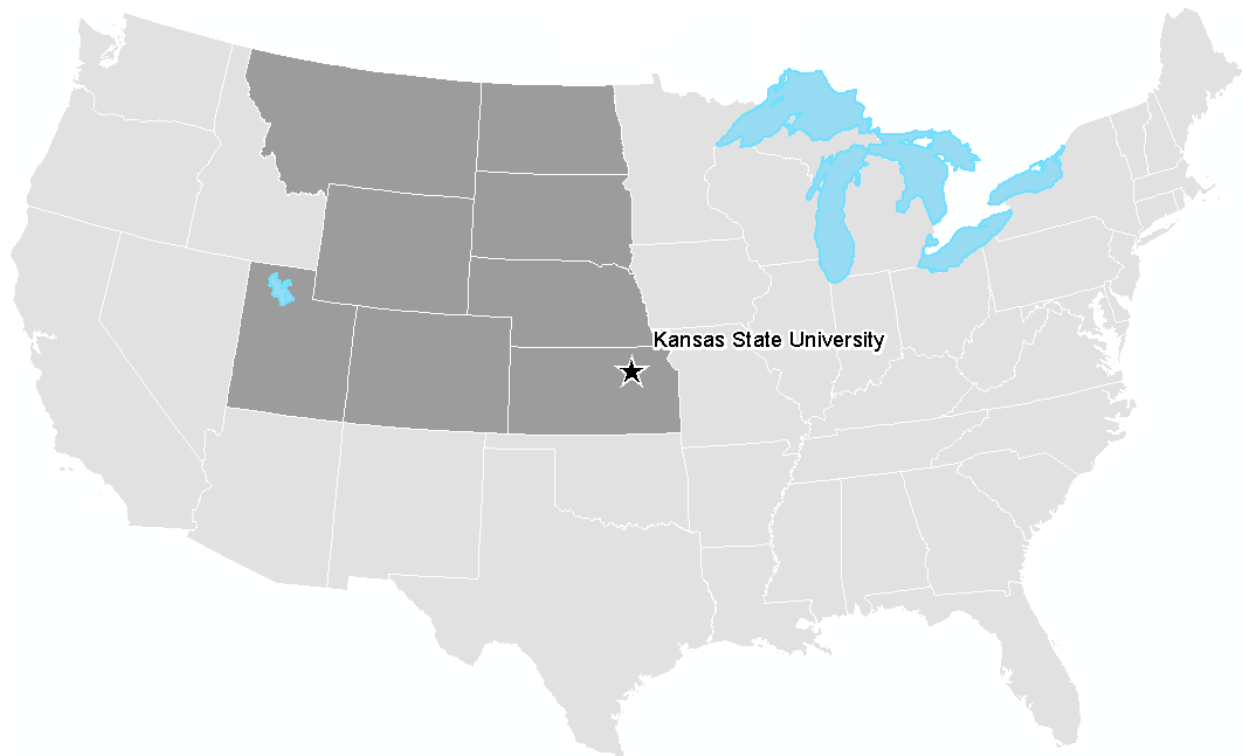


2018 Annual Meeting of the
Great Plains-Rocky Mountain Division of the
Association of American Geographers

Long Final Program

with Abstracts



Find more information about the conference and venue at:

<http://www.ksu.edu/gprm2018>

Share news about the GPRM meeting via Twitter using:

#gprm2018

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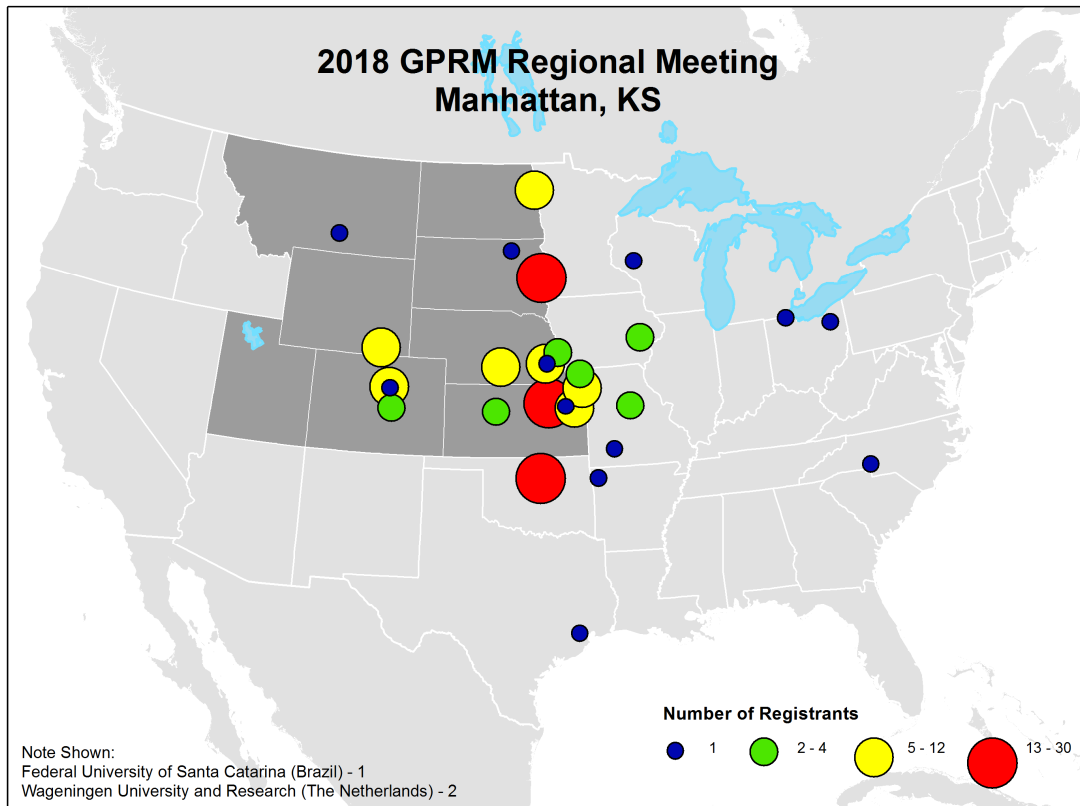
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Welcome to K-State!

Founded in 1863 as the nation's first operational land-grant university, Kansas State University is home to nearly 25,000 students from all 50 states and more than 100 countries. With campuses in Manhattan, Salina, and Olathe, undergraduate students can choose from more than 250 majors across nine colleges. The Graduate School also offers over 150 graduate degrees and certificate programs.

At K-State, teaching and students are a priority. The university has more national CASE/Carnegie Professors of the Year than any other public research university in the nation and is a leader in the total number of Rhodes, Marshall, Truman, Goldwater, and Udall scholarship winners. K-State is also on its way to become a top 50 public research university by 2025. Known as "the Silicon Valley for biodefense", Kansas State has been recognized by the Princeton Review and U.S. News & World Report as one of the best in America and by The Wall Street Journal as a top university for improving students' critical thinking skills.

Geography has been part of K-State since its founding. The Department of Geology and Geography was established in 1951 with bachelor's and master's degrees in geography available in 1956 and 1959, respectively. A stand-alone Department of Geography was formed in 1970 and a doctoral program created in 1996. Today, the department offers B.A./B.S., M.A., Ph.D degrees, as well as certificates in geographic information science. Many of the department's course offerings benefit from the rich natural and human history of the region. Undergraduate and graduate research projects often draw from this wide ranges of local settings. K-State geographers M. Duane Nellis and Richard Marston have served as presidents of the American Association of Geographers and our local chapter of Gamma Theta Upsilon is one of the most honored in the country.

Manhattan, home to the main campus of Kansas State University, is a dynamic college town with a large academic population, thriving food scene, and growing reputation as a scientific research hub set in the distinctive Kansas Flint Hills ecoregion. With a population of 55,000, Manhattan is routinely ranked by Forbes Magazine as one of the top college towns in America.

Acknowledgements and Special Thanks

Arnaud Temme and Shawn Hutchinson thank the students and faculty from the Department of Geography at Kansas State University who assisted with logistics, registration, room management, and field trips. Special thanks go to graduate students Abbey Marcotte, Michael Stumpff, Barrie Chileen, and Colleen Gura.

In addition, we thank Dean Amit Chakrabarti, Dean of the College of Arts & Sciences at K-State, and Dr. Chuck Martin, Head of the Department of Geography, who provided essential financial and logistical support in the early stages of conference planning. GPRM Regional Councilor Deb Thomas and GPRM Past Chair Paul Todhunter provided valuable advice and guidance in throughout the process.

GPRM Officers 2018-2019

Chair	Arnaud Temme Kansas State University
Vice Chair	Not Filled
Secretary	Robert Watrel South Dakota State University
Treasurer	Robert Watrel South Dakota State University
Past Chair	Paul Todhunter University of North Dakota
Regional Councilor	Deborah Thomas University of North Carolina at Charlotte

Past and Future GPRM Regional Meetings

2014	University of New Mexico (Joint Mtg w/SWAAG)
2015	University of Nebraska at Kearney
2016	University of Colorado at Colorado Springs
2017	University of North Dakota
2018	Kansas State University
2019	???
2020	???
2021	???
2022	???

Student Awards

Paper and Poster Competition

All students presenting a paper or poster at this year's annual meeting will be entered in one of four competitions: (1) Best Undergraduate Student Paper, (2) Best Undergraduate Student Poster, (3) Best Graduate Student Paper, and (4) Best Graduate Student Poster. All papers and posters entered into the competition must report on original research conducted primarily by presenting student. Papers and posters will be judged on the basis of research design, content and organization, presentation style and quality, and creativity. Awards are funded by the GPRM Division, except where noted.

With the exception of the 1st place graduate student paper, award amounts for each competition are \$100 for 1st place, \$50 for 2nd place, and \$25 for 3rd place. The student presenting the top graduate paper will receive the region's AAG Council Award and a \$1,000 prize. The winner must attend the 2019 AAG National Meeting to receive the funds.

GeoBowl

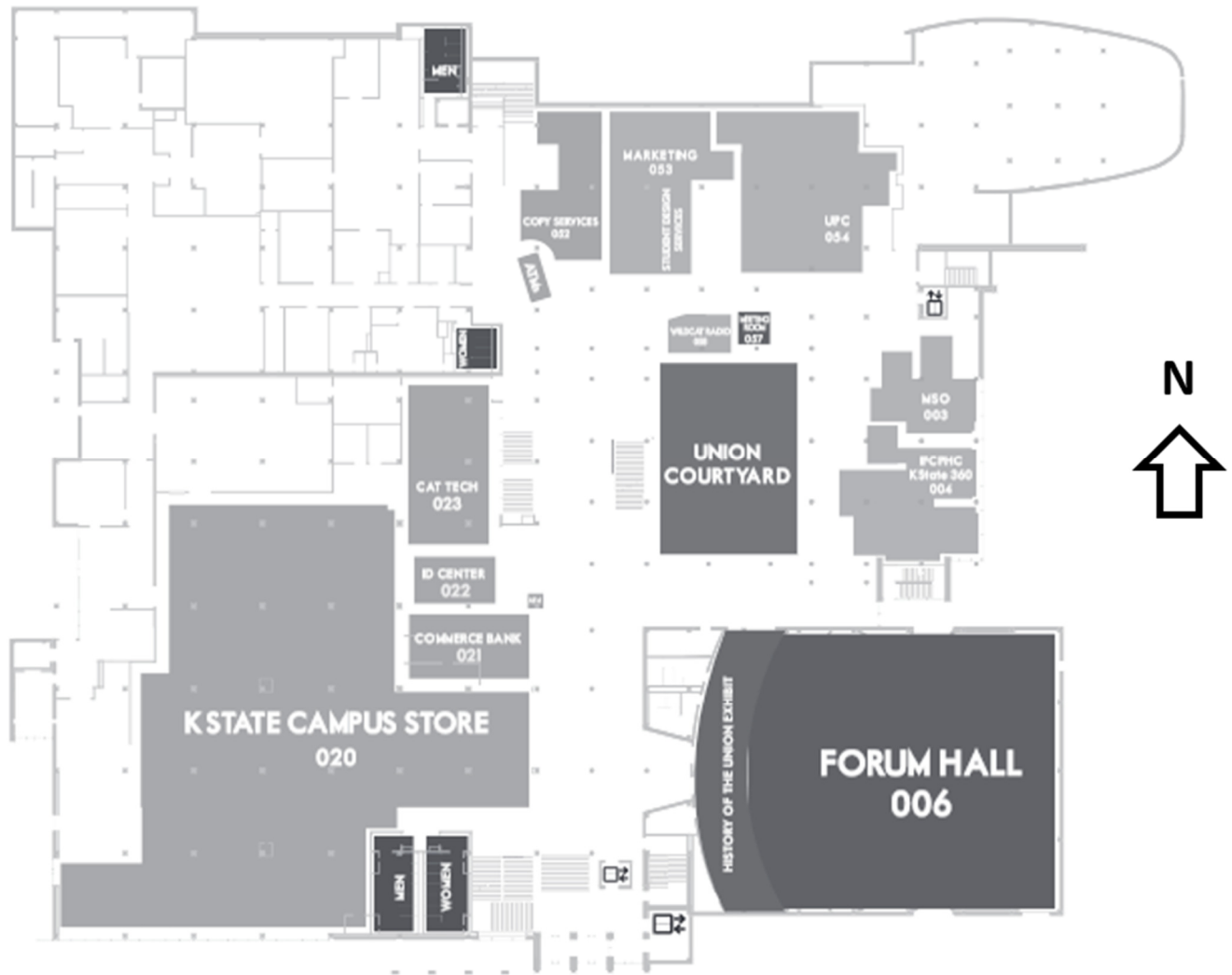
In addition to the winning team, the top individual finishers among all competing schools will be recognized during the Awards Ceremony. The top individual finishers are invited to represent the GPRM region at the World GeoBowl held during next spring's AAG National Meeting.

The GPRM regional team must include a minimum of one undergraduate and one female student. Team members who travel to the AAG National Meeting and represent the GPRM region at the World GeoBowl will receive a cash award of \$600 provided by AAG and the GPRM region.

Award Funding

Please note that award amounts stated here are approximate and, excluding the AAG Council Award, are subject to change.

