peak Chl-a and NPP values in spring and late fall and significant interannual variability linked to hydrological and climatic drivers. While no strong monotonic trend was detected, a gradual increase in Chl-a suggests potential eutrophication over time. This study represents one of the first long-term assessments of Chl-a and NPP in the Mississippi Sound using machine learning and satellite data, offering a transferable and scalable approach for remote sensing-based water quality monitoring in estuarine environments. The findings contribute valuable baseline data for ecosystem management, and the methodology can be adapted for other dynamic coastal systems facing similar environmental challenges.

Where Have All the Singularities Gone? From Alexander von Humboldt's "Alles ist Wechselwirkung." to a Nonrepresentationally Realist Geography of Singularities

Charlie Jackson (New Mexico State University)*

Alexander von Humboldt, climate change, object-oriented image analysis, artificial, cognition

Geography is an explicitly metaphysical discipline and has been since at least 1 August 1803 or soon thereafter when Alexander von Humboldt wrote down that now-famous theory of totality in his travel journal while in and around Mexico City: „Alles ist Wechselwirkung." or "Everything is correlation/reciprocity." Not only is its context climatic, this metaphysical holism, unlike Spinoza's, is born out of Kant's transcendental idealism. It is then shown that A. v. Humboldt subtly rejected the Kantian thing-in-itself no later than with publication of VIEWS OF NATURE in 1808. My translation of Friedrich Schiller's four-line chorus extracted from THE BRIDE OF MESSINA (1803) for use as the 'world-relating chorus' to close its preface makes this clear. This position is what Quentin Meillassoux has called 'strong correlationism', possibly making A. v. Humboldt its first arbiter. I claim that the so-called quantitative revolution is better characterized as a turn to the continuous, beginning with Benoit Mandelbrot's 1967 paper on statistical self-similarity and Tobler's First Law of Geography in 1970. After the pixel intervenes in 1972, persistent singularities are basically ruled out of existence. I then defend the existence of 1) geographically scalar climatic entities (a peculiar kind of 'notoriously vague thing') and 2) their associated objects above the pixel level which are extracted and therefore also have an aura of artificiality. I use the following philosophical systems, each with its unique treatment of the thing-in-itself, to be successful: New Realism, object-oriented philosophy and Tristan Garcia's FORM AND OBJECT: A TREATISE ON THINGS (2014).

Traces on the Landscape of a Lost Migration

Don Jonsson (Austin Community College)*

Migration, immigrants, landscape, Sweden, Texas

Led by Sven Svensson (Swante Swenson), 4,000 to 7,000 Swedes migrated to Texas from 1840 to 1915. Most of these Swedish immigrants were farmers. This "Swedish Pipeline" of migration from Sweden to Texas was the result of the push factor in Sweden of industrialization and the pull factor in Texas of fertile farmland on the Blackland Prairie. Swedish farmers established the communities of Elroy, New Sweden and Carlson near Austin, Texas. These intrepid immigrants cultivated the land, growing mostly cotton for economic survival in the blistering, hot Texas sun. It was a very difficult life. These Swedish immigrants built homesteads, barns, churches and roads. They lived and died in a new land, so Swedish cemeteries also dot the landscape. The second and third generations of these Swedish immigrants did not persist in an agrarian lifestyle. The toils of farming in Texas was not an attractive occupation. The children of the original "Swedish Pipeline" chose to move to the cities, gain an education and quietly move on to new occupations and lifestyles. Moving on in time into the 20th Century, urbanization increases. Farms and homesteads are replaced by subdivisions, new roads, airports and race tracks. Urban expansion begins to change the landscape and erase the heritage and legacy of the Swedish immigrants. Time changes the landscape. The lingering traces on the landscape of the migration from Sweden to Texas are the communities, homesteads, barns, churches, roads and cemeteries.

Damage Costs in Gila National Forest: What We Lose With Repeal of the Roadless Rule

Jason P. Julian (Texas State University)* and Aspen Maning

Conservation, ecosystem services, nature contributions to people, New Mexico

Protected lands provide a wide range of ecosystem services and monetary benefits across all scales, from local to global. But only if they stay protected from destruction and development. On 27 August 2025, our federal administration started the process of rescinding the 2001 Roadless Area Conservation Rule, which for a quarter century has restricted development in 58.5 million acres of some of our country's most valuable lands. If this rule is rescinded, the damage costs will be extraordinary. In this paper, we use the Gila National Forest (New Mexico, USA) as a case study to show the value of ecosystem services provided by protected lands and the damage costs associated with removing protections from destruction and development. Total values for ecosystem services in Gila NF ranged from $2.2 – 2.5 billion annually. Damage costs from development of just 1.4% of Gila NF's total area were $82 – 273 million. By using the best available scientific and economic data, this study illustrates the importance and value of ensuring that federal lands remain protected.

The Spatial Representatives of Low-Resolution Sea Ice Concentration Products of Conditions at Coastal Sites Along the Central Western Antarctic Peninsula

Andrew G. Klein (Texas A&M University)* and Carly K. Casper

Cryosphere, Antarctica, sea ice

Macroalgal forests exist along the northern portion of the western Antarctic Peninsula (WAP). A strong negative correlation has been documented between total macroalgal cover sampled in situ and several sea ice concentration datasets (e.g., National Ice Center Charts, AMSR-E and AMSR-2 and the National Snow and Ice Data Center Sea Ice Index). These remote-sensing derived sea ice concentrations document sea ice concentrations at spatial scales larger than the scale of the sampling sites (~100 meters across). To investigate how representative these sea concentrations are of conditions at the studied shallow water coastal sites, sea ice concentrations from Landsat (30 m) and MODIS (1000 m) were computed for buffers ranging from 100 m to 10,000 m around each site. The MODIS comparisons utilized the existing MODIS sea-ice product. The Landsat comparisons were accomplished using an adaptation of the MODIS sea-ice algorithm whose performance was manually validated from comparisons with manual observations at 100 site/image pairs and utilized the Antarctic Landsat archive

housed in Esri's Living Atlas. These concentrations were then compared to concentrations from the larger footprint products. The larger footprint sensors generally underestimated sea ice concentrations than Landsat or MODIS. However, the observed differences at individual sites were consistent across buffer sizes. However, as the buffer size increases, the differences between sea ice concentrations determined from the lower and higher resolution sensors tends to decrease.

A Preliminary GIS-Based Investigation of Adaptive Water Management Practices in the Arid Southwest United States: Past Environments and Future Challenges

Mason P. Miller (Texas State University)* and Samantha M. Krause

Water resources, sustainability, GIS, adaptive infrastructure, resource management

In New Mexico, community-based water sharing systems are often referred to as water democracies (Rivera and Glick 2021). Acequias are an example of water infrastructure whose physical form and durability is determined by cyclical adaptation of anthropogenic modification and environmental shifts. The placement, length, and hydrological efficacy of these channels represent deliberate, iterative adaptations to the constraints and opportunities of arid and semi-arid landscapes. These enduing forms of hydrosocial governance and landscape adaptation are rooted in both the Indigenous engineering practices of the Ancestral Pueblo, Hohokam, and Zuni cultural groups as well as Iberian legal practices (Rivera and Glick 2003; Rivera and Glick 2021). In the face of climate change-driven extreme wildfire and flooding events from the past several decades, the preservation and maintenance of these living water management systems is a paramount consideration for the communities that rely on them to survive. Across research fields including history, hydrology, anthropology, archaeology, and geography, scholars have documented how acequias shape ecological relationships, community structure and resilience, and resource management in arid environments. Building on this, a GIS-based approach to acequia modeling provides new insights into acequias as adaptive technologies. With present and future acequia management in consideration, this research assesses the paleoclimate conditions in which acequia channels were created, how terrain-derived features affect the spatial distribution of acequia channels, the ecological function of those channels, and how these factors influence the continued use or closure of individual channel segments over time.

The Land-Water Nexus in South-Central Texas: An Analysis of Historical and Future Land Use and Water Use

Elizabeth M. Kubacki (Texas State University)*

Water resources, land use, land cover

The land-water nexus describes the relationship between land use and water use. As the population grows in Texas, there is more development which leads to one of the biggest challenges facing Texas—ensuring sufficient water supplies for the future. The goal of this research project was to empirically evaluate how land use relates to water demand. My study area is Comal County in Central Texas. In 1990, Comal County had a population of 51,800, which increased to 152,000 by 2020. Texas Water Development Board (TWDB) projections estimate a 2070 population over 357,400. I analyzed National Land Cover Database (NLCD) data to track changes in land use. As land cover changes and population increases, water demand also increases. In 1990, the total water demand for all sectors in Comal County was 15,400 acre-ft/year. By 2020, demand increased to over 42,000 acre-ft/year with projections of 84,700 acre-ft/year by 2070, an increase of 450% from 1990. To evaluate how land use change affects water demand over time, I classified the NLCD land use values into six categories to match the TWDB's water demand categories. Comparing the land use in acres to the total water demand for each category, I derived water demand coefficients. Between 1990 and 2020, the population in Comal County

increased, but the water demand coefficient decreased despite water demand increasing. Land use and water demand for mining increased, and the coefficient quadrupled between 1990 and 2020. Land use conversion as the population increases changes the water demand.

People of the Land: Gila Apache Corridors Beyond Captivity

Ruben Quincy Leyva (New Mexico State University)*

Indigenous geography, Gila Apache, Ndeh Bikah, sovereignty, foodways

This paper reinterprets Apache geography through what I call the Gila Apache paradigm—a framework of "corridors of survival" rather than "boxes of captivity." Conventional histories of the Chiricahua Apache emphasize what I term the Prisoner-of-War (POW) paradigm—Fort Sill, Mescalero, and San Carlos—as if reservation confinement defined identity. In contrast, Gila Apache kinship logics emphasize movement through mountain corridors that linked Mangas/Tularosa, the Huachuchas, the Black Range at Ojo Caliente, and the Sierra Madre. These corridors sustained life through foodways—piñon, acorns, corn, and deer meat—and kinship strategies of hiding in plain sight across borders and censuses. I situate this geography through the frame of Ndeh Bikah—"People of the Land"—an Indigenous land ethic that understands geography not as possession (bikéyah), but as relational responsibility enacted through food, kinship, and mobility. This epistemology runs counter to U.S. perspectives that define land through ownership, boundary, and reservation. Where institutions such as the Branigan Cultural Center describe this region as the "Land of the People," this research offers a theoretical inversion: sovereignty emerges not from land as an object held, but from being a people sustained by and responsible to the land itself. Through archival analysis, oral histories, and family narratives, this study repositions figures such as José Albino "Guero" Leyva, Apache Frank Leyva, Ramón "Nana" Elías, and José María Elías within these geographies of movement. This counternarrative reframes Apache geography as relational and mobile rather than fixed—grounding sovereignty in responsibility, kinship, and survival.

Urban Flood Risk Disparities Across Historic Redlining Neighborhoods: A Comparative Study of Chicago and Los Angeles

Yujian Lu (University of New Mexico)* and Xi Gong

Flood risk disparity, HOLC, redlining, green infrastructure, impervious surface coverage

Historical redlining practices continue to shape present-day urban environments in U.S. cities, disproportionately affecting neighborhoods with former lower Home Owners' Loan Corporation (HOLC) grades (C and D, yellow and red, respectively). However, the relationship between these historical housing policies and contemporary flood risk disparities across diverse urban contexts remains underexplored. This study investigates urban flood risk disparities in former HOLC-graded neighborhoods in Chicago and Los Angeles, using the Urban Flood Susceptibility Index for Chicago and composite flood depth for 100 years in Los Angeles. To address spatial dependence, eigenvector filtering was applied prior to conducting Kruskal–Wallis tests to assess differences in flood risk among HOLC grades. Results reveal that lower HOLC-graded neighborhoods (C and D) exhibit higher flood risk than higher-graded areas (A and B) in both cities, a pattern partly explained by their greater green infrastructure distribution and lower impervious surface coverage, which directly influence stormwater infiltration and runoff generation. Nonetheless, flood risk disparities are more pronounced in Chicago than in Los Angeles, with Chicago showing less green infrastructure distribution and higher impervious surface coverage across all HOLC grades. These findings demonstrate that redlining practices continue to shape flood risk disparity through distinct pathways in different urban contexts. Urban planners and policymakers should prioritize historically disinvested neighborhoods through equitable flood mitigation strategies by expanding green infrastructure and green space investments to enhance flood resilience

and address these persistent historical injustices.

Rainwater Harvesting Geopoetics

Eric Magrane (New Mexico State University)*

Rainwater harvesting, geopoetics, geohumanities, sustainability, landscape design

Might a rainwater harvesting design, implemented in a landscape, be considered a kind of lyric essay or experimental poem? My contribution will consider urban rainwater harvesting as a geopoetic landscape practice. I am currently designing a water harvesting plan for a small urban site (my family's home) in Las Cruces, New Mexico, which receives about 8" (20 cm) of rain per year. The goals are to a) provide over 80% of the landscape irrigation by rainwater or greywater harvested on site and b) design earthworks with the ability to hold and infiltrate at least a 2" (5 cm) rain event within the site. This will include, among other design features, digging a series of water harvesting basins throughout the roughly 3,000 ft2 area, two water tanks to store rainwater harvested off the roof, and a laundry-to-landscape greywater system that waters fruit trees when we do laundry. My presentation will weave together lyric + theoretical writing on water, design considerations, and poems. Might it be useful epistemologically to consider rainwater harvesting earthworks as a re-writing of the literal sites and inscriptions of a geopoetics and geohumanities practice?

Wildfire Severity in Los Angeles: Hydroclimatic–Vegetation Linkages From ECOSTRESS and Landsat

Md Munir Mahmud (Texas State University)*, Soe Win Myint, Yuanhui Zhu, Su Yeon Han, Eunsang Cho

Wildfire, ECOSTRESS, Sen's slope, susceptibility, Landsat

The 2025 wildfire in Los Angeles (LA) County ranks among the most devastating in U.S. history, underscoring the need to better understand hydroclimatic and vegetation drivers of fire severity. This study evaluates wildfire severity in relation to evapotranspiration (ET), evaporative stress index (ESI), land surface temperature (LST), moisture signal index (MSI), and enhanced vegetation index (EVI). Short-term indicators were derived from ECOSTRESS (2024), while long-term ecological trends (2000–2023) were assessed using Sen's Slope analysis of Landsat records. Burn severity was mapped using Sentinel-2 differenced Normalized Burn Ratio (dNBR) in Google Earth Engine and classified into USGS severity levels.Spatial clustering (Getis-Ord Gi* and Average Nearest Neighbor) revealed statistically significant hotspots aligned with high-severity fire zones. Zonal statistics confirmed monotonic associations between dNBR and hotspot intensity. Correlation analysis indicated that ECOSTRESS-derived LST and ET were more strongly associated with burn severity than long-term trends, although Sen's Slope metrics highlighted chronic ecological stress. Machine learning models identified LST and moisture-related variables (ET, ESI) as dominant predictors. Random Forest (R^2 = 0.478, RMSE = 0.108) provided the most stable performance, followed by Artificial Neural Networks and Support Vector Regression. The Random Forest susceptibility map closely aligned with observed burn scars, highlighting high-risk zones across the Santa Monica Mountains, Santa Clarita, and northeastern Angeles National Forest. This study marks the first application of Sen's slope–based ET and ESI in wildfire assessment, presenting a dynamic framework that integrates multi-sensor data and temporal trends to support wildfire preparedness and climate adaptation in Southern California.

Hidden Costs of Distance: Contraceptive Access and Maternal Health in Texas

Mahboobe Safaei Mehr (University of Texas at Austin)*

Maternal mortality, contraceptive access, health disparities, econometrics, Texas

Maternal mortality has emerged as a critical public health challenge in the United States, while most high-income countries have recorded consistent improvements in maternal outcomes. While other nations have seen consistent declines in maternal deaths, the United States has experienced the opposite trend, with mortality linked to pregnancy and childbirth rising over the past two decades. Texas reflects this crisis in a particularly severe way, reporting both high overall rates and significant racial disparities. Black and Latina women in Texas are disproportionately affected, underscoring the deep structural inequities that shape reproductive health access and outcomes. These inequities are not only the result of individual socioeconomic status but also reflect systemic issues such as healthcare availability, insurance coverage, and geographic barriers to essential services. Access to reliable contraception is one factor that may influence maternal health outcomes by reducing unintended pregnancies and supporting timely prenatal care. Yet many parts of Texas remain contraceptive deserts where affordable and consistent options are limited. The aim of this study is investigating whether county-level access to contraception aligns with maternal mortality patterns across Texas between 2018 and 2022. Data are drawn from the American Community Survey (ACS), the Texas Department of State Health Services (DSHS), and publicly available pharmacy locations. Indicators of contraceptive access are developed using both availability and proximity measures and are combined with county-level maternal mortality data and socioeconomic characteristics. An Ordinary Least Squares (OLS) regression model is applied to assess associations while controlling for socioeconomic factors like income, insurance coverage, racial and ethnicity, and rural–urban status. While the analysis does not claim causality, it provides an initial statistical assessment of whether contraceptive deserts coincide with higher maternal mortality. The goal is to identify underserved areas and provide evidence to inform more equitable maternal health planning in Texas.