KSU Student Union – Ground Floor – Forum Hall

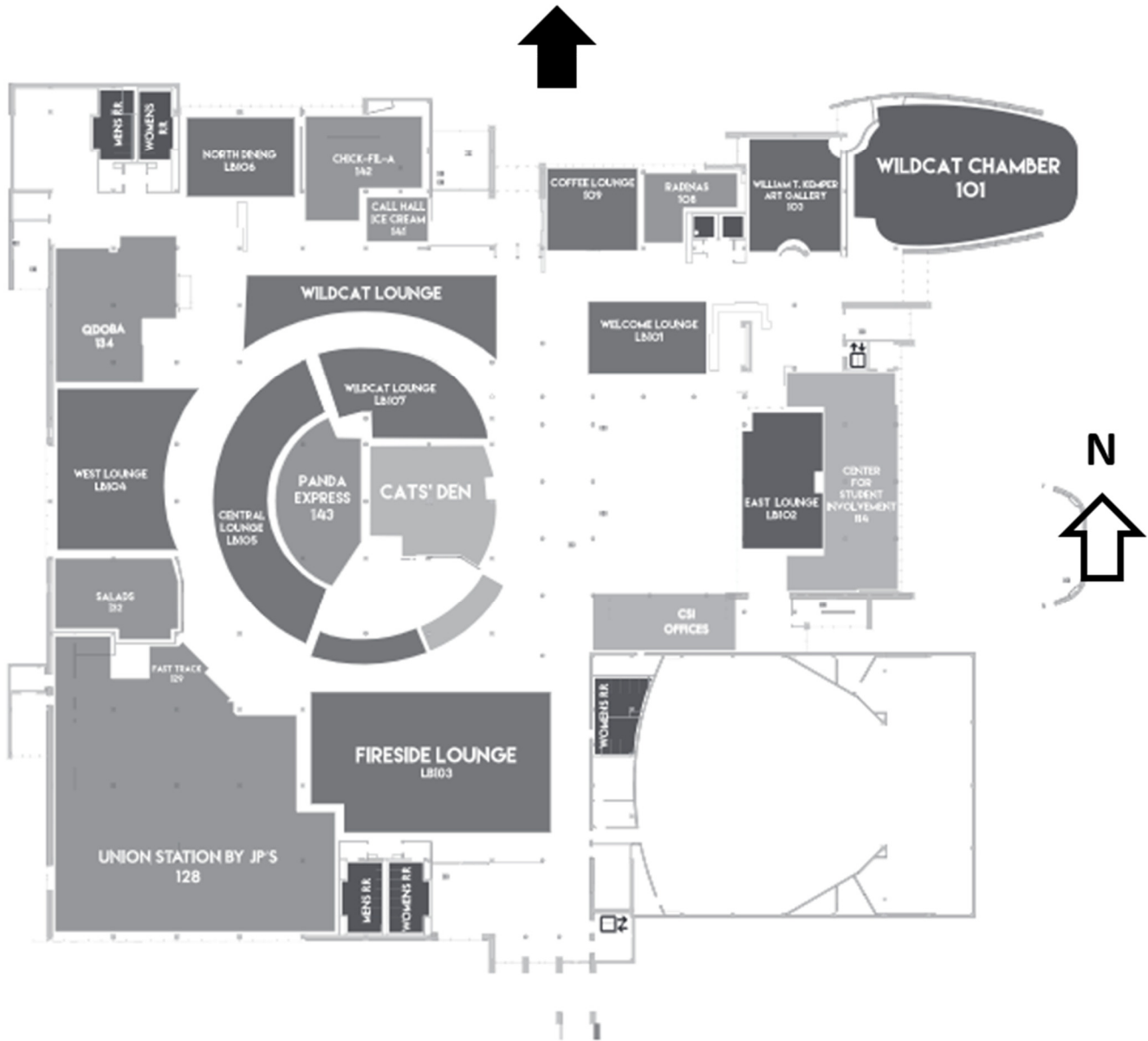


Access from Parking Garage and Holiday Inn Manhattan at the Campus

Wireless Internet – Complimentary wireless access is available throughout the KSU Student Union. You're your computer or mobile device, please choose the network **KSU Guest**. No password is needed.

KSU Student Union – First Floor – Food Service

To Seaton Hall and Department of Geography for Field Trips/Workshop

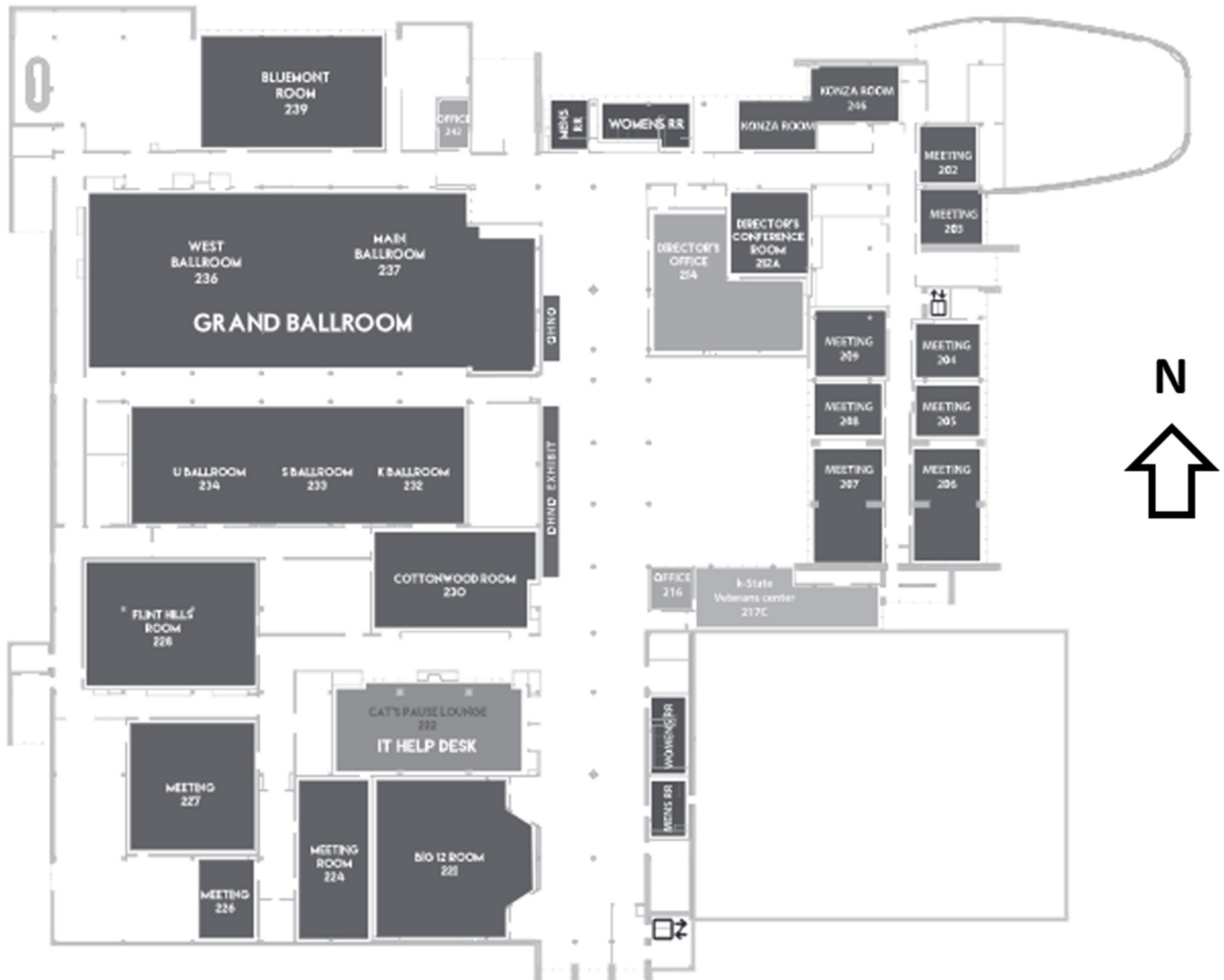


Wireless Internet – Complimentary wireless access is available throughout the KSU Student Union. You're your computer or mobile device, please choose the network **KSU Guest**. No password is needed.

Food Service – We anticipate many of the dining options located in the KSU Student Union to be open during the conference. Restaurants include Chick-fil-A, Panda Express, Union Station by JP's, and Subway (basement). Aggieville, Manhattan's historical college district, also has a variety of food options and is just a short walk from the KSU Student Union. The Cat's Den, a "quick shop" style store, will also be open during the conference.

Registration – The registration desk on Saturday will be located on the First Floor in the vicinity of the Wildcat Lounge.

KSU Student Union – 2nd Floor – Papers, Poster, and Banquet



Conference Rooms – With the exception of the Opening Plenary, all paper and poster sessions will be held in rooms located on the Second Floor of the KSU Student Union. This will also be the location of the Awards Banquet on Saturday evening.

Wireless Internet – Complimentary wireless access is available throughout the KSU Student Union. You're your computer or mobile device, please choose the network **KSU Guest**. No password is needed.

Field Trips

Meet in Seaton Hall Lobby near Department of Geography Office

Chasing Geography and History along the Kaw River Valley

Host: Jeffrey S. Smith, Kansas State University

Duration: Half Day (1:00 PM – 4:30 PM)

Recommended: Sturdy walking shoes, seasonal jacket, and water bottle

Cost: \$20.00

This field trip will visit communities within the Kansas (Kaw) River valley and examine changes in population and culture over time. Lunch is not included in the trip. Please plan to begin the trip after lunch on your own.

The Konza Prairie Biological Station and Kansas Flint Hills

Host: Kendra McLauchlan, Kansas State University

Duration: Half Day (1:00 PM – 4:30 PM)

Recommended: Sturdy walking shoes, seasonal jacket, long pants, and water bottle

Cost: \$35.00

This field trip will visit the nearby Konza Prairie Biological Station, a NSF-funded Long-term Ecological Research site, for discussion of current research and views of the tallgrass prairie and Kansas Flint Hills. Lunch is not included in the trip. Please plan to begin the trip after lunch on your own.

Introduction to R Programming for Visualization

Host: Shawn Hutchinson, Kansas State University

Duration: Half Day (1:00 PM – 4:30 PM)

Recommended: Be prepared to take notes and bring a USB drive to store data and R scripts used and developed in our session

Cost: Free!

R is a popular and useful language and environment for statistical computing and graphics that has become an increasingly important component of a geographer's research toolkit. In the hands of a skilled researcher, R can be used to perform a broad (and growing) range of analysis, data manipulation, spatial analysis, and visualization tasks. This introductory workshop is designed for those who want to learn how to use R independently with an emphasis on data manipulation and graphing for exploratory data analysis and visualization. Lunch is not included in the workshop. Please plan to begin the session after lunch on your own.

Opening Plenary Keynote

Saturday, October 6 | 8:00 AM– 8:50 AM | Forum Hall



“Rhyming West: Cowboy Poetry Then and Now”

Dr. Timothy Keane

Professor and Director of Research, Scholarship, and Creative Activity
College of Architecture, Planning, and Design
Department of Landscape Architecture and Regional & Community Planning
Kansas State University

Tim Keane is Professor of Landscape Architecture and Distinguished Graduate Faculty in the College of Architecture, Planning, and Design at Kansas State University where he has served since 1984. His research involves the study of rivers, creeks, gullies and erosional/depositional processes. While this all sounds quite pretentious, he attempts to remain pragmatic, half-hand, and on occasion, entertaining. Tim has been attempting to write “cowboy poetry” for thirty years or more. In 2014, 2017, and 2018 Tim was named “Champion” in the Kansas Cowboy Poetry Contest and in 2016 and 2018 he was Reserve Champion at the National Cowboy Poetry Rodeo (NCPR) where he has won multiple events. Keane lives with his wife Sharon and a couple of bird dogs in northwest Wabaunsee County, Kansas.

Dinner and Awards Banquet Keynote

Saturday, October 6 | 7:00 PM – 9:00 PM | Main Ballroom



“Expanding the Community of Geography”

David H. Kaplan

Vice-President, American Association of Geographers
Professor of Geography, Kent State University

Dr. David Kaplan is a Professor of Geography at Kent State University. He has written some 60 peer-reviewed articles and chapters, and has also published *Segregation in Cities, Nested Identities, Boundaries and Place, Human Geography, Urban Geography, Landscapes of the Ethnic Economy, Perthes World Atlas*, the four volume *Nations and Nationalism: A Global Historical Overview, Navigating Ethnicity* and *Scaling Identities*. Dr. Kaplan’s research interests include nationalism, borderlands, ethnic and racial segregation, urban and regional development, housing finance, and sustainable transportation. Dr. Kaplan has directly supervised 48 graduate students and teaches courses on many different aspects of human geography. Dr. Kaplan is the Vice President and upcoming President for the American Association of Geographers, the largest academic geography association in the Americas, and is a Councilor for the American Geographical Society, the United States’ oldest geographical organization. He edits the *Geographical Review*, the flagship journal of the AGS, as well as *National Identities*.

Special Sessions

A3: Tips and Strategies in Writing Effective Proposals for the National Science Foundation (NSF) | Big 12 Room | 9:00 AM – 10:40 AM

Organized by Jacqueline M. Vadjunec (National Science Foundation, Geography and Spatial Sciences)

This outreach session is intended for faculty members, professional geographers, and graduate students who engage in geographic or spatial scientific research and who wish to learn how to prepare effective proposals for NSF. A Program Director from the Geography and Spatial Sciences (GSS) Program at the National Science Foundation (NSF) will discuss research grant opportunities at NSF and highlight ways to improve the quality and competitiveness of a proposal. The session will include details about the review process, including the intellectual merit and broader impacts review criteria. Ample time for Q&A will be provided.

B2: Geographies of Place Attachment | Cottonwood Room | 10:50 AM – 12:30 PM

Organized by Joshua Hagen (Northern State University) and Alexander C. Diener (University of Kansas)

This session encompasses a diverse range of case studies exploring the human propensity to feel connected to place and space. The notion of place attachment captures that proclivity nicely and its role in how people organize their surroundings while making sense of the world and our place in it. These geographies of place attachment can take many forms, ranging from banal acts of everyday life to spectacular assertions of authority.