Trends and Climate Controls of Streamflow in Perennial Streams in Southeastern Oklahoma (1990–2022)

Sylvia Mensah (Oklahoma State University)* and Thomas LaVanchy

Water resources, streamflow trends, sustainability, climate change

This study examines long-term hydrologic and climatic patterns in perennial streams of southeastern Oklahoma from 1990 to 2022. Its objectives were twofold: to identify changes in streamflow and climatic water balance, and to explore the relationship between streamflow and specific climate variables. Monthly streamflow data for both rivers were analyzed alongside gridded climate data from the Parameter-elevation Regressions on Independent Slopes Model (PRISM), which includes precipitation, average temperature, and potential evapotranspiration estimated via the Thornthwaite method. Trends were assessed using Seasonal Mann-Kendall tests and decadal Theil-Sen slopes, while correlation analyses were performed at both monthly and yearly scales. Results indicate a significant decrease in Blue River streamflow (-138 cubic feet per second per decade, $p < 0.001$). In contrast, the Glover River showed a weaker, non-significant decrease of -113 cubic feet per second per decade. The climatic water balance (precipitation minus potential evapotranspiration) showed slight downward trends at both sites, although these were not statistically significant. Correlation analyses revealed that streamflow was strongly and positively associated with monthly precipitation ($r = 0.73$ for Blue, $r = 0.77$ for Glover, $p < 0.001$) and with monthly climatic water balance ($r = 0.64$ for Blue, $r = 0.75$ for Glover, $p < 0.001$). Conversely, temperature and potential evapotranspiration exhibited weak to moderate negative relationships. These findings suggest that precipitation is a primary factor influencing streamflow. However, the notable decline in Blue River discharge indicates the presence of additional non-climatic factors, likely including groundwater withdrawals or land-use changes.

Landsat Study of Land Surface Temperature Dynamics in Texas (2020–2025)

Fabiha Shafi Mim (University of Arkansas)* and Mohamed H. Aly

Urbanization, remote sensing, LST, Landsat 8 and 9, NDVI, NDBI

Rapid urbanization in recent decades led to higher Land Surface Temperatures (LST) and reduced green spaces. Typically, urban heat islands have been estimated using ground-based observations, but nowadays remote sensing is widely being employed due to its broad spatial coverage and finer resolution. This study developed a remote sensing approach to monitor urban heating effects across the three most urbanized cities in Texas - Houston, San Antonio, and Dallas, by integrating satellite data with a fishnet-based zonal analysis from 2020 to 2025. Landsat 8 and 9 images were processed to derive LST, Normalized Difference Vegetation Index (NDVI), Normalized Difference Built-up Index (NDBI), and a 75-km buffer was created for each city. A grid of 5 x 5 km was applied for zonal analysis to capture LST dynamics using a linear regression model to examine the relationships among LST, green vegetation indices, and built-up areas in the summers (June – August) and winters (December – February). Results show that Dallas experienced the highest summer LST, 47.5 °C in 2022, while Houston showed the lowest winter LST, 12 °C in 2024. LST rises in the summer, while NDVI peaks in the summer and declines in the winter. NDBI increases most in the winter and drops in the summer. The linear regression model reveals a positive trend between LST and NDBI in Dallas, whereas San Antonio shows no major trends during these periods. These findings underscore the impact of increased urbanization on green spaces and propose a robust remote sensing model to assess the overall heating effect.

Rectifying a River: A Critical Case Study of Engineering Control on the Rio Grande in El Paso, Texas

Adriana Montoya (Texas State University)*

Political ecology, infrastructure, dams, Rio Grande, US-Mexico border, urban rivers, critical geography

In the city of El Paso, Texas, human manipulation of the Rio Grande through history made urban life possible in the arid Chihuahuan Desert. Yet the Rio Grande has also historically been a source of troubles for dominant power structures, which sought to control both the flow of the river and the flow of people across the borderlands. My paper seeks to analyze the implementation of two river engineering projects in the El Paso region during an era defined by two major periods of progressive federal reform. Elephant Butte Dam (1916) and the Rio Grande Rectification Project (1938) were both conceived to address issues of flooding and irrigation in the El Paso-Juarez Valley. This research applies a Foucauldian discourse analysis to archival planning documents to investigate: 1) how members of the Rio Grande social-ecological system were framed by proponents of these two projects, 2) whether there were differences in how the two river engineering projects were presented in documents intended for internal versus external audiences, and 3) what purposes the transformation of the Rio Grande served for proponents of these two projects. Emerging results on the development of Elephant Butte Dam in particular provide insight into how state authority was used as a tool in the biopolitical goal of arid lands settlement. Set against the backdrop of an intensifying competition for river control between federal and corporate interests, this project explores how the differing visions of social actors in the Rio Grande SES manifested in the river's physical engineering.

Risk Assessment for Non-Meteorological Natural Hazards in Louisiana

Rubayet Bin Mostafiz (Louisiana State University)***, Robert V. Rohli**, Carol J. Friedland, and Nazla Bushra

Average annual loss, soil shrinking/swelling, sinkholes, wildfires, United States Gulf Coast

While Louisiana, U.S.A., is well-known to be vulnerable to the effects of atmospheric hazards, other environmental hazards including expansive soils, wildfires, and sinkholes are often overlooked. Recent updates to the Louisiana State Hazard Mitigation Plan objectively and comprehensively assess these

risks, for perhaps the first time. Using methodologies developed here that include projections for both structure and content losses (for wildfires and sinkhole) and structure losses (for expansive soils), we estimated the (2010$) annual average property loss in the state to these three hazards to be $66.23 million, $5.56 million, and $211,000, respectively. By 2050, our projections (2010$) show an increase to $91.75 million, $11.17 million, and $311,000, respectively. We also conducted sensitivity analysis that provide optimistic and pessimistic scenarios. While these totals pale in comparison to the average annual losses into the billions per year for flood and wind hazards, they are nevertheless important considerations for risk management and insurance purposes. The methodology herein is transferable to other locations and was projected at the census block level to reveal the spatial distribution of risk.

Influence of Climate Shifts and Anthropogenic Activities on Niche Shift Across Global Terrestrial Protected Areas

Nowshin Nawar (University of Arkansas)* and Brad G Peter

Protected areas, wildlife, climate, remote sensing, Google Earth Engine

Protected areas (PA) are regions dedicated to conserving ecological biodiversity and habitat for both flora and fauna. Anthropogenic processes, along with shifts in the climate, can alter the effectiveness of these areas throughout the world. Many wildlife PAs have been established since the early 2000s and were drawn based on the climatic conditions and needs at the time. However, the variations in long-term climate and human driven land-use/land-cover (LULC) changes may have shifted niches outside their originally intended boundaries and thus reduced their effectiveness. These shifts may further introduce conflicts by encroaching upon LULC types where human activity is prevalent (e.g., settlements and agriculture). The goal of this research was to characterize and analyze climate profiles and anthropogenic activities from the early 1980s to 2024 and evaluate how the historical biophysical conditions around global terrestrial wildlife protected areas compare to today's conditions. We made the comparison between two epochs, the past epoch being 1980–2000 and the present epoch being 2001–2024. Specifically, we analyzed air temperature, total precipitation, and relative humidity data to build climate anomaly grids relating to the past and present epochs. We utilized ERA-5 data to build climate profiles of protected areas, both at the time of establishment and at present. The results from this research will be useful to wildlife protection agencies, government services, and NGOs to revise the boundaries of the protected areas and implement necessary measures to maintain the utility of protected areas now and into the future.

Geospatial Analysis of Land Use and Land Cover Changes in Akure, Nigeria (2004–2024)

Saheed Oyekunle Oyetunji (New Mexico State University)* and Johnson Ayomide Ibukun**

Urbanization, remote sensing, land cover, land use, Nigeria

Urbanization and unplanned development have increasingly transformed the land use and land cover (LULC) dynamics of Akure, Ondo State, Nigeria, over the past two decades. This study employed multi-temporal Landsat imagery (Landsat 7, 8, and 9) and supervised classification using the Maximum Likelihood algorithm to evaluate LULC changes from 2004 to 2024. Four dominant classes—built-up areas, agricultural land, vegetation, and bare surfaces—were analyzed. The results revealed a substantial increase in built-up areas (from 65.32 km^2 to 246.94 km^2) and agricultural land (from 56.79 km^2 to 145.24 km^2), alongside a marked decline in vegetation cover (from 702.57 km^2 to 376.34 km^2) and a moderate rise in bare surfaces (from 165.48 km^2 to 220.35 km^2). These trends underscore the intensification of anthropogenic activities, resulting in vegetation loss, soil degradation, and heightened flood susceptibility.

Burn Severity Assessment and Mapping in the Hindu Kush Himalayan (HKH) Region

Gayatri Paudel (Texas Tech University)* and Abinash Bhattachan

Burn severity, MODIS, Hindu Kush Himalaya, remote sensing, VPD

The Hindu Kush Himalayan (HKH) region in Asia, spanning eight countries, is vulnerable to wildfires that threaten ecosystems, biodiversity, and the livelihoods of millions of people. In the recent decades, fire frequency and severity have intensified, largely due to climate change and anthropogenic activities. However, a comprehensive spatiotemporal assessment and mapping of burn severity across the HKH is missing. This study investigates the burn severity from 2000 to 2020 at 5-year intervals using MODIS surface reflectance data. Burn severity was quantified using Normalized Burn Ratio (NBR) and differenced NBR (dNBR) method applied through mean compositing technique. Burn severity was categorized into six classes: regrowth, unburned, low, moderate-low, moderate-high and high. Results indicate that moderate-high and moderate-low severity fires dominate across the region, consistently accounting for the largest burned areas. Between 2000 and 2020, burned area under moderate-high severity declined from 3,915,485 km² to 3,665,169 km², moderate-low severity increased from 609,332 km² to 820,099 km², high-severity fire extent nearly doubled from 187,771 km² to 333,906 km², and unburned areas declined sharply from 13,342 to 967 km². These trends highlight an alarming shift toward more frequent and intense fires. The influence of vapor pressure deficit (VPD) change on fire severity was examined to assess whether higher burn severity generally correlated with increasing VPD in the region. By providing the first long-term regional scale burn severity assessment for the HKH, this research contributes critical insights to support policymakers, land managers, and conservationists in developing sustainable fire management strategies for this ecologically sensitive region.

Middle Rio Grande Conservancy District: A Century of Service

Timothy C. Pitts (Middle Rio Grande Conservancy District)*

Water resources, sustainability, conservation, engineering

The Middle Rio Grande Conservancy District (MRGCD) was established by the New Mexico Legislature in 1923 to address persistent flooding, poor drainage, and unreliable water delivery throughout the Middle Rio Grande Valley. In 2025, the District will commemorate one hundred years of continuous operation as a central institution in the management of the region's water and land resources. Today, the MRGCD is responsible for approximately 280,000 acres in Central New Mexico, providing critical services that include flood control, drainage, and the delivery of irrigation water to agricultural and community users. Over the past century, the MRGCD has played an essential role in supporting the economic and social development of the Middle Rio Grande region. Its work has not only sustained local agriculture but also contributed to habitat restoration, groundwater management, and infrastructure maintenance that protect both people and the environment. The District's governance structure, partnerships, and long-standing commitment to integrated resource management continue to serve as a model for collaborative water stewardship in the arid Southwest. As the MRGCD enters its second century, it faces complex challenges driven by climate change, population growth, and evolving cultural and economic demands. This presentation reviews the District's historical contributions to New Mexico's development, evaluates the policies and practices that have defined its success, and considers the strategic priorities necessary to ensure the continued resilience and sustainability of water resources in the Middle Rio Grande Basin.

Enhancing Active Fire Detection With GeoAI: Case Study of the 2022 Calf Canyon–Hermits Peak Wildfires

Md Jakirul Islam Jony Prothan (New Mexico State University)* and Chao Fan

GeoAI, deep learning, wildfire, AFD-S2

Wildfire risk is intensifying across New Mexico as hotter, drier conditions persist. This study develops a GeoAI-driven workflow to map active fire across the Calf Canyon-Hermits Peak areas. We use three complementary data products: Sentinel-2 surface reflectance imagery (HARMONIZED), VIIRS active-fire imagery, and MODIS land-cover biomes including forest, shrubland, and grassland. Our detection framework combines two approaches. First, we assemble Sentinel-2 images from May 1–5, 2022, to compute the Normalized Burn Ratio (NBR). We then use MODIS land-cover biomes and biome-specific NBR thresholds to identify the spectral signature of actively burning vegetation. This biome-specific thresholding reduces false positives spectral signature of fire while producing a 20-m fire mask. Second, we trained a convolutional neural network (CNN) for fire segmentation using VIIRS active fire pixels as labels. The CNN captures fine-scale spatial and spectral patterns in the Sentinel-2 stack that rule-based methods such as the AFD-S2 algorithm may miss. Both approaches were evaluated using standard accuracy metrics including precision and F1 score. Together, the AFD-S2 algorithm and CNN models provide complementary capabilities for active fire detection. The final output is a set of consistent, reusable, and high-resolution active fire maps for the Calf Canyon-Hermits Peak areas, with minimized false alarms. These methods demonstrate how combining geospatial rules with GeoAI-driven learning can improve wildfire monitoring and support decision-making in fire-prone landscapes.

Spatial Analysis of NRCS Conservation Practices to Improve Water Access and Security on New Mexico's Working Lands

Md. Masudur Rahman (New Mexico State University)*, Atikul Hoque, Chao Fan, and Michaela Buenemann

Water access, water security, conservation practices, spatial autocorrelation, MGWR

The Natural Resources Conservation Service (NRCS) provides technical and financial assistance to improve natural resources, yet the equity and spatial distribution of this support remain poorly understood, complicating efforts to prioritize land owners and landscapes for assistance. This study investigates the implementation of NRCS Conservation Practice Standards (CPS) across New Mexico over the past five years, focusing on practices aimed at improving water quality and quantity on the state's working lands, and asks two questions: What are the spatial patterns of CPS implementation? Which human and environmental variables explain these patterns? To answer these questions, we: (1) acquired CPS implementation data from NRCS at the census-tract level; (2) thematically aggregated the 149 unique CPS into 5 water-related CPS indices given CPS definitions, purposes, and applicability conditions; (3) explored spatial patterns in the indices using cluster and outlier analysis (Anselin Local Moran's I); (4) acquired and processed diverse human (e.g., land ownership) and environmental (e.g., land cover) variables; and (5) modeled spatial relationships between these independent variables and the dependent variables (all CPS combined and the five CPS indices) using Ordinary Least Squares (OLS), Geographically Weighted Regression (GWR), and Multiscale Geographically Weighted Regression (MGWR). Our findings show distinct hot and cold spots for all CPS and CPS indices across the state. These spatial patterns are explained by a parsimonious subset of covariates. Model performance ranked MGWR > GWR > OLS, underscoring the value of accounting for spatial nonstationarity when examining conservation practice implementation and water-access outcomes.

Advancing Air Quality Action Through Local Public Engagement in West Texas: Opening a Path to Bridge Research and Policy

Zyanya I. Ramirez Diaz (Texas Tech University)* and Jen Henderson

Research to operations, science policy, dust storms, air quality

One of the biggest challenges of preparing for the impacts of extreme weather events is moving research into actionable policy, particularly at the local level. This work describes the process and lessons learned in a project that advocates for installing a dust storm local monitoring system, aiming to translate scientific evidence into operational practices and informed policymaking. This project focused on the City of Lubbock, a semiurban region with extensive cattle and agricultural fields, where around 30% of the national cotton production is grown. Strong winds, low soil moisture and bare soil make this region prone to dust events that decrease the air quality, affect the health of the community, harm crops, cause traffic accidents, damage property and require immense cleaning efforts. Despite these impacts, there is a lack of appropriate public monitoring instruments to detect dust particles. In this work, we prepared a policy document to encourage the local government to invest in a monitoring system specifically for dust events, which can later be used to implement an early warning system. We describe the challenges of the project, such as finding the appropriate local entities to submit the document, understanding the perspectives of funding sources, and choosing appropriate instruments that reflect local priorities and capacities. This project illustrates how investing in local-level science policy advocacy is a powerful tool for resilience, equity, and evidence-based governance. We hope this work serves as a guide for fostering institutional mechanisms that enable continuous adaptation of extreme weather events.