C2: South Asia and Small Island Developing States (SIDS) | Cottonwood Room | 1:50 PM – 3:30 PM

Organized by Bimal Kanti Paul (Kansas State University) and S.A. Hasnath (Boston University)

This special session focuses on selected contemporary environmental and other emerging problems in South Asia and addresses how countries in the region have been trying to solve these problems on their own - without seeking external assistance. The session also focuses on an issue of Small Island Developing States (SIDS), which is widely seen as an important barrier for development and political instability of these countries.

C4: Encroachment or Opportunity? Geography in a World of Environmental Studies, Global and International Studies, GIScience, Environmental Science, and Sustainability Studies | Room 227 | 1:50 PM – 3:30 PM

Organized by Deborah Thomas (University of North Carolina Charlotte) and Shannon O’Lear (University of Kansas)

With the creation and expansion of interdisciplinary programs, geography must position itself strategically. Departments and/or curriculum in sustainability, such as global studies, international studies, environmental science among others, run the risk of encroaching on geography majors and enrollments or can complement and augment geography degrees. This facilitated workshop will explore opportunities, strategies and challenges to this dilemma.

Conference at a Glance

Friday, October 5 at Seaton Hall or Berney Family Welcome Center

Time	Event
12:30 PM – 1:00 PM	Registration (Department of Geography, 1002 Seaton Hall)
1:00 PM – 4:30 PM	Field Trips and Workshop (gather at Registration Desk to meet trip/workshop leader): <i>Chasing Geography and History along the Kaw River Valley – Dr. Jeffrey Smith</i> <i>The Konza Prairie Biological Station and Kansas Flint Hills – Dr. Kendra McLaughlan</i> <i>Introduction to R Programming for Visualization – Dr. Shawn Hutchinson</i>
6:00 PM – 9:00 PM	Welcome Reception (Berney Family Welcome Center) and Registration
9:00 PM	GPRM Student Social (Venue TBA)

Saturday, October 6 at KSU Student Union

	Flinthills	Cottonwood	Big 12	Room 227
7:30 AM	Registration (1 st Floor, KSU Student Union)			
8:00 AM – 8:50 AM	Opening Plenary (Forum Hall) <i>Welcome: Dr. Charles Martin (Department of Geography, Kansas State University)</i> <i>Keynote: Dr. Timothy Keane (Landscape Architecture and Regional & Community Planning, Kansas State University)</i>			
9:00 AM – 5:20 PM	A5 Poster Session (KSU Ballroom) <i>Poster presenters need to be at their posters from 1:20-1:50 PM</i>			
9:00 AM – 10:40 AM	A1 Maps, Media, and Education	A2 Managing Landscape Use	A3 NSF Tips and Strategies	A4 Water
10:50 AM – 12:30 PM	B1 Plains and Towns	B2 Geographies Place Attachment	B3 Agriculture	B4 Models of Landscape/Landuse
12:30 PM – 1:50 PM	“On Your Own” Lunch			
1:50 PM – 3:30 PM	C1 Spatial Policy	C2 South Asia and SIDS	C3 Physical Geography 1	C4 Encroachment or Opportunity
3:40 PM – 5:20 PM	D1 Cultural Geography	D2 People and Population	D3 Physical Geography 2	
5:30 PM – 6:30 PM				GPRM Business Meeting
5:30 PM – 7:00 PM	GPRM GeoBowl (Teams meet in Big 12 Room no later than 5:30 PM to receive instructions)			
7:00 PM – 9:00 PM	Banquet and Awards Dinner (Main Ballroom) <i>Welcome: Dr. Amit Chakrabarti (Dean, College of Arts & Sciences, Kansas State Univ)</i> <i>Keynote: Dr. David Kaplan (Vice-President, AAG)</i> <i>Awards Presentation: Dr. Arnaud Temme (Kansas State University)</i>			

Paper and Poster Sessions

Underlined = Session Chair * = Graduate # = Undergraduate ~~Strikethrough~~ = Withdrawn

A1: Maps, Media, and Education | Flint Hills Room | 9:00 AM – 10:40 AM

- **A1.1. Measuring Place in the News: Using Big Data to Find Over- and Underrepresented Places in Media**
David Parr and Todd Jacobus
Metropolitan State University of Denver
- **A1.2 An Interactive Point Pattern Analysis Web Application and Teaching Exercise**
Jonathan C. Comer (1) and Mathew Haffner (2)
(1) Oklahoma State University, (2) University of Wisconsin – Eau Claire
- **A1.3 Geography with Goudge: Using Weekly Media Maps as a Form of Community Outreach**
Theodore L. Goudge
Northwest Missouri State University
- **A1.4 The Use of Air Navigation Maps and Related Resources in Geographic Education**
Richard Lisichenko and Thomas Schafer
Fort Hays State University
- **A1.5 Patterns in the Locations of U.S. Mass Shootings**
Avonlea Keenen*
Oklahoma State University

A2: Managing Landscape Use | Cottonwood Room | 9:00 AM – 10:40 PM

- **A2.1 Indigenous Territorial Jurisdictions and Forest Conservation in Central America**
Peter Herlihy, M.L. Fahrenbruch, and T.A. Tappan
University of Kansas
- **A2.2 Biophysical and Economic Impacts of Farmer Managed Natural Regeneration in the Province of Bam in Burkina Faso**
Brice B. Zoungrana*
South Dakota State University
- **A2.3 Floods, Droughts, Oil Spills, and Citizen Engagement: A Longitudinal Study of Life on the Yellowstone River**
Susan J. Gilbertz (1), Damon M. Hall (2), and Christopher Craig (1)
(1) Montana State University Billings, (2) University of Missouri
- **A2.4 Standing Rock: Understanding Patterns and Impacts of Land Allotment**
Stephen L. Egbert (1), Joshua Meisel (1, 2), and Joseph Paul Brewer II (1)
(1) University of Kansas, (2) Haskell Indian Nations University
- **A2.5 A Socio-Hydrology Profile Methodology: Including Human and Social Attributes**
Jean Eichhorst
University of Wisconsin-Eau Claire

A3: NSF Tips and Strategies | Big 12 Room | 9:00 AM – 10:40 AM

Organized by Jacqueline M. Vadjunec (National Science Foundation, Geography and Spatial Sciences)

- **A3.1 Tips and Strategies in Writing Effective Proposals for the National Science Foundation**
Jacqueline M. Vadjunec
National Science Foundation, Geography and Spatial Sciences

A4: Water | Room 227 | 9:00 AM – 10:40 AM

- **A4.1 “In Budyko We Trust”: Application of the Budyko Framework for Streamflow Partitioning in a Glaciated Prairie Landscape**
Paul Todhunter (1), Courtney Jackson (2), and Taufique Mahmood (2)
(1) University of North Dakota, (2) Pennsylvania State University
- **A4.2 FOSSFlood: Free and Open Source Software for Harnessing the Potential of the National Water Model**
James Coll* (1) and Mike Johnson (2)
(1) University of Kansas, (2) University of California, Santa Barbara
- **A4.3 Lake Storage Variation on the Endorheic Tibetan Plateau and its Attribution to Climate Change Since the New Millennium**
Fanfang Yao* (1), Jida Wang (1), Kehan Yang (2), Chao Wang (3), Blake Walter (1), and Jean-François Crétaux (4)
(1) Kansas State University, (2) University of Colorado Boulder, (3) University of Puerto Rico, (4) Laboratoire d’Études en Géophysique et Océanographie Spatiales (LEGOS)
- **A4.4 Global Assessment of Surface Water Abundance in Lakes and Reservoirs**
Meng Ding* and Jida Wang
Kansas State University
- **A4.5 Dioxins and Fish Consumption on the Lower Ohio River**
John Paul Henry*
University of Kansas

A5 Posters | KSU Ballroom | 9:00 AM – 5:20 PM

- **A5.1 The Impacts of Public-Private School Choice on Public Schools in the St. Louis Area**
Tessa Cook*
Oklahoma State University
- **A5.2 “Getting that Jellyfish Crunch”: Sequential Exploitation, Cannonball Jellyfish, and the Global Jellyfish Market**
Matthew L. Fahrenbruch*
University of Kansas
- **A5.3 Assessment of Regeneration Time of an Evergreen Forest After Wildfire Using LANDSAT Images**
Fatema Tuz Johra Nourin* and Chen Xu
University of Wyoming
- **A5.4 The Effects of Distance on the Composition of U.S. State Legislatures**
Jesse R. Andrews*
Oklahoma State University
- **A5.5 The Electricity Sector Evolution in Brazil: The Emergence of BioElectricity**
Helder Martins*
Federal University of Santa Catarina (Brazil)
- **A5.6 Climatic and Environmental Factors Influencing Parcel-Scale Woody Plant Encroachment in Cimarron County, Oklahoma**
Austin Boardman* and Jacqueline M. Vadjunec
Oklahoma State University
- **A5.7 Quaternary Landscape Reconstruction Using Bioclimatic Envelopes and Pollen Based Modelling Approaches in Southern Wyoming**
Thomas Koenig*
University of Wyoming

- **A5.8 Using Structure-from-Motion Photogrammetry and Erosion Pins to Quantify Controls on Bedrock Erosion and Sediment Transport in a Heterogeneously Layered Landscape, Flint Hills, KS**
Abbey L. Marcotte* and Abigail L. Langston
Kansas State University
- **A5.9 Analyzing Tornado Frequency and Regional Climate Change Relationships in Kansas CE 1950-2016**
Michael S. Molloy* and Bimal Kanti Paul
Kansas State University
- **A5.10 A Geography of Advertising in Early Automobile Route Guides**
John T. Bauer and Claire M. Christner
University of Nebraska Kearney
- **A5.11 Identifying Food Deserts in Rural North Dakota: A GIS-Based Analysis of Food Accessibility**
Phoebe Eichhorst#, Zachary Seeger, and Enru Wang
University of North Dakota
- **A5.12 Quantifying the Effects of Sediment Flux and Water Discharge on Lateral Bedrock Erosion Using Flume Experiments**
Ricardo Gonzalez# and Abigail L. Langston
Kansas State University
- **A5.13 Patterns of Cottonwood Forest Change Along the South Platte River, Logan County, Colorado, 1979-2016**
Haley Hampstead# (1), Gabrielle Katz (1), and Jessica Salo (2)
(1) Metropolitan State University of Denver, (2) University of Northern Colorado
- **A5.14 Changes in Weather by Elevation in a Colorado Mountain Environment During a Winter Storm Event**
Jana MacInnis#, Kimberly Clough, Destarte “Conagher” Haun
University of Colorado Colorado Springs
- **A5.15 Libya's Seismic History: From Roman Records to Modern News**
Somaia Suwihli* and Thomas R. Paradise
University of Arkansas
- ~~**A5.16 The Diverse Faces of American Agriculture: Gendered and Racial Representations of Farmers and Ranchers in the Southern Great Plains**~~
~~Maria Ramirez Saenz, Fernanda Ramirez Saenz*, Jacqueline M. Vadjunec, and Todd Fagin~~
~~Oklahoma State University~~
- **A5.17 The Contemporary Scottish Gaelic Linguistic and Cultural Landscape**
John Paul Rogers*
Kansas State University
- **A5.18 The Importance of Geographic Realism in Genre Fiction: How Place and Landscape in Robin Hobb's *Assassin's Quest* Produce Subversive Social Critique**
C.A. Shropshire*
Oklahoma State University
- **A5.19 The Connections of Grassland Conversion in the Midwest**
Lucas Porter* and Darrell Napton
South Dakota State University
- **A5.20 The Interconnected System of Geology, Soils and Land Use around Álora, Spain**
Marte M. Stoorvogel*
Wageningen University (The Netherlands)
- **A5.21 Locating Suitable Locations to Measure Snow Avalanche Geomorphic Impacts**
Michael Stumpff* and Arnaud J. Temme
Kansas State University

- **A5.22 Land Use and Land Cover Changes in the 'Ghost Villages' of Uttarakhand, India**
Komal Preet Kaur* and Marcellus Caldas
Kansas State University
- **A5.23 Assessing Impacts of Grass on Vertical Accuracy of Digital Surface Models Derived from Unmanned Aerial Systems**
Amanda F. Thomas*
Oklahoma State University
- **A5.24 Time Series Analysis of Phenometrics and Long-Term Grassland Trends across the Great Plains Ecoregion using Moderate Resolution Satellite Imagery**
J.M. Shawn Hutchinson and Hilda Onuoha
Kansas State University
- **A5.25 Where are Dams and Reservoirs, and How Do They Affect Surface Water Budget?**
Jida Wang, Blake A. Walter, and Fangfang Yao
Kansas State University
- ~~**A5.26 Maternal Mortality and Population Growth in 19th Century Britain**~~
~~Andrew Smith#~~
~~Brigham Young University~~
- **A5.27 The Sinking Island of Isle de Jean Charles: How Climate Change, Oil Development, and Severe Weather are Impacting the Native American Community**
Clayton Blodgett and Kane Wolkey#
University of Missouri
- **A5.28 Mapping Imperialism: Integrating Geography into History Lessons**
Jessica Hunt# and Dawn M. Drake
Missouri Western State University
- **A5.29 The Benefits of GIS to Public Works Departments: The Case of St. Joseph, Missouri**
Cheyenne Curley# and Dawn M. Drake
Missouri Western State University
- **A5.30 Using GIS to Overcome Language Barriers in Healthcare**
Kim Leach# and Dawn M. Drake
Missouri Western State University
- **A5.31 Spatial Examination of Nebraska's Pioneer and Heritage Farms**
Natasha Winfield# and Jason Combs
University of Nebraska-Kearney

B1: Plains and Towns | Flint Hills Room | 10:50 AM – 12:30 PM

- **B1.1 Changes in the Landscape of a Northern Plains Town: Antler, North Dakota (1900 to 2018)**
W.A. Wetherholt (1) and G.S. Vandeberg (2)
(1) Frostburg State University, (2) University of North Dakota
- **B1.2 Deconstructing the Rural Kansas Stereotype: The Story of Bradford, Wabaunsee County, a Lost Biracial Community, 1890-1941**
Karl F. Bauer
University of North Dakota
- **B1.3 The Historic Preservation of Northern Rocky Mountain Ghost Towns**
Krista Evans
Missouri State University
- **B1.4 Pipelines, Protectors, and a Sense of Place: Media Representations of #NoDAPL**
Katie Grote*
University of Kansas