Rice Yield Prediction Using UAV-Derived Vegetation Indices and Machine Learning Methods

Sagar Rana (University of North Texas)**, Abhishek Adhikari, Jeshan Pokharel, Jiya Thapa, Shekhar Bhattarai, and Uma Shankar Pandey

Yield prediction, feature engineering, machine learning, neural network

Accurate crop yield prediction is essential for enhancing agricultural planning. Yet, traditional estimation methods, which rely on manual inputs and historical statistical data, are still practiced in developing countries like Nepal. This research focused on precise rice yield estimation by integrating Unmanned Aerial Vehicle (UAV) remote sensing data with machine learning (ML) and deep learning (DL) techniques. The study utilized high-resolution multispectral (MS) and RGB imagery to investigate the impact of vegetation indices (VI), plant characteristics, and farm management practices on crop yield. The analysis explored several ML models, including Support Vector Machines (SVM), Linear Regression (LR), Decision Trees (DT), and Random Forests (RF), in addition to a deep neural network model. A rigorous data preprocessing framework, involving feature selection, transformation, and dimensionality reduction, was used to optimize model performance. Linear regression with principal component analysis achieved a 69.09% accuracy using MS data, while SVM performed the best for RGB data with 68.27% accuracy. Overall, neural networks yielded the highest accuracies, reaching 75.29% and 64.60% with MS and RGB data, respectively. Notably, model accuracy varied significantly across different rice varieties. The Sona variety (n = 127 samples) achieved the highest accuracies of 80.21% for MS and 76.34% for RGB, while other varieties with fewer samples yielded comparatively lower accuracies. Results indicate that sorting features based on importance, rather than their elimination, enhances accuracy, especially using the linear regression feature importance method, which proves pivotal for the predictive capabilities of LR and SVM algorithms. The analysis of crop and farm management data further identified variables such as rice variety, plant age, and soil nutrients as crucial factors for rice yield estimation.

Object-Based Image Analysis Approach to Map Animal Feeding Operations

Barira Rashid (University of Arkansas & Science and Technologies for Phosphorus Sustainability)*, Rebecca Muenich,Co-Author, and Argha Saha

GeoAI, remote sensing, environmental monitoring, OBIA

As demand for meat and dairy continues to rise, the livestock industry in the United States has increasingly turned to animal feeding operations (AFOs), facilities where large numbers of animals are confined in centralized areas to optimize production. While efficient, these operations can lead to significant environmental and public health concerns due to concentrated waste emissions. At the same time, they represent potential sites for resource recovery, particularly manure reuse. Despite their significance, there is currently no nationwide, standardized dataset detailing the locations, animal populations, or manure management practices of AFOs, creating a major gap in monitoring and policy development. This study seeks to close that gap by enhancing an existing automated detection method using machine learning and object-based image analysis (OBIA). Building on previously identified AFO hotspots, we introduce a structural feature extraction technique to confirm and characterize facility locations. Key metrics such as footprint area, shape complexity, and boundary length are used to estimate permitted animal counts, which in turn inform calculations of potential manure output. These spatial indicators show strong promise for predicting facility-scale impacts. Ultimately, this approach not only improves our ability to monitor AFOs at regional and national scales but also lays the groundwork for adapting this methodology to global livestock systems, enabling better-informed strategies for environmental mitigation and sustainable agricultural management.

Multi-Scale Analysis of Suspended Sediment via Remotely Sensed Data and Data-Driven Models Along the Upper Mississippi River

Sahar Rezaei (University of Arkansas)* and Brad G. Peter

Suspended sediment concentration, water quality, automated machine learning (AutoML) approach, Upper Mississippi River (UMR)

Monitoring and quantifying Suspended Sediment Concentration (SSC) along major fluvial systems such as the Upper Mississippi River (UMR) is crucial for maintaining ecological health and ensuring water quality. Combining in situ water quality data, terrain indicators, and remote sensing within a data-driven framework can facilitate informed preservation of aquatic ecosystems. However, selecting the best model is often time-consuming and influenced by human bias. Thus, this research employs an Automated Machine Learning (AutoML) approach, which compares multiple ML algorithms and varied parameterizations to select the best fit model. This study compiled historical SSC records (1990–2025) from USGS sampling sites located across five UMR reaches. To better capture sediment dynamics, we evaluated which spectral wavelength regions and indices best quantify the relationship between optical reflectance and measured SSC across the UMR. Additionally, this study identifies the most influential predictor variables for mapping time-series SSC dynamics and assesses the transferability of basin-scale sediment models to reach-scale applications. The AutoML framework selected the XGBRegressor model as the best model, with $R^2 = 0.86$ for the testing group (20% of the dataset) and an RMSE value of 0.49, which reflects relatively small deviations between predicted and observed SSC values. Basin-scale models demonstrated strong transferability to reach-scale applications ($R^2 > 0.50$). SHAP analysis revealed that among the 49 predictors used, discharge, elevation, topobathymetry, surface temperature, and key indices such as “Red – SWIR1” and “NIR – SWIR1” were the most important predictors of SSC.

Theorizing Blues Space: Flow and Fixity in Early Texas Blues

Eric Sarmiento (Texas State University)*, Rosalie Ray, and Emily Rhodes

Black geographies, music geographies, social theory, historical geography, Texas

The emotive and affective power of the musical form known as the blues arguably lies not so much in the basic harmonic structure of the chord progressions, but in the capacity of the performers to

intensify expressive affects within the relatively narrow and repetitive confines of more or less standard cyclical chord progressions. Seen in this light, the blues as it emerges in Texas and other sites through struggle against racial capitalist regional development reflects a dynamic of fugitive movement, creativity, and improvisation within and in opposition to a sociospatiality of confinement, violent territorialization, and exploitation. In this talk, we explore ways of conceptualizing the relationships between blues space and racial capitalist space. We posit that the sociospatiality that emerges from the fraught interplay of blues space and racial capitalist space is not dualistic or binary, but rather interwoven and layered. From this perspective, we argue that racial capitalist development imaginaries reach into and shape blues spaces in various ways, while the blues imaginary also traverses and mediates racial capitalist, colonial development trajectories as well. This in turn has implications for how we conceptualize change, futurity, contingency, agency, and other geographical and social questions.

Using Creative Methods of Traditional Plant Medicine to (Re)Conceptualize Environmental Change

Dara Saville (New Mexico State University)*

Plant intelligence, environmental change, creative methods, geohumanities, Indigenous methods

Experiences of environmental change are frequently associated with unsettling emotions of uncertainty, grief, anxiety, or hopelessness. Traditional plant medicine of the Middle Rio Grande Valley of New Mexico utilizes a variety of creative practices for healing and community knowledge building. These processes often bring forth new understandings of human health~Land health and ways to (re)conceptualize environmental change. These practices incorporate a multitude of cultural roots encompassing Indigenous, Mexican curanderismo, and Western herbalism. Pláticas, or intimate conversations of solidarity for individuals or groups, are a central practice that often includes storytelling and other creative modes of expression. Project collaborators, who are local herbalists and traditional plant medicine practitioners, used art forms of their choosing to engage with research questions pertaining to their relationships with medicinal plants, how communication occurs with plants, and what insights plants offered for living with environmental change. These creative works were not only a way of expressing lived experiences but also served as a launch point for in-depth storytelling through pláticas. Art, pláticas, and storytelling revealed complex understandings of plant intelligence, ecological~social healing possibilities, and relationally interconnected human~nonhuman worlds that exist across nonlinear time. These combined creative methods revealed ways that plant-people relationships develop, how they affect well-being, how plant communication is perceived, and myriad perspectives for (re)conceptualizing environmental change.

Multi-Hazard Risk Assessment of Flooding and Heatwaves in Metro Manila, Philippines

Binisha Shrestha (Texas Tech University)* and Abinash Bhattachan

Compound extremes; multi-hazard risk; heatwaves; flooding; analytical hierarchy process

Global climate change is increasing the frequency of compound extreme events, putting rapidly growing cities at higher risk to heatwaves and flooding. This study focuses on Metro Manila, where existing risk assessments of flooding and heatwaves are typically conducted separately and these studies are limited in their consideration of socio-economic dimensions. Through a comprehensive multi-hazard risk-assessment framework of the Analytic Hierarchy Process (AHP), this study evaluates which zones/districts are vulnerable to the compound risks of flooding and heatwaves in Metro Manila, Philippines. We integrated geospatial data, hydro-meteorological records and demographic information to determine flood and heatwaves hazard surfaces, social vulnerability and exposure layers, and an integrated multi-hazard risk map. The results show that the flood-dominated hotspots along western Manila Bay coastline and the region's major river corridors, especially the Pasig-Marikina River, that puts

37.6% of land within Metro Manila in high to very high flood risk. The heatwave-dominated hotspots cluster within the impervious, low-vegetation urban core, with 35.7% of land in high to very high heat risk. The compound-risk priority zone covers 42.28% of the National Capital Region, that aligns to the west-central core and the Pasig-Marikina corridor. The AHP model performance is strong, with Receiver Operating Characteristic - Area Under the Curve (ROC-AUC) value of 0.852. The multi-hazard risk-assessment framework points to near-term priorities for drainage upgrades, urban greening and cooling projects, protection of critical infrastructure facilities, and improved emergency care access. The results from this study are transferable to other data-limited cities seeking actionable compound-risk assessments.

What Roles Might a White Settler Scholar Play in Indigenous Media Making?

Laurel C. Smith (University of Oklahoma)*

Geohumanities, creative methodologies, cultural geography, filmmaking

I've embraced filmmaking as a geohumanities practitioner. But I'm not a creative artist or media maker and I haven't undertaken sensory ethnography. Heck, I'd be lying if I said I was competent with recording and editing equipment. And frankly, trained as a critical cultural geographer, I'm lousy at formulating short, punchy pitches for projects. Instead, I'm a white settler scholar with anti-colonialist convictions who doesn't approach filmmaking as a method, but rather as a methodology. And in this talk, I share some lessons I have learned while participating in Indigenous media making. I begin by briefly tracing the scholarly path that led me to this work. Next, I describe my recent roles in collaborative media making. I also detail initiatives – some successful and other not – I (and others) have undertaken to share the resultant short films through online channels, community screenings, and film festivals. Then, I explain why I no longer frame my work as participatory video or describe my efforts in terms of coproduction. Emphasizing the shifting sands of mentorship, my story concludes by recognizing that I'll likely never participate in Indigenous making again and clarifying why that's a very happy ending.

Remote Sensing-Derived Urban Heat Islands and Land Surface Phenology

Raihan Sorker (University of Arkansas)* and Jason Tullis

Urban heat island, land surface phenology, spatiotemporal analysis, Landsat time series, Google Earth Engine

The urban heat island (UHI) effect varies spatiotemporally across different regions. Although remote sensing literature on UHI effects around the world is well established, the relationship between UHI and land surface phenology (LSP) is less understood. Spatiotemporal characteristics of UHI will be analyzed together with historical variations and patterns in LSP within the area of Kansas City, Missouri, USA. Landsat 5 and 8 time series, including thermal channels and vegetation indices will be utilized to conduct a time series analysis. Landsat imagery from 2001 to 2024 will be used for the analysis and Google Earth Engine (GEE) will be utilized to determine LSP and UHI. Historical LSP data will be observed to examine shifts in vegetation patterns such as delayed green-up and earlier vegetation aging. The results are expected to depict a strong connection between the historical LSP and the spatiotemporal dynamics of UHIs. It is anticipated that areas with longer vegetation cycles will be associated with lower intensity UHI and are areas with sparse or fragmented vegetation with higher UHI intensity. The results will be useful to understand the value of LSP in urban assessment and planning for energy resilience and quality in urban environments. The outcomes can influence how urban planners, policymakers, and environmental scientists understand urban temperature trends in the context of historical vegetation patterns and can inform strategies for new and revitalized urban development.

Wanderlust in the Classroom: Practical Insights Into Designing Virtual Reality Field Trips

Jamie E. Spinney (Southern Utah University)* and Chris Joy

Virtual reality (VR), field trips, experiential learning, student engagement

This presentation explores the design and implementation of virtual reality (VR) field trips as a tool to expand experiential learning opportunities in higher education. Traditional field trips offer powerful ways for students to connect course content with real-world environments, but they are often limited by cost, time, and accessibility. VR provides a practical alternative that allows students to explore global locations without leaving the classroom. This presentation describes the process of developing and integrating VR field trips using Meta Quest headsets and the Wander application, the latter of which uses immersive 360-degree imagery from around the world. The presentation outlines key design decisions, including the selection of destinations, the alignment of virtual experiences with learning outcomes, and strategies for guiding student exploration. Preliminary classroom experiences suggest that VR field trips enhance student engagement, promote curiosity, and create opportunities for interactive discussion. Students report feeling more connected to the material and demonstrate stronger recall of geographic concepts. The presentation concludes with lessons learned, including the importance of scaffolding activities to ensure meaningful learning and the need to balance novelty with clear instructional goals. By sharing practical methods and insights, this presentation offers educators a roadmap for using VR field trips to make learning more accessible, immersive, and memorable.

Betting on Carbon Markets: Scotland's Approach to Climate Resilience

Fatema Tarin (Texas State University)* and Jason P. Julian

Carbon markets; climate change; woodland creation; peatland restoration; climate resilience

Scotland's carbon market has taken shape under mounting climate pressures, especially emissions from degraded peat and limited native woodland. It also reflects a legal frame underpinned by the Climate Change (Scotland) Act 2009 (which sets a statutory target of net zero by 2045) and the secondary regulations such as Carbon Accounting Scheme (Scotland) Regulations 2010. This study evaluates how that context drives private finance toward land-based mitigation or nature-based solutions. The Woodland Carbon Code and the Peatland Code provide the core rules for additionality, monitoring, and long-term stewardship in the voluntary carbon market, while the EU/UK ETS (2005-2020/2021-present) set the backdrop by pricing large point sources. The analysis finds, first, that climate risk and the statutory frame together is pushing the voluntary market to target peatland restoration, and native woodland expansion and creation, while creating projects with stronger permanence safeguards and clearer claims than earlier practice. Second, complementary public programs (e.g., Peatland ACTION, Forestry Grant Scheme, Nature Restoration Fund) materially de-risk projects and expand supply, leveraging private capital and widening participation beyond large estates. Third, the separation between national accounting and voluntary credits has clarified buyer claims and reduced double-counting risks, while still strengthening operational delivery. These results matter beyond academia because they identify the practical conditions under which a trustworthy, mandated voluntary market can convert Scotland's land-based climate risks into durable mitigation and resilience benefits for communities and ecosystems, in parallel with compliance carbon pricing.

Community Engagement in Post-Fire Landscapes: Lessons From the Communities of the Hermit's Peak Calf Canyon Fire

Cassidy A. Tawse-Garcia (University of New Mexico)*

Wildfire, geohumanities, community engagement, human dimensions of climate change

Community-engaged Listening Sessions are a critical tool for understanding the experiences of community members impacted by wildfire. Managers and researchers have the opportunity to build trust and strengthen their place-based adaptability, by listening to the experiences of those who have lived through and are processing the related disasters of wildfire. This presentation explores research methods, including creative geo-humanities methodologies, and findings from eight Community Listening Sessions (with 123 total participants) that took place between January and April 2025, on the impacts and responses to the 2022 Hermit's Peak Calf Canyon (HPCC) Fire – the largest wildfire in New Mexico's state history. The listening sessions were co-facilitated by PhD researcher, Cassidy A. Tawse-Garcia, and community partner, Neighbors Helping Neighbors (based in Las Vegas, NM), to hear directly from community members on how the HPCC Fire and subsequent floods have impacted them. Facilitators heard that participants are frustrated, let down by, and often angry at the timeline of recovery. Three years on, there is still ample grief in what was lost. Most importantly, people do not feel the Formal System of Recovery (aka Federal and State emergency management resources like FEMA) is working for them, while also showing significant gratitude for their neighbors and community organizations, who showed up for them throughout the crisis. By utilizing Community Listening Sessions as part of post-fire recovery, researchers and managers have the opportunity to Increase trust with community, create a safe space for community members to be heard, build or increase relationships across the community, and support community capacity for self-advocacy in post-fire landscapes.