- **B1.5 A Cultural Geography of Visualizing Spatial Attributes of Human Trafficking in the American Great Plains**
Rebecca Buller
University of Nebraska - Lincoln

B2: Geographies of Place Attachment | Cottonwood Room | 10:50 AM – 12:30 PM
Organized by Joshua Hagen (Northern State University) and Alexander C. Diener (University of Kansas)

- **B2.1 Making Places and Spaces of Memory in Nazi Germany: Semiotics, Performativity, and Affect**
Joshua Hagen
Northern State University
- **B2.2 Exogenous place attachment and Amazonian conservation.**
Stephen Cameron*
University of Kansas
- **B2.3 “Tied To The Land”: Pipelines and Place Attachment**
Christina Dando
University of Nebraska Omaha
- **B2.4 Attachment to Vanishing Places**
Jeffrey Smith
Kansas State University
- **B2.5 Theorizing Multi-Scalar Territorialization in Central Asia: Russians in Kazakhstan’s Northern Borderland**
Alexander Diener
University of Kansas

B3: Agriculture | Big 12 Room | 10:50 AM – 12:30 PM

- **B3.1 Exploring the Impacts of Agricultural Landscape Diversity on Yields in the U.S. Using Bayesian Spatiotemporal Modeling**
Katherine S. Nelson (1) and Emily K. Burchfield (2)
(1) Kansas State University, (2) Utah State University
- **B3.2 Using Remote Sensing to Detect Changes in Vegetated and Riparian Buffer in Agricultural Areas of Nebraska: Preliminary Results**
Alex R. Mohr*
University of Nebraska Omaha
- **B3.3 Dynamics of Soybeans and Cattle Production in Brazil**
Rebecca Lima Albuquerque Maranhão* (1), Osmar Abílio de Carvalho Júnior (2), Potira Meirelles Hermuche (2), Roberto Arnaldo Trancoso Gomes (2), Concepta McManus (2), and Renato Guimaraes (2)
(1) Kansas State University, (2) University of Brasilia (Brazil)
- **B3.4 Analysis of Dairy Cow Populations and Land Use in the Kansas City Milkshed**
Dawn M. Drake
Missouri Western State University
- **B3.5 A Hidden Past: The Historical Geography of Agricultural Drainage in Iowa**
Jakob Hanschu#
Kansas State University

B4: Models of Landscape and Landuse | Room 227 | 10:50 AM – 12:30 PM

- **B4.1 Participatory Mapping the Public Perceptions of Browns Canyon National Monument, Colorado**
John Harner (1), Lee Cerveny (2), and Rebeccas Gronewold (1)
(1) University of Colorado Colorado Springs, (2) U.S. Forest Service
- **B4.2 Assessing the Quantitative and Qualitative Differences between 3D Models Produced from LiDAR and Structure from Motion**
Matthew Moebes* and Clayton Blodgett
University of Missouri
- **B4.3 Open (Paper Withdrawn)**
- **B4.4 The Compounding Threat to Brazilian Cerrado Biodiversity: Exploring Land and Climate Change Impacts on Amphibian Habitats**
Marcellus Caldas (1), Gabriel Granco (1), and Paulo de Marco Jr. (2)
(1) Kansas State University, (2) Federal University of Goiás
- **B4.5 Geotagging and Geobragging**
J. Stubbendeck#
University of Nebraska Lincoln

C1: Spatial Policy | Flint Hills Room | 1:50 PM – 3:30 PM

- **C1.1 How Does Place-based Culture Influence on Pro-Environmental Policy Support? An Examination using Agent-based Simulations**
Gabriel Granco, Marcellus Caldas, and Matthew Sanderson
Kansas State University
- **C1.2 Indus the Blue Gold: - Rethinking on the Transboundary Water Distribution Between India and Pakistan**
Puja Jana*
Oklahoma State University
- **C1.3 A Preliminary Examination of Wildfire Evacuation Zoning: Evidence from the Vineyard Fire and the Carr Fire**
Dapeng Li
South Dakota State University
- **C1.4 For the Greater Good: How Flood Control and Stream Management Became a Federal Concern**
Michael A. Urban
University of Missouri
- **C1.5 Public-Private Partnerships with Public Transit, Local Government Agencies, and Ridesourcing in Denver, CO**
Sylvia Arriaga Brady*
University of Denver

C2: South Asia and Small Developing Islands (SIDS) | Cottonwood Room | 1:50 PM – 3:30 PM

Organized by Bimal Kanti Paul (Kansas State University) and S.A. Hasnath (Boston University)

- **C2.1 How Many Monolingual Countries Are There? Language Diversity in Small Island Developing States (SIDS)**
Bimal Kanti Paul
Kansas State University

- **C2.2 Large Development Projects in Shaping Land Use and Livelihood: A Case Study of the Padma Multipurpose Bridge Project, Bangladesh**
Jawata Afnan Saba* (1), Abu Suphiyan Shekh (2), and Manjur Morshed (3)
(1) South Dakota State University, (2) Jahangirnagar University, (3) Khulna University of Engineering and Technology
- **C2.3 Determinants of Human Migration in the Climate Change Affected Indian Sundarbans**
Subarna Chatterjee*, Bimal Kanti Paul, and Audrey Joslin
Kansas State University
- **C2.4 Deteriorating Groundwater Quality Causing Health Hazards in Selected Villages of Gautam Budh Nagar District, Uttar Pradesh, India**
V.K. Boken (1), K. Lal (2), I Mukerjee (2), R.K. Yadav (3), and M. Singh (2)
(1) University of Nebraska-Kearney, (2) Indian Agricultural Research Institute, (3) Center for Soil Salinity Research Institute (India)
- **C2.5 Kerala Floods: Should India Change its Foreign Aid Policy?**
Avantika Ramekar* and Bimal Kanti Paul
Kansas State University

C3: Physical Geography 1 | Big 12 Room | 1:50 PM – 3:30 PM

- **C3.1 Two Arguments in Favor of Characterizing Additional Proglacial Soil Chronosequences**
Arnaud J. Temme
Kansas State University
- **C3.2 Dynamics of Lodgepole Pine Forests in Fire-Driven Landscapes: Past, Present and Future**
Barrie Chileen* (1), Kendra K. McLaughlan (1), and Philip Higuera (2)
(1) Kansas State University, (2) University of Montana
- **C3.3 Spatiotemporal Patterns of Human-Induced Landscape Change in a German Agricultural Landscape**
W. Marijn van der Meij* (1, 2), Arnaud J.A.M. Temme (3, 4), and M. Sommer (2)
(1) Wageningen University (Netherlands), (2) Leibniz Centre for Agricultural Landscape Research (ZALF) (Germany), (3) Kansas State University, (4) University of Colorado Boulder
- **C3.4 Assessing the influence of parameters for agricultural flood loss estimation in the Middle Cedar River Watershed, Iowa**
Md Abu Sayeed Marroof*
Kansas State University

C4: Encroachment or Opportunity | Room 227 | 1:50 PM – 3:30 PM

Organized by Deborah Thomas (University of North Carolina Charlotte) and Shannon O’Lear (University of Kansas)

- **C4.1 Encroachment or Opportunity? Geography in a World of Environmental Studies, Global and International Studies, GIScience, Environmental Science, and Sustainability Studies**
Deb Thomas
University of North Carolina Charlotte

D1: Cultural Geography | Flint Hills Room | 3:40 PM – 5:20 PM

- **D1.1 An Analysis of Advertising Revenue in Early Automobile Route Guides**
John T. Bauer
University of Nebraska Kearney

- **D1.2 New Colossus, New Nationalisms? Affective-Discursive Practices and The National Body of “Lady Liberty”**
James E. Baker*
University of Nebraska Lincoln
- **D1.3 Becoming Laura: Performing Gender at Little House Tourist Sites**
Kimberly Johnson Maier*
Oklahoma State University
- **D1.4 Mate Between Mates: The Evolving Social Relations of Yerba Mate Consumption**
Adam S. Dohrenwend*
University of Kansas
- **D1.5 Geographies of Opera in Communist Slovakia**
Brett R. Chloupek
Northwest Missouri State University

D2: People and Population | Cottonwood Room | 3:40 PM – 5:20 PM

- **D2.1 David Rankin: America's Greatest Farmer**
Jason Combs
University of Nebraska Kearney
- **D2.2 Neo-Isolationism in the U.S. Presidential Election of 2016**
J.C. Archer (1), F.M. Davidson (2), E.H. Fouberg (3), F.M. Shelley (4), and R.H. Watrel (5)
(1) University of Nebraska Lincoln, (2) University of Arkansas, (3) Northern State University, (4) University of Oklahoma, (5) South Dakota State University
- **D2.3 The Electoral Geography of Iowa Territory and Early Iowa Statehood**
Robert Shepard
University of Iowa
- **D2.4 Rural Depopulation and the Resurgence of Six-Man Football in Nebraska**
Andrew Husa*
University of Nebraska Lincoln
- **D2.5 Chain Migration as a Factor in Migrants’ Income – a Case Study of the Informal Recycling Sector in Beijing, China**
Jia Feng
Washburn University

D3: Physical Geography 2 | Big 12 Room | 3:40 PM – 5:20 PM

- **D3.1 Parameterization of the Prospect Leaf Reflectance Model for Tallgrass Prairie**
Douglas G. Goodin
Kansas State University
- **D3.2 Predicting and Estimating Land Cover Mapping at Bento Rodrigues Dam Disaster Area using Machine Learning and Landsat Images**
Dong Luo*, Marcellus Caldas, and Douglas G. Goodin
Kansas State University
- **D3.3 Contrasting Effects of Dams on River Morphology and Sand Transport in the Colorado River Basin**
Erich R. Mueller (1), David J. Topping (2), and Paul E. Grams (2)
(1) University of Wyoming, (2) U.S. Geological Survey
- **D3.4 Use of Oklahoma’s Mesonet and Severe Environmental Events**
Steve Stadler (1) and Chris Fiebrich (2)
(1) Oklahoma State University, (2) The Oklahoma Mesonet

GPRM GeoBowl Competition | 5:30 PM – 7:00 PM

Organized by Deborah Hann (Emporia State University)

Teams should meet in the Big 12 Room

Preliminary Rounds in the Flinthills and Cottonwood Rooms

Final Round in the Cottonwood Room

GPRM Business Meeting | 5:30 PM – 6:30 PM | Room 227

Organized by Arnaud Temme (Kansas State University)

GPRM Banquet and Awards Dinner | KSU Ballroom | 7:00 PM – 9:00 PM

Bar opens at 7:00 PM with dinner served at 7:15 PM

Program Begins 7:45 PM

- **Opening Remarks**
Dr. Amit Chakrabarti, Dean, College of Arts & Sciences
Kansas State University
- **Keynote Present**
Dr. David Kaplan, Vice President, American Association of Geographers
Kent State University
- **Presentation of Student Awards**
Dr. Arnaud Temme
Kansas State University

Paper and Poster Abstracts

A1.1 Measuring Place in the News: Using Big Data to Find Over- and Underrepresented Places in Media

David Parr and Todd Jacobus

Department of Earth and Atmospheric Science, Metropolitan State University of Denver (U.S.)

Abstract: Why are some places frequently mentioned in the news while other places seem to seldomly appear? This paper discusses some initial research and findings into which places are over- and underrepresented in the media and why that may be occurring. Using the Google BigQuery engine and the GDELT worldwide sentiment analysis engine, we explored real-time and near real-time media coverage of places in worldwide English media, specifically television, print and web sources over three months in 2018. From these sources, we collected mentions of places in news pieces. A descriptive exploratory analysis describes the location, quantity and density of place mentions within the US and around the world. A second analysis attempts to reveal factors that may contribute to the spatial distributions of mentions and their relationship to spatial distance, population and socioeconomic factors, and the broader hierarchical network of cities. Using sentiment analysis, we also measure the positive and negative associations with places represented in the media. The results suggest some factors that may contribute to the quantity and density of places mentioned in media as well as future avenues of research.

Keywords: Big data, GIS, place and space, media

A1.2 An Interactive Point Pattern Analysis Web Application and Teaching Exercise

Jonathan C. Comer (1), Mathew Haffner (2)

(1) Department of Geography, Oklahoma State University, (2) Department of Geography and Anthropology, University of Wisconsin-Eau Claire

Abstract: Methods in spatial statistics are difficult for students to grasp, and student anxiety toward statistics is common. Studies have shown that gaming approaches, digital tools, and interactive instruction for teaching spatial thinking complement and enhance students' geospatial skills. In addition, these approaches can positively affect student perception of courses and thus improve classroom performance. Yet, few resources exist outside of textbooks for teaching these methods. This paper introduces a web-based, interactive point pattern analysis "game" that allows users to quickly and repeatedly generate a point pattern on screen and immediately learn whether the pattern is statistically different from random. It uses two point pattern analysis methods: quadrat analysis and nearest neighbor analysis. This game challenges students to achieve randomness, demonstrates the differences between quadrat analysis and nearest neighbor analysis, and easily permits in-class use by running in any web browser. It is built using Shiny, a web framework for R, and the application's code is hosted on GitLab where the authors encourage use, modification, and contributions by others.

Keywords: Spatial thinking, GIS&T, point pattern analysis, geographic pedagogy

A1.3 Geography with Goudge: Using Weekly Media Maps as a Form of Community Outreach

Theodore L. Goudge

Department of Geography, Northwest Missouri State University (U.S.)