GRAS-SES Research Coordination Network (RCN): Building a Community of Practice for Co-Producing Resilient Socio-Ecological Systems in Grasslands

Jacqueline M. Vadjunec (University of Oklahoma)* and Todd D. Fagin ***

Co-production, grasslands, Great Plains, research coordination network (RCN), socio-ecological systems (SES)

This poster presents highlights, challenges, and lessons learned from the National Science Foundation Research Coordination Grant (RCN, CHIRRP-2435176), "Building a Community of Practice for Co-Producing Resilient Socio-Ecological Systems in Grasslands." Despite losing ~32 million acres since 2012, the Great Plains hosts some of the most intact remaining grasslands in the world. Yet, the human-environmental interaction in this region is marked by extreme vulnerability. Here, a diverse socio-ecological system (SES) that houses generations of people is at risk. The threats facing North American grasslands challenge the ability of communities to prepare, respond and recover from climate variability and extreme weather events. Interconnected by land, water, and people, more holistic understandings of grasslands and grassland management are needed to foster more resilient communities. However, critical obstacles exist in developing strategies to withstand these changes. Risk-based decisions demand holistic, integrated socio-ecological system (SES) understandings and approaches. Diverse multi-stakeholder partnerships (spanning academics, local to regional government agencies and NGOs, Tribal Nations, land managers, educators, etc.) are being nurtured across the US, Canada, and Mexico to engage society in co-designing actionable, science-based solutions using co-produced metrics, methods, and analytical frameworks in the Great Plains and beyond. The RCN is designed to achieve three major objectives (relevant conceptual frameworks, methods, and metrics, and on the ground (in)formal education and adaptive co-management), emphasizing three primary thematic areas (land, water, and people) to develop future points of convergence.

Conservation and Recreation in Early Oklahoma State Parks

Helen Wagner (University of Oklahoma)*, Randy Peppler, and Angela Person

Sustainability, conservation, recreation, state parks, historical analysis

Oklahoma has nearly 40 State Parks, covering more than 80,000 acres. Spanning 12 diverse ecoregions—including desertlands, grasslands, high plains, crosstimbers and more—the cultural and environmental histories of these parks as recreation and tourism sites appear under documented. For example, the Encyclopedia of Oklahoma History and Culture (EOHC), published by the Oklahoma Historical Society (OHS), does not have an entry documenting the “State Parks'' system as a whole. This archival research project seeks to fill this important historical gap related to documentation of three early Oklahoma State Parks—Roman Nose, Boiling Springs, and Osage Hills—to answer two central research questions: What were the key factors shaping the parks’ locations, amenities, and missions? Have these parks’ identities as conservation and recreation sites shifted over time? In answer to these questions, this historical project draws on extensive archival research of newspapers and photographs conducted at the Oklahoma Historical Society Research Center. Relevant archival newspaper articles and photographs are compiled in a database, which have been analyzed chronologically and thematically to answer the research questions. Per the historical analysis, driving forces shaping the original parks include the National Park Service, Civilian Conservation Corps (CCC), and local politicians. Parks like Osage Hills and Boiling Springs, whose primary influence was the National Park Service and the CCC, had a less documented history with less recreational features. Parks like Roman Nose, whose primary influence was the local politicians, have well documented histories with an abundance of recreational features.

Two Wheels to Town: Promoting Bicycle Infrastructure in Small-to-Midsized Texas Cities, a Spatial and Community-Based Analysis

Michael D. White (Texas State University)*

Cyclists, pedestrians, transportation, human geography, planning

As Texas continues to experience rapid population growth, particularly in Central Texas counties, small to medium-sized cities face the challenge of shifting away from auto-centric design. This research examines the existing transportation infrastructure in Lockhart and Seguin, Texas, using the nearby city of San Marcos as a model for potential improvements. The goal is to demonstrate how these smaller cities can implement bicycle-friendly infrastructure to enhance accessibility, urban livability, and equity while reducing car dependency. Employing a mixed-methods approach, this research utilizes census data, GIS mapping of existing and potential bike routes, analysis of city comprehensive plans, and community engagement with local advocacy groups like MoveSM. The study highlights a cultural bias toward auto-centricity in the region but finds evidence in citizen comments that residents desire more walkable and bikeable communities. By focusing on improving "first/last mile" connectivity to key areas like town squares, schools, and markets, this research proposes that context-driven design and community-based participatory planning are essential for creating more sustainable and accessible transportation options.

Protecting Biodiverse Private Land in the Southwest: A Case Study of the New Mexico Land Conservancy

John B. Wright (New Mexico State University)*

Land conservation, conservation easements, New Mexico Land Conservancy

Private property is vital to maintain ecological connectivity, yet subdivision and development often degrade landscapes. The session will explore how the New Mexico Land Conservancy has protected 800,000 acres in just twenty years. Conservation easements provide geographers a way of applying their knowledge to mitigate the negative effects of development and landscape change.

Digitizing the Past: Reconstructing Historical Cities Using Machine Learning

Yanan Wu (The University of Central Arkansas)*, Chengbin Deng, and Yalin Yang; Yanan Wu**

Historical geography, city change, geospatial analysis, machine learning, spatial modeling

This research presents a machine learning–based framework for transforming historical fire insurance maps into structured, machine-actionable geospatial data. Sanborn Fire Insurance Maps, produced extensively across the United States from the late nineteenth to the mid-twentieth century, offer an unparalleled record of urban development, documenting the evolution of city blocks, building materials, and land use patterns. Despite their immense historical and analytical value, most of these maps remain in scanned or paper form, preventing systematic spatial analysis and integration with modern geospatial datasets. To address this limitation, the study applies deep learning methods to automate the extraction and conversion of map content into digital spatial representations. The framework leverages computer vision models to interpret visual symbols and cartographic conventions, transforming static imagery into GIS-ready layers suitable for spatial modeling and visualization. These digitized data products enable the reconstruction of historical cityscapes in three dimensions, allowing urban researchers to examine patterns of industrial expansion, infrastructure growth, and social change across time and space. By linking historical cartography with contemporary geospatial and machine learning techniques, this research bridges the gap between archival preservation and computational analysis. The resulting datasets and methods not only enhance our ability to document urban transformations but also contribute to the broader goals of open, reproducible, and data-driven historical geography—offering a scalable pathway to preserve and explore the built environment of the past in digital form.

U.S.–Mexico Trade in Feed and Livestock Products: A Case Study in Transportation Geography

Michael S. Yoder (Univesity of Central Arkansas)*

Agricultural transportation, US-Mexico trade, grains, livestock

An emerging theme in economic geography is the recent increase in regional trade compared to globalization. Considering the pending renegotiation of the US-Mexico-Canada (USMCA) Trade Agreement, two themes stand out as requiring updated studies. First, as the US and Mexico develop stronger trade relations despite tariff threats, a focus on agricultural trade between the two countries is warranted. Second, studies of agricultural transportation overall are sorely lacking in the academic literature, including in the context of US-Mexico trade. This paper directly addresses the two themes. Through a literature review (primarily agriculture and freight transportation trade publications, and USDA reports) and a summary of interviews of appropriate stakeholders, the paper provides an overview of southbound movements of US-grown corn, sorghum and soybeans to Mexico, the majority of which are associated with livestock feed, and meat products (beef, pork and poultry). The paper then addresses northbound movements of feeder calves from Mexico to US feedlots. It discusses the dominant spatial patterns of the production and transportation of the different products. The paper concludes that a loosely organized binational supply chain exists for the agro-livestock industry based on US exports of feed and packaged meat to Mexico and Mexican exports of calves to feedlots in the Texas Panhandle and other nearby locations. This regional complementarity sustains a multi-modal agricultural transportation geography based on rail, trucking and maritime shipping.

Quantifying Wildfire Smoke's Persistent Effects on PM2.5 Speciation Across U.S. Regions: Evidence From 2007–2023 Smoke Events

Shiyan Zhang (New Mexico State University)*, Jiakai Zhang, and Manzhu Yu

Wildfire smoke, PM2.5 speciation, persistent impacts, difference-in-differences, event study

Wildfire smoke substantially degrades air quality by increasing total PM2.5 concentrations and their chemical speciation. While existing research has documented PM2.5 during active fires, the

spatiotemporal persistence of these pollutants across US regions remains insufficiently quantified. Leveraging quasi-experimental variation arising from 2007-2023 wildfire smoke events, we employ difference-in-differences (DID) and event study approaches to estimate the causal effects on both PM2.5 concentrations and their chemical speciation, while assessing their duration. Our analysis reveals that smoke events increase PM2.5 concentrations by 35% nationally, with pronounced regional heterogeneity: western states experience the most severe impacts (+50% persisting for 3 days), while northeastern and southern regions exhibit weaker and shorter-lived effects. Chemical speciation analysis reveals distinct temporal dynamics: heavy metals (chromium, manganese) and inorganic compounds exhibit transient spikes (1 day), whereas lead, vanadium, and organic carbon remain elevated for 3 days. Our findings underscore the urgent need to integrate chemical speciation into air quality monitoring systems to better assess composition-specific health risks under climate-driven intensification of wildfires.