Abstract: Last year (2017) Derek Alderman, then AAG President, developed an initiative he called "Geography is REAL" (Responsive, Engaged, Advocating, and Life-Improving). "The purpose of REAL is to create and open

spaces within our discipline to demonstrate the larger public value of a geographic perspective to a wider world.” The author has spent a career investigating the spatial analysis of sport. Sport and geography share a common spatial bond. Boundaries, delineation, demarcation, territorial control, spatial interaction, distance decay, etc. are essential elements of both. The role sport plays in the American way of life is inescapable. How many ESPN channels are there? Thus, academic investigation into the cultural geography of sport, sport landscape and sports impact on society is a data-rich subfield that poses unlimited possibilities. ‘Geography with Goudge’, a weekly media (newspaper & radio website) map focusing on the geography of sport is an example of an attempt at public communication or what the author calls ‘Community Outreach’. Alderman characterized, “Public communication as ‘serious business’, meaning that the consequences of effective or poor communication should not be taken lightly”. The purpose of this project was to examine the impact ‘Geography with Goudge’ has had in terms of making Geography REAL. Examples of the outreach along with attempts to measure its degree of impact (effectiveness) are discussed. These include viewership data, social media implications, readership impacts (testimonials) and other measures. Suggestions for engaging in community outreach are also included.

Keywords: College sports, community outreach, public communication, sport geography

A1.4 The Use of Air Navigation Maps and Related Resources in Geographic Education

Richard Lisichenko and Thomas Schafer

Department of Geosciences, Fort Hays State University

Abstract: Although not widely used in the classroom, air navigation maps contain valuable amounts of geographic description regarding both landscape and airspace. Spatial elements such as types of controlled airspace zones and altitudes, surface obstacles, navigation landmarks, aircraft pathways, and various human activities are provided. Supplemental Internet information resources contain current situation data about places that include factors such as: weather conditions and location activities, restrictions, and trip planning. Air navigation maps and support resources are easily accessible, and provide a useful and interesting dimension towards both geographic description and spatial analysis of locations throughout the world.

Keywords: Geographic education, cartography, air navigation maps

A1.5 Patterns in the Locations of U.S. Mass Shootings

Avonlea Keenen

Department of Geography, Oklahoma State University

Abstract: Mass shootings are topics of intense public concern and debate. Unfortunately, most previous research examining mass shootings within the U.S. has focused on motivations or other characteristics of the shooter(s) with less attention directed at places or communities where the violence has occurred. This study explores mass shooting locations as unique sites marked by tragedy with the goal of revealing patterns associated with mass shooting locations. Such patterns may include community characteristics and the influence of state firearm policies. Two research questions are considered: 1) What community attributes are associated with locations where mass shootings have taken place? and 2) To what extent are state firearm policies associated with the locations of mass shootings? Approximately 1,000 observations from the Gun Violence Archive (2014-16) are used within a logistic regression analysis to address the research questions.

Keywords: Mass shootings, crime, regression, community attributes

A2.1 Indigenous Territorial Jurisdictions and Forest Conservation in Central America

P.H. Herlihy, M.L. Fahrenbruch, and T.A. Tappan

Department of Geography and Atmospheric Sciences, University of Kansas

Abstract: Geographic inquiry about the interrelationships between indigenous populations and the natural environment of Central America began in the 1980s. The coexistence of indigenous peoples and their “indigenous territorial jurisdictions” (ITJs) with forested habitats of the region is examined here using 21st century information and technology. More reliable census information, cadastral mapping, and land cover analysis are coupled with first hand analysis and participatory research mapping (PRM) results in the development of an ArcGIS database. The results show ITJs now cover about 18% of Central America, including the region’s most important forested areas. With about 40% of the area of the ITJs overlapping with the region’s protected areas, our results suggest ITJs are working better at protecting the forest than legally-established protected areas.

Keywords: Indigenous peoples, territorial jurisdictions, Central America, deforestation, protected areas

A2.2 Biophysical and Economic Impacts of Farmer Managed Natural Regeneration System in the Province of Bam in Burkina Faso

Brice B. Zoungrana

Department of Geography, South Dakota State University

Abstract: Farmer Managed Natural Regeneration (FMNR) is the protection and the management of natural grown trees to increase the value and quantity of wood vegetation on farmlands in parts of West Africa. By protecting the trees, farmers establish a low-cost system to restore degraded land, improve agricultural production, and improve forest and pasture land. This ongoing study evaluates the issues of sustainable land use, land change, and land management in the province of Bam in Burkina Faso, by looking at the biophysical and economic impacts of Farmer Managed Natural Regeneration. Satellite imagery, as well as a survey in the study area will provide the history, and the economic impact of FMNR. In addition, soil samples in the villages with and without FMNR will provide a comparative result of the hypothesized changes in the quality of the soil induced by trees. Farmer managed natural regeneration mixes human activities such as agriculture and environmental protection in a sustainable and beneficial way for humans and nature.

Keywords: Farmer Managed Natural Regeneration (FMNR), land management, sustainability, Burkina Faso.

A2.3 Floods, Droughts, Oil Spills, and Citizen Engagement: A Longitudinal Study of Life on the Yellowstone River

Susan J. Gilbertz (1), Damon M. Hall (2), and Christopher Craig (3)

(1) Department of Social Sciences and Cultural Studies, Montana State University Billings, (2) School of Natural Resources-Bioengineering, University of Missouri, (3) Department of Business Administration, Montana State University Billings

Abstract: Beginning in 2006, a concerted effort was undertaken to document and catalog the concerns and desires of the people of the Yellowstone River. Attention was focused on how different interest groups (agriculturalists, civic leaders, recreationalists and residentialists valued the resources of the river and how they

chose to deal with physical processes, such as flooding, erosion and drought. Follow-up interviews were conducted and catalogued in 2013 after a pipeline rupture contaminated the river. In 2017, the valley experienced one of the wettest springs on record, followed immediately by one of the driest summers; and so, a third round of interviews were conducted and catalogued in 2018. As a body of evidence, these three sets of interviews serve as narrative snapshots that allow for longitudinal examinations of how cultural values can remain steadfast, shift dramatically when faced with crises and slowly evolve over time. The longitudinal examinations are useful to scholars and practitioners as they illuminate the intersections of science, government and local citizenry.

Keywords: Cultural geography, physical geography, environmental contamination, qualitative data, longitudinal study, Yellowstone River

A2.4 Standing Rock: Understanding Patterns and Impacts of Land Allotment

Stephen L. Egbert (1), Joshua Meisel (2), and Joseph Paul Brewer II (3)

(1) Department of Geography and Atmospheric Science, University of Kansas, (2) Geography Program, Haskell Indian Nations University and Department of Geography and Atmospheric Science, University of Kansas, (3) Environmental Studies Program, University of Kansas

Abstract: A major part of the push to assimilate Native peoples in the late 1880s and early 1900s was a program to divide reservations into “allotments” for individual tribal members. Allotments were designed to force Native peoples into agricultural lifestyles and to diminish the power of tribal and cultural identities. The Dawes Act of 1887 was the primary enabling legislation, although there were numerous other treaties, acts, and executive orders. While some impacts, such as fractionation and checkerboarding, are now well understood, there has been a paucity of studies utilizing GIS mapping and visualization to understand allotment’s spatio-temporal patterns and processes. Our goals are to explore land allotment patterns on the Standing Rock Reservation to understand: (1) the strategies employed by Native people, within the confines of the policies imposed upon them, and (2) the impacts of land allotment on Native society. Using archival records and GIS, we created databases of allotment lands at Standing Rock and analyzed the resulting patterns. We found that, unsurprisingly, the people primarily selected lands in the eastern parts of the reservation and along river valleys. Families used various strategies in selecting their lands, ranging from clustered to highly dispersed patterns. The allotments of married women were displaced to the west of those of their husbands, because they were allotted after the first wave of allotments. The allotting agent’s letters revealed that Standing Rock residents were well aware of the implications of allotment, chose their parcels deliberately, and strove to make allotment work in their favor.

Keywords: Native lands, allotment, Standing Rock, historical GIS

A2.5 A Socio-Hydrology Profile Methodology: Including Human and Social Attributes

Jean Eichhorst

Geography and Anthropology Department, University of Wisconsin-Eau Claire

Abstract: Socio-hydrology is a growing field among hydrologists and water management practitioners, especially as it pertains to modeling and the inclusion of human attributes and values. Such human characteristics are difficult to quantify and replicate in hydrological models due to their qualitative nature. Sivapalan et al. (2014) have proposed a three-part socio-hydrological model (structures and dynamics, well-being outcomes, values and norms), but without identifying specific values and norms. It is important for a

socio-hydrology model to be inclusive of human attributes and practices to fully represent the relationships between people and water. I address the unanswered question of what and how to incorporate human values and experiences into the broader modeling process and associated decision-making that accompanies the challenge of maintaining socio-ecological systems. Cultural, historical, and environmental experiences play an important role. Those events provide context but may be difficult to include as an input variables. I share a socio-hydrological profile and methodology for the Republican River basin and the 1943 compact that regulates the basin's water management. I identify the various components that dominate the basin's hydrological place in space. My results revealed four themes that have ebbed and flowed in time and space; that US federal statutory language plays a large role in management flexibility; and that stakeholders are most concerned with equitable water allocations today and moving forward. Based on these results, I propose that Sivapalan's model be expanded explicitly in its human component by including thematic categories that address economics, history, and ethics among others.

Keywords: Socio-hydrology, Republican River, models, water management, human attributes

A3.1 Tips and Strategies in Writing Effective Proposals for the National Science Foundation (NSF)

Jacqueline M. Vadjunec

National Science Foundation, Geography and Spatial Sciences

Abstract: This outreach session is intended for faculty members, professional geographers, and graduate students who engage in geographic or spatial scientific research and who wish to learn how to prepare effective proposals for NSF. A Program Director from the Geography and Spatial Sciences (GSS) Program at the National Science Foundation (NSF) will discuss research grant opportunities at NSF, and will highlight ways to improve the quality and competitiveness of a proposal. The session will include details about the review process, including the intellectual merit and broader impacts review criteria. Ample time for Q&A will be provided.

Keywords: National Science Foundation (NSF), grant writing, funding opportunities

A4.1 "In Budyko We Trust": Application of the Budyko Framework for Streamflow Partitioning in a Glaciated Prairie Landscape

Paul Todhunter (1), Courtney Jackson (2), and Taufique Mahmood (3)

(1) Department of Geography and GISc, University of North Dakota, (2) Department of Geography, Pennsylvania State University, (3) Harold Hamm School of Geology and Geological Engineering, University of North Dakota (U.S.)

Abstract: Devils Lake, a terminal lake within the Devils Lake Basin (9,870 km²), has experienced explosive growth over the past 25 years. Previous work has demonstrated that lake expansion can be explained by historical atmospheric change, however the role of historical landscape change as a driver of hydrological change remains unexamined. We explore the use of the Budyko Framework to separate historical hydrological change into climate and human components within the Mauvais Coulee (1,002 km²), a major sub-basin contributing inflow to Devils Lake, for the period 1956-2015. We first follow standard procedures from the literature on the use of the Budyko Hypothesis, and use Hurst rescaling of lake volume to identify 1993 as separating the baseline and post-change periods. This approach attributes 45% of streamflow change to climate drivers, and 55% to human drivers. We then explore the suitability of the assumptions required for use of the Budyko Framework, assumptions readily acknowledged in the literature but rarely demonstrated prior to application of the method. The identification of the baseline and post-change periods fails to account for

hydrological thresholds within the basin. Ground water storage effects are negligible, but root zone storage is significant, and we hypothesize that vadose zone storage effects are pronounced. The precipitation-runoff relationship is highly non-linear. Finally, the timing of human modifications within the sub-basin is inconsistent with the baseline and post-change periods. We conclude with remarks on the use of the Budyko relationship and its use in the assessment of climate change effects upon basin streamflow.

Keywords: Budyko Hypothesis, Devils Lake Basin, Mauvais Coulee, streamflow partitioning

A4.2 FOSSFlood: Free and Open Source Software for Harnessing the Potential of the National Water Model

James Coll (1) and Mike Johnson (2)

(1) Department of Geography, University of Kansas, (2) Department of Geography, University of California, Santa Barbra (U.S.)

Abstract: When the National Water Model went online in 2016, for the first time in the modern computational era the nation went from a lumped basin parameterization to a fully distributed, coupled hydrologic/hydraulic representation of the water cycle. Not only does this implementation represent an almost 21,000-fold increase in our predictive potential of river discharge, its modular nature ensures that future efforts to improve individual aspects of the model are immediately integrated into the lifecycle of a hydrologic event. However, the methods of accessing these efforts for those not intimately familiar with the model or data science conventions are limited, and the means of consuming these within the emergency management realm are currently nonexistent. To rectify these shortcomings, a graphical user interface built on Free and Open Source tools is demonstrated whose ideal users include first responders and decision makers. These intuitive and accessible properties enable virtually anyone with a modern computer to access, interact with, and make decisions based on, National Water Model forecasts – effectively bridging the gap between federal scale efforts to guide and inform, and the local scales where actions are made.

Keywords: National water model, flooding, emergency management

A4.3 Lake Storage Variation on the Endorheic Tibetan Plateau and its Attribution to Climate Change Since the New Millennium

Fangfang Yao (1), Jida Wang (1), Kehan Yang (2), Chao Wang (3), Blake Walter (1) and Jean-François Crétaux (4)
(1) Department of Geography, Kansas State University, (2) Department of Geography, University of Colorado Boulder, (3) Department of Environmental Sciences, University of Puerto Rico, (4) Department of Environmental Centre National d'Études Spatiales (CNES), Laboratoire d'Études en Géophysique et Océanographie Spatiales (LEGOS) (France)

Abstract: Alpine lakes in the interior of Tibet, the endorheic Changtang Plateau, serve as “sentinels” of regional climate change. Recent studies indicated that accelerated climate change has driven a widespread area expansion in lakes across the Changtang Plateau, but comprehensive and accurate quantifications of their storage changes are hitherto rare. Such volume estimate is crucial in understanding lake water budget and thus contributes to conclusively uncovering the dominant cause on lake dynamics in the complex alpine setting. This study integrated optical imagery (Landsat and Huangjing 1A/1B) and digital elevation models (SRTM and ASTER DEMs) to uncover the fine spatial details of lake water storage (LWS) changes across the Changtang Plateau at an annual timescale after the new millennium (from 2002 to 2015). The accuracy of our approach was compared with two existing approaches: one based on satellite imagery and long-term radar altimetry and the other based

on satellite imagery and short-term ICESat (laser) altimetry. The result show that the proposed approach using DEMs outperforms that using ICESat altimetry by producing volume variations that are highly consistent with long-term radar altimetry record. The trajectory of net LWS across the Changtang Plateau exhibits three distinct phases: a monotonic increase from 2002 to 2012, a general cessation and pause in 2013 and 2014, and then an evident decline from 2015. Observations from the Gravity Recovery and Climate Experiment satellites (GRACE) reveal that the LWS pattern is in remarkable agreement with that of the regional mass changes: a net effect of precipitation minus evapotranspiration (P-ET) in endorheic basins. Despite some regional variations, P-ET explains ~70% of the net LWS gain from 2002 to 2012 and the entire LWS loss after 2013. These findings clearly suggest that the water budget from net precipitation (i.e., P-ET) dominates those of glacier melt and permafrost degradation, and thus acts as the primary contributor to recent lake area/volume variations in the endorheic Tibet.