Hydroclimatic Stress and LULC Changes Amplify Aerosol Burdens and Inequitable Exposure in Phoenix (2000–2020)

Yuanhui Zhu (Texas State University)*, Soe Myint, and Yubin Li

Aerosol optical depth, urbanization, inequitable exposure, hydroclimatic stress

Desert metropolitan regions in the U.S. Southwest experience the most severe air pollution in the nation. Although national air quality has generally improved in recent decades, the temporal shifts in air pollution, their links to hydroclimatic and vegetation dynamics, and racial-ethnic exposure disparities under climate change remain underexplored. We derived fine-resolution Landsat-based aerosol optical depth (AOD), land surface temperature (LST), actual evapotranspiration (ETa), LULC, and NDVI from 2000 to 2020. These variables were aggregated at the block groups in Phoenix, Arizona, and linked with demographic data to assess long-term exposure trends. Our analysis reveals a significant increase in annual mean AOD (Sen's slope = 0.0010 yr^{-1}), occurring primarily in urban development areas. This trend sharply contrasts with the national pattern of decline. AOD increases were spatially associated with declining ETa (R = –0.491), decreasing NDVI (R = –0.47), and rising LST (R = 0.098), highlighting strong hydroclimatic–vegetation linkages. Exposure disparities are pronounced as AOD Sen's slopes are positively associated with the percentage of Hispanic, Black, and American Indian residents, and negatively associated with White and non-Hispanic populations ($p < 0.001$). These inequities co-occur where hydroclimatic stress intensifies—blocks with higher marginalized groups exhibit faster ETa and NDVI declines and stronger LST increases. Results highlight a climate–land surface–society nexus in which warming and vegetation degradation exacerbate aerosol burdens and disproportionately affect marginalized communities. Adaptation should pair urban greening and land-surface management with equity-centered planning to jointly reduce hydroclimatic stress and pollution exposure disparities in arid cities.

Meeting Participants

The list below is sorted by first name initials and will be updated periodically throughout the meeting.

1. Abeiku Arhin Tsiwah, New Mexico State University
2. Adriana Montoya, Texas State University
3. Albert Agyei, New Mexico State University
4. Alberto Giordano, Texas State University
5. Alborz Ebadi, Texas State University
6. Alexander Standen, New Mexico State University
7. Althea Atherton, Central New Mexico Community College
8. Andrew Klein, Texas A&M University
9. Anne-Lise Boyer, University of Arizona
10. Ashok Gahatraj, New Mexico State University
11. Atikul Hoque, New Mexico State University
12. Augustus Guikema, University of New Mexico
13. Ayomide Famewo, Texas State University
14. Babak Heidari, Texas State University
15. Barira Rashid, University of Arkansas
16. Bimala Awasthi, University of North Texas
17. Binisha Shrestha, Texas Tech University
18. Blessing Ankrah, Oklahoma State University
19. Brad Bays, Oklahoma State University
20. Bren Vander Weil, Texas State University
21. Brent Hedquist, Texas A&M University-Kingsville
22. Brock Burford, Texas State University
23. Bryant Evans, Houston City College
24. Cade Adams, University of Central Arkansas
25. Carol Campbell, New Mexico State University
26. Carol Placchi, New Mexico State University
27. Carolina Cambron, Texas State University
28. Cassidy Tawse-Garcia, University of New Mexico
29. Catalina Salinas, RomoGIS
30. Chandra Hada, Texas A&M University
31. Chao Fan, New Mexico State University
32. Charlie Jackson, New Mexico State University
33. Christopher Brown, New Mexico State University
34. Claryce Bosson, Texas State University
35. Crispin Awodanzo Ajugu, New Mexico State University
36. Daniel Dugas, New Mexico State University
37. Dara Saville, New Mexico State University
38. Derrick Korblah Ahadzi, Texas State University
39. Desiree Loggins, University of New Mexico
40. Don Jonsson, Austin Community College
41. Edith Hancock, New Mexico State University
42. Elizabeth Kubacki, Texas State University
43. Elyn Clarke, City of Las Cruces

44. Emerald Darby, University of Missouri
45. Eric Magrane, New Mexico State University
46. Eric Sarmiento, Texas State University
47. Erik Prout, Texas A&M University
48. Erin Elder, University of New Mexico
49. Fabiha Shafi Mim, American Society for Photogrammetry and Remote Sensing
50. Farzana Afroz, University of Oklahoma
51. Fatema Tarin, Texas State University
52. Frank Romo, RomoGIS
53. Gayatri Paudel,
54. Goodluck Dike, Texas Tech University
55. Greg Turner, Texas State University
56. Hardt Bergmann, New Mexico State University
57. Helen Wagner, University of Oklahoma
58. Jacqueline Vadjunec, University of Oklahoma
59. Jack Wright, New Mexico State University
60. Jamie Spinney, Southern Utah University
61. Janet Azure Atanga, New Mexico State University
62. Jaryd Hinch, University of South Florida
63. Jason Julian, Texas State University
64. Jaydon Allison, Texas State University
65. Jiakai Zhang, New Mexico Institute of Mining and Technology
66. Joe Lakey, New Mexico State University
67. John Paul Jones III, University of Arizona
68. John Taylor
69. Jose Solis, New Mexico Office of the State Engineer
70. Joshua Hodge, University of Tennessee at Chattanooga
71. Juna Keehn,
72. Kaitlynn Dusek, Texas State University
73. Kari Bellavita, NMSU Graduate School
74. Katelyn Cooke, Oklahoma State University
75. Katie Slack, University of New Mexico
76. Kevin Wohlmut, New Mexico Office of the State Engineer
77. Krist Nelson, Bohannan Huston
78. Lakshmi Reddi, New Mexico State University
79. Laurel Smith, University of Oklahoma
80. Lorelei Harris, University of Central Arkansas
81. Lucas Fellure, City of Las Cruces
82. Luke Cutburth, New Mexico State University
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88. Md Ashraful Habib, Texas Tech University
89. Md Jakirul Islam Jony Prothan, New Mexico State University
90. Md Jubier Ahammed, Texas Tech University
91. Md Masudur Rahman, New Mexico State University

92. Md Munir Mahmud, Texas State University
93. Michael Boyles, Texas State University
94. Michael McCanless, Texas Tech University
95. Michael White, Texas State University
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99. Morgan George, University of North Texas
100. Nicholas Wicklund, City of Las Cruces
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102. Nusrat Jahan, Texas Tech University
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106. Perry Carter, Texas Tech University
107. Racheal Tovar, City of Las Cruces
108. Rae Bennu, University of New Mexico
109. Raihan Sorker, University of Arkansas
110. Ramona Malczynski, University of New Mexico
111. Randy Peppler, University of Oklahoma
112. Raynee Bacorn,
113. Rebecca Asbury, New Mexico State University
114. Robert Czerniak, New Mexico State University
115. Robert Rohli, Louisiana State University
116. Rory Hill, Oklahoma State University
117. Rosalie Ray, Texas State University
118. Ruben Leyva, New Mexico State University
119. Sagar Rana, University of North Texas
120. Sahar Rezaei, University of Arkansas
121. Saheed Oyetunji, New Mexico State University
122. Sajad Ghafari, Texas Tech University
123. Sarah Blue, Texas State University
124. Sawyer Giese, University of Central Arkansas
125. Shipu Debnath, Texas Tech University
126. Shiyan Zhang, The Pennsylvania State University
127. Sirwan salimi, Texas State University
128. Sophie Roark, University of Central Arkansas
129. Stephen O'Connell, University of Central Arkansas
130. Sylvia Mensah, Oklahoma State University
131. Timothy Pitts, (Middle Rio Grande Conservancy District)
132. Tristan Goedert, Texas State University
133. Veronica Briggs, University of North Texas
134. William Acheampong, New Mexico State University
135. William Doolittle, The University of Texas at Austin
136. William Moseley, Macalester College
137. Yanan Wu, University of Central Arkansas
138. Yuanhui Zhu, Texas State University
139. Yubin Lee, Texas State University

140. Yujian Lu, University of New Mexico
141. Zhuo 'Austin' Tang, Texas Tech University
142. Zyanya Itandehui Ramírez Díaz, Texas Tech University