Keywords: Alpine lakes; Changtang Plateau; Endorheic Tibet; Lake water storage; Climate change, Satellite altimetry, Digital Elevation Models

A4.4 Global Assessment of Surface Water Abundance in Lakes and Reservoirs

Meng Ding and Jida Wang

Department of Geography, Kansas State University

Abstract: The reserves of fresh water on the earth are of critical environmental and social importance. Water flow is considered to be a significant sustainable freshwater resource. However, the greatest mass of liquid surface water, which is readily accessible to human beings, resides in the stocks such as lakes, ponds, and reservoirs. Due to extensive distributions and dynamic natures, our knowledge of the accurate extent, quantity, and quality of global lake systems remains surprisingly poor. By integrating hydrological, spectral, climatological, and literature evidence on various geographic settings, we here systematically classified global lakes into freshwater and saline categories based on our circa-2000 lake inventory, which documents perennial waterbodies greater than 0.4 hectares. We then estimated the mean depth, volume, and associated uncertainties for each inventoried lake using geo-statistics, GIS-based terrain analysis, and existing literature. Compared to the circa-2000 global lake mapping, the recently produced circa-2015 mapping has more comprehensive information, so I assigned the attributes of water type and volume from the circa-2000 to the updated circa-2015 global lake dataset. Both water flow and water storage are significant freshwater resources, so we compared the annual average discharge (from 1990 to 2010) and lake storage on individual drainage basins to obtain the relationships between their abundance in a global scale. The final results reveal an unprecedentedly detailed inventory of global lake extents and storage, which will be beneficial to future surface freshwater monitoring and managements.

Keywords: Lakes, Reservoir, Landsat, Storage, Discharge

A4.5 Dioxins and Fish Consumption on the Lower Ohio River

John Paul Henry

Department of Geography, University of Kansas

Abstract: Industrial facilities situated along the Lower Ohio River and its tributaries have polluted the river with dioxins in an act of slow violence. Dioxins cause cancer, diabetes, and immunologic, neurologic, and reproductive harm; while the full extent of dioxins' toxic properties remain unknown. Dioxins bioaccumulate in fatty tissues of vertebrates and, in the particular relevance to the Ohio River, fish. Populations that consume

dioxin-contaminated fish in-turn store the toxins in their bodies, while pregnant and nursing women pass the toxins onto their children. Dioxins' effects vary significantly depending on age, and manifest in particularly hidden ways as obstructing neurological development in children or damaging natural immunization systems. In areas with poor access to healthcare, as in this study area, many of dioxins' effects will be attributed to chance, or go undiagnosed, further masking the slow violence. This study will focus on a population likely to eat high percentages of contaminated fish, commercial and hobby fishermen. Ethnographic interviews and participant observation will elucidate narratives of toxic exposure, as witnessed over decades by local fishermen and their families. Interviews will provide data of how family health histories compare with known dioxin effects. This study will contribute to the spatial understanding of populations located in areas of dioxin-contaminated waterways and how exposure to these contaminants relates to patterns of race and socio-economic status.

Keywords: Dioxins, slow violence, Ohio River, environmental pollution

A5.1 The Impacts of Public-Private School Choice on Public Schools in the St. Louis Area

Tessa Cook

Department of Geography, Oklahoma State University

Abstract: St. Louis Public Schools (SLPS) was once a thriving school district, leading the way for cities west of the Mississippi, but since 1967, the district has been declining in enrollment and is less than 1/4th of its peak size (Feldmann and Watson 2012). This poster features early results from the visualization section of my thesis, which will explore why and when SLPS started losing enrollment numbers to surrounding suburban and private schools, and specifically look at the impacts of historical and political changes on SLPS. The study area includes St. Louis City Public Schools (or SLPS), which is located in St. Louis City County, and the more than twenty suburban public school districts surrounding the city. My thesis consists of three distinct sections: historical background, quantitative analysis, and visualization. For the visualization of the research, I will use temporal GIS to map the quantitative analysis over several years—from the 1950s to current time. The statistics are from the Census Bureau's American Community Survey 5-Year Estimates, and the Missouri Department of Elementary and Secondary Education's Missouri Comprehensive Data System. In order to map these statistics, I will use TIGER shapefiles for Missouri unified school districts, available from the Missouri Spatial Data Information Service Open Data Site. I hope to provide a comprehensive display of the changes in SLPS over time alongside the historical context, in order to provide a better understanding of the impacts of policy changes and school choice on SLPS.

Keywords: Spatial statistics, urban geography, geography of education, critical geographies of education, segregation

A5.2 "Getting that Jellyfish Crunch": Sequential Exploitation, Cannonball Jellyfish, and the Global Jellyfish Market

Matthew L. Fahrenbruch

Department of Geography and Atmospheric Science, University of Kansas

Abstract: While much has been written in recent years about climate change and the expansion of jellyfish populations around the world, less has been reported on the sequential exploitation of jellyfish for human markets. Jellyfish has been a seafood product and traditional medicine in China and Greater East-Asia for at least 1700 years. The growth of the middle-income population and consumer markets in China have resulted in a significant increase in seafood consumption, including jellyfish. This growing demand has taxed traditional

fisheries and driven traders to look abroad to non-traditional source areas; connecting new resource with old markets. Approximately 35 species of jellyfish have experienced some form of human consumption. One of the most recent species to be commoditized is the cannonball jellyfish (*Stomolophus meleagris*). In the last decade, cannonball jellyfish fisheries have developed in the United States, Mexico, Honduras, and Nicaragua; converting a local 'trash' species into a valuable international commodity. In this poster presentation I map the sequential exploitation of global jellyfish production. I provide a brief overview of the biogeography of the cannonball jellyfish, as well as a case study on cannonball jellyfish processing from my dissertation work in the community of Tuapi, RACCN, Nicaragua.

Keywords: Sequential Exploitation, Jellyfish Fisheries, Nicaragua, China, Globalization

A5.3 Assessment of Regeneration Time of an Evergreen Forest After Wildfire Using LANDSAT Images

Fatema Tuz Johra Nourin and Chen Xu

Department of Geography, University of Wyoming

Abstract: In this research remote sensing techniques using LANDSAT images is used to understand forest regeneration patterns after a wildfire in Yellowstone National Park. The regeneration of land covers has been analyzed for two fire years 1988 and 2007 in this park. The atmospheric correction and image classification have been accomplished by using the Semi-Automatic Classification Plugin (SCP) in QGIS platform. The satellite images have been classified into seven classes following the national Land Cover Database (NLCD) - evergreen Forest, deciduous forest, shrubland, grassland, mixed forest and emergent herbaceous forest. An unburnt land parcel in both fire years having similar land cover have been used as a control plot. To determine the control plot, input from the image classification has been used to identify similar land cover in both fire years. Two indices, Regeneration Index (RI) and Normalized Regeneration Index (NRI) would be calculated using the NDVI values of 1998 and 2007. The regeneration pattern is not specific to any tree species, but for a forest type. So, this recovery rate would be replicable for other places with similar forest type. The current practice of fire management includes burning down the forests, but calculation of the cost incurred due to the burning down is also necessary. So, analyzing the recovery rate of the forest types can add new dimension to the current fire management practice.

Keywords: Wildfire, Remote sensing, LANDSAT, Classification

A5.4 The Effects of Distance on the Composition of U.S. State Legislatures

Jesse R. Andrews

Department of Geography, Oklahoma State University

Abstract: This study statistically analyzes how travel times from legislative districts to United States' state capitols effect the demographic makeup of state legislative bodies. Using spatial regression techniques, the study controls for a number factors, including the length of legislative meeting times, number of members, party affiliation and demographic factors. The study concludes that distance is an important and little discussed factor influencing the demographic makeup of state legislatures. This effect is most acute in states with long travel distances and those with part time legislative bodies. Overall, we conclude that while controlling for other factors, greater travel distances seem to significantly increase the number of retirees and business owners in the state legislators and likely increases the mean age of state legislative bodies.

Keywords: Political Geography, Legislative Professionalization, Political Representation

A5.5 The Electricity Sector Evolution in Brazil

Helder Martins

Federal University of Santa Catarina (Brazil)

Abstract: Over the last two decades, the Brazilian electricity sector had substantial changes. In 1990, the hydroelectric sector represented 92.8% of market share but in 2017, its share fell to 63.1%. Also, alternative sources like bioelectricity from sugarcane industry started to emerge. For instance, the bioelectricity sector that represented only 0.8% of Brazilian electricity market in 1990 increased its share to 6.1% in 2017.

The literature on electricity market considers that this sort of market cannot develop by itself. Therefore, the main goal of this paper is to identify and understand which factors have influenced both the electricity sector and bioelectricity over the years. To accomplish these goals, I make use of descriptive analysis to evaluate production and public policies in both sectors from 1990 to 2017.

The results suggest that public policies have had significant impacts in the electricity supply by creating a new markets and thus mitigating the hydroelectric power dependence. In addition, public policies were important due to the following issues: i) to overcome electric crisis occurred in 2001; ii) to diversify the Brazilian electricity sector; and iii) to restrict dirty energies supply by promoting clean energies.

Keywords: None provided

A5.6 Climatic and Environmental Factors Influencing Parcel-Scale Woody Plant Encroachment in Cimarron County, Oklahoma

Austin Boardman and Jacqueline M. Vadjunec

Department of Geography, Oklahoma State University

Abstract: The proliferation of woody vegetation into grasslands has increased over at least the past century. In addition to ecological concerns associated with woody plant encroachment (WPE) such as decreased biodiversity, agriculturalists have observed that tree and shrub invasions result in reduced forage for cattle and loss of already scarce water resources. While previous research shows that environmental factors play a role in WPE susceptibility, much of the literature on Great Plains rangelands has focused on anthropogenic effects including overgrazing, fire suppression, decreased biodiversity, and climate change. We sought to identify non-anthropogenic factors associated with spatial variation of WPE in Cimarron County, OK, sourcing fine-scale climate data from WorldClim, terrain data from the USGS NED, and soil information from the USDA-NRCS Soil Survey. We measured WPE severity using data from the USGS National Land Cover Dataset, examining the change in herbaceous cover between 1992 and 2011. Using individual parcels of land as our unit of analysis, we used logistic regression to find the relationships between climate/environmental variables and WPE severity. Our model explains over 50% of the variation in Cimarron County's woody plant encroachment at parcel-scale. Areas with a warmer, drier climate and more rugged terrain were strongly associated with WPE, suggesting that environmental factors play a significant role in conferring vulnerability to WPE, while anthropogenic factors are also important contributors. Future research on the topic should examine the human-environment interactions involved in this complex issue, since environmental and land use factors appear to work in tandem to influence WPE.

Keywords: Woody plant encroachment, modeling, remote sensing, human-environment, landscape ecology

A5.7 Quaternary Landscape Reconstruction Using Bioclimatic Envelopes and Pollen Based Modelling Approaches in Southern Wyoming

Thomas Koenig

Department of Geography, University of Wyoming

Abstract: Ecological studies are inherently spatial and the spatial components are crucial to the accuracy of these studies. Ecological studies of past landscapes have an arduous task in addressing the same spatial components in order to uphold the same rigor and accuracy of modern studies. To combat the difficulties in representing the spatial components in quaternary ecological studies two methods are provided. The first method is the use of the REVEALS or LOVE model in which current vegetation surveys and pollen samples are used to calibrate the model to predict the spatial relationship for the lake sediment sourced pollen. Vegetation survey data for this study were collected using the crackles bequest survey method which implements concentric circles influenced by an inverse distance weighting method. The second method is that of bioclimatic envelopes which use the species observed ecological niche defined by bioclimatic parameters to predict the suitability of that species over the landscape intended. Each method is situational but can provide valuable insight to the land cover of the time period in question. By examining past land cover and vegetation patterns more long-term forest dynamics may be revealed. This will become increasingly important when trying to understand the forests response to a rapidly changing climate

Keywords: Bioclimatic envelopes, ecology, spatial analysis, quaternary studies, vegetation, forest dynamics, Wyoming-southern.

A5.8 Using Structure-from-Motion Photogrammetry and Erosion Pins to Quantify Controls on Bedrock Erosion and Sediment Transport in a Heterogeneously Layered Landscape, Flint Hills, KS

Abbey L. Marcotte and Abigail L. Langston

Department of Geography, Kansas State University

Abstract: Bedrock rivers play a critical role in landscape evolution; erosion and subsequent channel adjustment in these systems is driven by a complex combination of stream discharge, sediment supply and transport, and climate. While much is known about how these processes drive vertical erosion, controls on lateral erosion remain poorly understood. In this study, we monitored erosional processes of Kings Creek, an intermittent stream located within Konza Prairie LTER, Kansas, U.S.A., using erosion pins and Structure-from-Motion (SfM) photogrammetry. SfM is a range imaging technique that aligns multiple overlapping images to create a three-dimensional topographic point cloud. Erosion pins were installed vertically in exposed bedrock in the stream channel banks, which are comprised of alternating layers of limestone (more resistant) and shale (less resistant). Stream discharge gages are located throughout Kings Creek; however, due to variability in streamflow, time-lapse cameras positioned at our study sites will supplement discharge data and capture streamflow dynamics. Through SfM processing and repeated surveys, high-resolution digital elevation models (DEMs) of the channel can be generated, ultimately resulting in the creation of DEMs of Difference to identify locations of erosion, deposition, and sediment transport. Values from erosion pins will then be used to compare and validate SfM for erosion monitoring. We anticipate erosion in the limestone will be minimal, with more erosion occurring in the shale layers through plucking of dry material. These data will provide insight to mechanisms of erosion and sediment transport in a small grassland system and can potentially be applied to larger bedrock rivers.

Keywords: Fluvial geomorphology, bedrock channels, erosion pins, Structure-from-Motion, Konza Prairie

A5.9 Analyzing Tornado Frequency and Regional Climate Change Relationships in Kansas CE 1950-2016

Michael S. Molloy and Bimal Kanti Paul

Department of Geography, Kansas State University

Abstract: Due to climate change, severe thunderstorms with the potential to produce tornados are expected to be less frequent and more intense over the next several decades. The goal of this research is to determine how regional climate change is influencing the frequency of tornadic activity occurring in Kansas. Using decadal averages of temperature and precipitation along with decadal tornado totals, we conducted multiple regression analyses to determine if there is a relationship between the decadal values of tornados, precipitation, and temperature from CE 1950 to 2016. We found that four out of seven decades were above the 30-year average of 12.1 degrees Celsius, and six out of seven decades of precipitation were above the 30-year average of 68.42 centimeters. After analyzing the data we found that there is no relationship between tornado frequency, temperature, and precipitation. This study does suggest that further analyses should be conducted to look for other potential patterns.

Keywords: Frequency, Regional Climate Change, Tornados, Precipitation, Temperature

A5.10 A Geography of Advertising in Early Automobile Route Guides

John T. Bauer and Claire M. Christner

Department of Geography, University of Nebraska Kearney

Abstract: Automobile route guides were important precursors to the road maps that Americans are familiar with today. Unfortunately, little is known about them and few researchers have analyzed their roles in the history of commercial cartography. The most widely used and successful early route guide was the *Official Automobile Blue Book*. Published between 1901 and 1927 as an annual, multivolume series, it provided simple maps and turn-by-turn directions between towns in the United States and Canada. *Blue Book* publishers turned the guide into a commercial success by selling hundreds of advertisements for hotels, restaurants, and other tourist services in its pages. This research is an analysis of those advertisements. By summarizing them by size, location, and frequency, we can estimate the amount of revenue generated by the advertising, and thus know more about this early form of commercial cartography. Also, mapping the locations of the advertised businesses within the five volumes published in 1914 reveals that advertising revenue was not gathered from places equally dispersed throughout the country, but rather clustered in the Northeast and Midwest. Publishers used the revenue from some guides to subsidize the cost of others.

Keywords: Cartography – history, automobile route guides, United States

A5.11 Identifying Food Deserts in Rural North Dakota: A GIS-Based Analysis of Food Accessibility

Phoebe Eichhorst, Zachary Seeger, and Enru Wang

Department of Geography, University of North Dakota

Abstract: Lack of food, and especially food access, is detrimental to the health and well-being of all populations regardless of socio-economic status. In the United States, food insecurity affects one in eight households. Recent food security research has focused on urban areas, while rural area food desert identification has been overlooked. Rural communities face different kinds of food access challenges compared to those that live in urban areas such as driving long distances. Our research goal was to visualize, analyze, and investigate areas in the predominantly rural state of North Dakota with low food accessibility. Using GIS, we analyzed rural food deserts in North Dakota. The first step was to calculate accessibility to food stores using a service area network

analysis that incorporated road network and residential unit datasets. The second step analyzed the spatial patterns and delineated areas with least accessibility as rural food deserts. Additional research avenues would be to investigate how a lack of food access could impact a population's health, development, and behavior.

Keywords: Food desert, rural food access, GIS, North Dakota, food security, public health, policy, service area

A5.12 Quantifying the Effects of Sediment Flux and Water Discharge on Lateral Bedrock Erosion Using Flume Experiments

Ricardo Gonzalez and Abigail L. Langston

Department of Geography, Kansas State University

Abstract: Flume experiments have been used many times to quantify the processes of erosion and deposition in alluvial channels and the mechanisms of vertical incision in bedrock channels. Only one experiment has been conducted focusing on the lateral erosion of bedrock channels. Identifying and quantifying these conditions that force rivers to shift between primarily laterally widening and primarily vertically incising is important for understanding how rivers respond to changes in climate. Climate influences lateral erosion through changes in water discharge and sediment flux, but these relationships have not been quantified in the laboratory or field. At the Saint Anthony Falls Laboratory (SAFL) in Minneapolis, MN, we conducted nine experiments exploring the primary controls on lateral erosion in a cohesive, bedrock-like material in a flume measuring 70x150 cm. We used a mixture of kaolin clay and sand size ground walnut shells to simulate weak, cohesive bedrock similar to shale. This mixture was mixed to be strong enough to create overhangs much like we would see in the real world, yet weak enough to show erosion within a timely manner. Over two weeks, experiments using different levels of discharge and sediment flux were conducted. Photos were captured every 15 seconds of runtime for the experiment and in-between every five minutes of runtime topographic scans of the flume were taken. We hope to extract from these a percentage of bed covered by sediment using an image classification software e.g. ENVI and eCognition to help us with identifying the conditions of lateral bedrock erosion.

Keywords: Fluvial geomorphology, erosion, bedrock channels

A5.13 Patterns of Cottonwood Forest Change Along the South Platte River, Logan County, Colorado, 1979-2016

Haley Hampstead (1), Gabrielle Katz (1), and Jessica Salo (2)

(1) Department of Earth and Atmospheric Sciences, Metropolitan State University of Denver, (2) Department of Geography, University of Northern Colorado

Abstract: Over the past century, cottonwood forests along the South Platte River in northeastern Colorado have spread and densified. This pulse of forest expansion was associated with water management beginning in the 1880's, which stabilized and augmented stream flows. As a pioneer species, intermittent flooding is required to allow for the establishment of plains cottonwood seedlings. Through this research we attempt to document and understand the historic spatial pattern of forest growth to aid future resource management in the area. This research focuses on historic forest expansion and changes in forest density, based on the changing streamflow of the river's channel. To study this, we digitized riparian vegetation using orthophotos at roughly decadal increments for a 30 km section of the South Platte River in Logan County, Colorado. We measured the turnover of forest patches, as well as their densities, at each decade between 1979 and 2016. As certain decades brought drought and others flooding, we examined how flow variation in the channel effected the movement and growth of the cottonwood forests. Preliminary results show that from 1989 to 1998 this section of the river

narrowed 4% and saw a forest area decrease of 14%. From 1998 to 2006, a period of overall low flow, this section of river narrowed by 15% and was accompanied by an expansion of cottonwood forest by 20%. From 2006 to 2015, a period that included high flows and two major flood events, we observed channel expansion of 38% as well as a decrease in cottonwood forests by 12%.

Keywords: Biogeography, land cover, riparian, GIS

A5.14 Changes in Weather by Elevation in a Colorado Mountain Environment During a Winter Storm Event

Jana MacInnis, Kimberly Clough, and Destarte "Conagher" Haun

University of Colorado Colorado Springs

Abstract: The purpose of this project is to show temperature and humidity changes at different elevations before, during, and after a winter storm passes through a mountain environment in Colorado. Temperature and some relative humidity data was gathered by students using HOBO data loggers in the Silverton, Colorado area between January 8-12 at five locations spread across three elevations. We compared this data with data from other weather stations in the area at similar elevations to show the changes that occur during a winter storm event and how that can vary with location from the valley floor, mid slope, and summit. This illustrates the importance of obtaining fine scale data when researching and forecasting in mountain environments.

Keywords: Physical Geography, Weather, Mountain, Temperature, Humidity, Colorado, Winter

A5.15 Libya's Seismic History: From Roman Records to Modern News

Somaia Suwihli and Thomas R. Paradise

Department of Geosciences, University of Arkansas

Abstract: Libya is not considered a highly active seismically, however, several earthquakes of magnitude >6.0 have occurred. The scope of this study is to chronicle past seismic frequency and magnitude in Libya. This archive relies on multi-media records, documents, and archives of Libya's seismic history (i.e. written, film, aural). Classical references to earthquake activity have been identified in historic or archaeological data where records exist since 262 AD, and 365 AD when two great quakes destroyed Cyrene. The 262 AD Earthquake caused considerable damage in Libya in the fifth consulship of Gallienus, with Faustinus. It is believed that the shock affected Cyrenaica in northeastern Libya, where archaeological evidence describes destruction across the region. In 704 AD, a large shock destroyed many towns and villages in the Sebha Territory. While in 1183 a violent tremor occurred in Tripoli killing 20,000 people. In 1935 and 1939, a series of large earthquakes struck the Hun Graben area, including one of magnitude 7.1 on April 19, 1935 -- considered one of the strongest earthquakes in Africa's history. The coastal zone of northeastern Libya in Al-Jabal and Al-Akhdar continue to be a seismically active. Barka (Al-Marj) with population of 13,000, was completely razed by an earthquake of a moderate magnitude (5.3R) on 21 February, 1963. This earthquake is well-known in recent history, not because of its magnitude, but because of the loss of life (Minami 1965); many houses collapsed killing 300 and injuring 375 people; moreover, 12,000 individuals were made homeless.

Keywords: Libya, seismic history, earthquakes, Al-Marj, North Africa

A5.16 The Diverse Faces of American Agriculture: Gendered and Racial Representations of Farmers and Ranchers in the Southern Great Plains

Maria Ramirez Saenz, Fernanda Ramirez Saenz, Jacqueline M. Vadjunec, and Todd Fagin
Oklahoma State University

Abstract: Social constructions of identity partially rely on the visibility of the participants of a group. The contemporary narrative of American agriculture reflects and also influences those taking part in this economic activity. The last agricultural census shows an increase of 15% of non-white farmers in the United States. An example of this increasing diversity is also present in our study area (Las Animas, CO; Union County, NM; and Cimarron County, OK) where Hispanic agriculturalists are a significant ethnic minority, heading approximately 12% of the operations. However, female agriculturalists' participation decreased 2% nationally in 2012, and while in our study area the decrease was 7% (USDA, 2012). We explore what resources are available, and how are females and minorities represented in agricultural industries? We argue that institutional communication channels have not produced an accurate representation of diversified rural spaces. We also argue that policy makers have often overlooked women and minorities, limiting their knowledge and access to resources to adapt to climate variability and change. Using USDA Agricultural Census data from 1982-2012, we build a time-series analysis to understand the participation of female and minority agriculturalists over time in our study area. We execute a content analysis of government websites that promote agricultural assistance and resources (such as the USDA and FSA), to quantify direct institutional efforts to reach diverse groups. We conclude that the misrepresentation of women and minorities in agriculture may lead to different forms of exclusion from agricultural activities, making them more vulnerable to climate variability and change.

Keywords: Female Agriculturalists, Minorities in Agriculture, Representation, Diversity, Adaptation, Vulnerability, Communication, Policy

A5.17 The Contemporary Scottish Gaelic Linguistic and Cultural Landscape

John Paul Rogers

Department of Geography, Kansas State University

Abstract: Language is a key component of human culture that helps us define our world and communicate with others within it. Much like various aspects of material culture, the cultural landscape is rife with displays of the local language(s) and informs us of the values held by a people within a particular region. But what happens to this landscape when a language has fallen into disuse? In Scotland, the Gaelic language is one such example. Scottish Gaelic was dominant in the country, especially the Highland region, between the 10th and 16th centuries. The ascent of James VI of Scotland to the English throne, however, helped to spur the dominance of English in Scotland, with Gaelic falling out of favor as a result. Recent surveys by the Scottish Government have found that fewer than 100,000 speakers of Gaelic remain in Scotland, placing the language within the "endangered" category. How has this decrease in speakers been reflected in the Scottish landscape? Has the landscape of the Gaelic culture changed as well? In-depth field research in which elements of the cultural landscape (e.g. signs, shops, and events) were analyzed, aims to answer these questions and help us better understand the importance of a regional language within a culture as a whole.

Keywords: Scotland, linguistic geography, cultural geography, landscape analysis, Scottish Gaelic

A5.18 The Importance of Geographic Realism in Genre Fiction: How Place and Landscape in Robin Hobb's *Assassin's Quest* Produce Subversive Social Critique

C. A. Shropshire

Department of Geography, Oklahoma State University

Abstract: While scholars have analyzed the significance of geography in literature, genre fiction is often overlooked as simple entertainment in favor of the more concrete and factually relatable genres of literature, such as travel literature and ethnographies. In this project, I seek to fill the gap in research on literary fiction geography to incorporate a lesser known fantasy author, Robin Hobb. I will explore how Robin Hobb combines geographic realism and fantasy to create an imaginary, yet relatable world that evokes place and landscape in her book *Assassin's Quest*. In doing so, I will examine how the geographic realism and fantastical elements combine to enable the reader to be receptive to the author's potential subversion in such matters as sexuality, gender roles, doctrine, and nationalism. Through discourse analysis and the use of coding for examples of these subversive elements, and instances where place and landscape are clearly established, I will explore how Robin Hobb utilizes realistic geographies to establish subversion.

Keywords: Literature geography, fantasy, landscape, place, social critique, subversion

A5.19 The Connections of Grassland Conversion in the Midwest

Lucas Porter and Darrell Napton

Department of Geography, South Dakota State University

Abstract: Agricultural expansion of the 20th century altered the grassland landscape so drastically that little to no remnants of native vegetation survived. Tallgrass prairie ecosystems declined by approximately 99 percent and mixed grass ecosystems had a 70 percent decline. That decline did not happen overnight. The Midwest experienced epochs of change that culminated into the landscape we see today. The first driving force of grassland conversion within the region was the Homestead Act of 1862 that encouraged westward expansion. Later change within the region was driven by technological advances in equipment and crop genetics, market change in crop prices, and instituted government policies. These driving forces altered the land cover that led to declines in natural ecosystems and consequently ecosystem services. Habitat fragmentation, soil erosion, water pollution, and increases in carbon dioxide are a few effects of this change. The government created conservation programs to offset some of these effects with mixed results. The future outlook for grasslands in the Midwest is difficult to predict, but analysis of historic trends helps elucidate connections and key problems.

Keywords: Grasslands, agriculture, Midwest, ecosystem services

A5.20 The Interconnected System of Geology, Soils and Land Use around Álora, Spain

Marte M. Stoorvogel

Wageningen University (The Netherlands)

Abstract: Geology, soils and land use are often strongly interconnected. In some cases, these systems are separately studied, which does not lead to a complete understanding of the strength and direction of relationships. A region where this can clearly be illustrated is around the village of Álora in Southern Spain. Sedimentary, igneous and metamorphic rocks can all be found in separate geological units and the Guadalhorce river cuts through these units, resulting in the formation of river terraces. The lithology of the underlying parent material is thus the main soil forming factor in this region, since it influences weathering rates and soil chemical properties. Moreover, lithology partly determines topography and thus soil erosion rates and soil depth, which leads to an indirect soil-lithology link, just like in the US Great Plains. Soil characteristics, such as depth, chemical composition and hydrological properties, determine suitable land use types. The soil-land use relationship can be recognized in two directions, since land use is also a key factor for soil formation. Plowing, for instance, leads

to soil thinning on steep slopes and reduced olive and almond yields. Understanding geology, soil and land use interactions is of great importance to understand the combined geology-soil-land use system, and to inform landscape decision.

Keywords: Spain, soil-landscape relations, geology, land use, soil formation

A5.21 Locating Suitable Locations to Measure Snow Avalanche Geomorphic Impact

Michael Stumpff and Arnaud J. Temme

Department of Geography, Kansas State University

Abstract: Snow avalanches are a geomorphic process that erodes and deposits soil and rock, thereby shaping landforms. The resulting transportation of soils downslope in mountainous areas has serious implications for local hydrology, ecosystems, and human populations. Avalanches are common in the world's mountain ranges including the Rocky Mountains during winter and early spring. Increasing spatial awareness of the frequency, magnitude, and impacts of these events will aid in future studies and public safety. Unfortunately, erosional processes caused by avalanche effects are problematic to quantify due to interactions with other geomorphic processes and conducting *in situ* observations. My objective was to locate sites that allow for optimal quantification of avalanche effects. Criteria to select optimal sites were a minimum slope of 30° and maximum slope of 40°, completely above the treeline, underlying permeable lithology, and at least 65% of precipitation as snow. The criteria were evaluated at Hill Slope Unit (HSU) scale, while the study area was the Southern Colorado Rocky Mountains. 8700 HSUs were analyzed and around 500 meet the conditions for slope, treeline, and snow fraction. Several dozen HSU also meet the permeability criterion and thus constitute optimal research sites. Moving forward, this methodology will be useful because it can be readily extrapolated to other mountain ranges. The application of this methodology is not unique to this location and can be applied worldwide to other areas experiencing high geomorphic impacts.

Keywords: Avalanche, Suitability, Site Location, Erosion, Modelling

A5.22 Land Use and Land Cover Changes in the 'Ghost Villages' of Uttarakhand, India.

Komal Preet Kaur and Marcellus Caldas

Department of Geography, Kansas State University

Abstract: Himalayan mountains are not only prime biodiversity hotspot and genetic resource pool, they also provide ecosystem services to humankind and influence climatic conditions of Indian subcontinent. Rural mountainous areas of Uttarakhand, a Himalayan state of India, have witnessed massive out-migration that are turning some rural areas into 'ghost-villages'. Vulnerabilities from climate change, low agricultural productivity, limited infrastructural facilities in terms of road connectivity, educational, health services, and poor employability are a few primary reasons pushing people to move out from rural mountainous regions. While migration has been a well-documented phenomenon, its effect on land-use and land-change has not been studied in Uttarakhand. In this context, we are interested to evaluate the land cover dynamics taking place in previously inhabited areas that are now abandoned. Assuming limited anthropogenic activities in such areas, we hypothesize the improvement in natural vegetation cover in the depopulated areas. We plan to integrate demographic and geographic information to discern the landscape dynamics from 1990 to 2017. Landsat images would be combined with demographic and topographic data. The results of this study could shape the environmental policies in the region and would prove instrumental to the policymakers and the implementers to help making informed land-use decisions in the fragile Himalayan landscape.

Keywords: Migration, land use, land change, Himalayas, geospatial methods, Uttarakhand

A5.23 Assessing Impacts of Grass on Vertical Accuracy of Digital Surface Models Derived From Unmanned Aerial Systems

Amanda F. Thomas

Department of Geography, Oklahoma State University

Abstract: With the high cost of Lidar, digital photogrammetry via unmanned aerial vehicles (UAV) has become a viable alternative for creating accurate digital surface models (DSM). While many studies have acknowledged vegetation sensing as a limitation of this method, few have quantifiably assessed the impact of vegetation in DSM accuracy, specifically grasses. This study will compare structure from motion (SfM) data to ground measurements to answer the following questions: (1) Does grass *height* impact SfM-derived DSM accuracy? (2) Does grass *density* impact SfM-derived DSM accuracy? and (3) Is there a predictable relationship between the accuracy of the DSM, as measured by root mean square error and grass height/density? Results are expected to match current literature and find that both grass density and height impacts DSM accuracy. It is also expected that there will be a correlation between grass height and density, and error as calculated by root mean square error.

Keywords: Remote sensing, unmanned aerial vehicles, UAV, structure from motion, SfM, GIS, height metrics, vegetation modeling

A5.24 Time Series Analysis of Phenometrics and Long-Term Grassland Trends across the Great Plains Ecoregion using Moderate Resolution Satellite Imagery

J.M. Shawn Hutchinson and Hilda Onuoha

Department of Geography, Kansas State University

Abstract: A time-series analysis of Moderate Resolution Imaging Spectrometer (MODIS) 16-day maximum value composite normalized difference vegetation index (NDVI) data (MOD13Q1 Collection 5) was performed to explore differences in vegetation phenology and to assess long-term trends in vegetation greenness across the Great Plains ecoregion of the United States. The Breaks for Additive Season and Trend (BFAST) decomposition method was applied to a time series of images from 2001-2017 to derive spatially-explicit estimates of gradual interannual change. The program TIMESAT was also used to extract key measures of vegetation phenological development across the same study period. Phenometrics of interest include (1) season length, (2) start of growing season, (3) end of growing season, (4) middle of growing season, (5) maximum NDVI value, (6) small integral, (7) left derivative, and (8) right derivative. Analyses were performed to determine the significance of spatiotemporal differences in grassland phenology across the Great Plains and interannual changes in vegetation conditions. This is a prerequisite step for future analyses seeking to quantify the influence of climate and soils, along with key regional anthropogenic factors such as fire, on shaping long-term vegetation dynamics.

Keywords: Grassland, phenology, environmental change, MODIS, BFAST, TIMESAT

A5.25 Where are Dams and Reservoirs, and How Do They Affect Surface Water Budget?

Jida Wang, Blake A. Walter, and Fangfang Yao

Department of Geography, Kansas State University

Abstract: Since the 1950s, the world has seen a dramatic increase in artificial water impoundments in an unprecedented effort to eliminate variations in water accessibility. With nearly one-third of the world's population living in water scarce regions today, an improved understanding of total surface water stored in artificial reservoirs has never been more needed. However, a complete and spatially-explicit inventory of such storage capabilities is lacking. Using high-resolution global lake mapping datasets and multi-source dam registries, we here present a detailed spatial inventory of dams and reservoirs across the world. We use novel GIS techniques to integrate five authoritative dam registries into a single dam and reservoir dataset, which we deemed as the Global Dam and Reservoir Inventory (GDRI). In total, GDRI documents over 80 thousands dams/reservoirs for a total storage capacity of ~8,000 gigatons and a total water area of 750 thousand square kilometers. Compared to its counterpart, the Global Reservoir and Dam dataset (GRanD), GDRI increased the number of dams documented by +1,000% and the total capacity by ~40%. Initial water impoundment from dam construction activities can lower sea level by permanently trapping water storage on land. Dam construction was found to have negatively affected sea level rise (SLR) by about 0.27 mm/yr since the dam construction boom of the 1950s. This study contributes vital information about anthropogenic water resources that incrementally enhances our knowledge of global hydrology and the interactions taking place between different water entities.

Keywords: Lakes, reservoirs, Landsat, sea level, human impacts, GIS

A5.26 Maternal Mortality and Population Growth in 19th Century Britain

Andrew Smith

Brigham Young University

Abstract: The second half of the 19th century is a period known as the Second Industrial Revolution and was a time of great scientific and technological advancement in Great Britain. Increased population growth can facilitate periods of new ideas and innovations such as the Second Industrial Revolution, as more people can think about and solve the societal problems of the time. Thus, understanding causes of increased population growth can provide insight regarding the factors that lead to ingenuity and development. The research examines how maternal mortality rates impact the average mothers' age, average number of kids per household, and average marital age for women during the Second Industrial Revolution. Then the effect of average mothers' age, average number of children in a household, and average marital age on population growth rate during the same period was determined. Real GDP per capita, price of light, air pollution levels, and the year itself were included as control variables. Results show that maternal mortality rate affects average number of kids and average marital age with statistical significance. Results also indicate that average mothers' age and average marital age affect population growth rate with statistical significance. Other analysis suggests strong correlations of variables with maternal mortality rate or population growth rate, though without statistical significance. These results indicate that maternal mortality rate affects the variables that drive population growth during the Second Industrial Revolution. This points to possible solutions for policymakers and think tanks to consider to hasten development efforts throughout the world.

Keywords: None provided

A5.27 The Sinking Island of Isle de Jean Charles: How Climate Change, Oil Development, and Severe Weather are Impacting the Native American Community

Clayton Blodgett and Kane Wolkey

Department of Geography, University of Missouri

Abstract: Isle de Jean Charles is an island deep in the Louisiana Bayou that has faced the combined effects of climate change, severe weather, and coastal and oil development which have led to the island sinking into the Gulf of Mexico. This island is home to a combination of Native American tribes that moved to the island after the 1830 Indian Removal Act which led to what is now known as the Trail of Tears. The Biloxi-Chitimacha-Choctaw tribe who once enjoyed the sizable island full of trees and people, see their land taken from them once again as the island disappears into the sea, with the trees and people leaving as well. Using GIS and remote sensing, this research plans to show how the island has changed over the last fifty years including land area, vegetation, and population. This research also plans to look at how the local, state, and federal governments are either currently or planning to mitigate this issue, and what else can be done for this community. Lastly, the context of Isle de Jean Charles will allow for further discussion on the land loss throughout Southern Louisiana, including how that can make populations further inland more at risk of hurricanes.

Keywords: Climate change, remote sensing, gis, Native American, Louisiana, environmental geography

A5.28 Mapping Imperialism: Integrating Geography into History Lessons

Jessica Hunt and Dawn M. Drake

Department of History & Geography, Missouri Western State University

Abstract: As school districts across the Midwest, and the US as a whole, reduce the amount of instruction hours dedicated to social sciences, it becomes vital for teachers to integrate geography in innovative ways across the curriculum. A majority of states currently do not require secondary students to take a geography course. In 2013, reports indicate that only 17 states required any geography coursework in middle school and only ten required geography for students to graduate high school. Given the interdisciplinary nature of geography, however, there are multiple opportunities for integration of the discipline during the school day. Teaching geography across the curriculum also allows for differentiated instruction, incorporating experiences for visual and tactile learners. One of the simplest integrations for geography is through the history curriculum. The idea of blending history and geography is not new. It reinforces the importance of spatial awareness coupled with temporal change.

This poster will demonstrate how incorporating geography into a history lesson can help students comprehend and retain content from both subjects. US students typically do not perform well in geography, with nearly three-quarters of eighth-graders in 2014 testing below proficient, according to the Nation's "Report Card". As this research will demonstrate through a history lesson covering the British Empire and imperialism, geography can be incorporated via the locations Britain explored and/or colonized. To facilitate the incorporation of geography, ArcGIS Online and Story Maps, a free online ESRI product, can be a convenient vehicle for educators, even those without extensive geospatial training.

Keywords: Geography, history, GIS, K-12 education

A5.29 The Benefits of GIS to Public Works Departments: The Case of St. Joseph, Missouri

Cheyenne Curley and Dawn M. Drake

Department of History & Geography, Missouri Western State University

Abstract: The value of geographic information systems (GIS) in the management of data, especially in cases where spatial presentation aids in comprehension and analysis, has long been understood by geographers. Applications outside of geography, however, have been slower to be adopted, especially for small operations and municipalities with limited budgets. For public works departments, using GIS is an effective way to be

transparent in showing how funds have been utilized. It is an efficient means to keep an organized and honest accounting of operations accompanied by spatial display. It also allows organizations the opportunity to support employees with technology that can ease workload and improve management. GIS is easy to use, easy to teach, and easy to learn and can be utilized in multiple scenarios in public works departments.

St. Joseph, Missouri is a medium-sized Midwestern city that has struggled economically in recent years, causing many departments within the city to operate on limited funds. Recently the city deployed GIS technology in public works and municipal planning. For instance, the Public Works Department is creating maps of the roads to help inventory paving, grinding, resurfacing, and overlay. These maps help track when and where projects are completed. The resulting GIS layers provide a complex data set that can be utilized to not only track paving, but to aid in other public works management and planning projects.

Keywords: GIS, municipalities, planning, Saint Joseph, Missouri

A5.30 Using GIS to Overcome Language Barriers in Healthcare

Kim Leach and Dawn M. Drake

Department of History & Geography, Missouri Western State University

Abstract: St. Joseph, Missouri experiences the same difficulties as many Midwestern cities, struggling to find its identity as an agro-industrial city in a post-industrial economy. St. Joseph's second largest employer, Triumph Foods, tends to draw from a sizable immigrant population within the city. This creates unique language challenges, not only for Triumph, which employs workers from over 60 countries, but also for others. Triumph is only one pull factor for immigrants coming to St. Joseph. Some of these immigrant communities are not from the expected geographic regions. While the ethnic composition of St. Joseph generally reflects the average Midwestern city, the third largest immigrant community comes from the Chuuk Islands, a small island chain that is part of the Federated States of Micronesia. Due to these variabilities in the immigrant population, many organizations in St. Joseph struggle to close language gaps and provide necessary services.

Language barriers are a major challenge for Mosaic Life Care, the local healthcare system in the St. Joseph region. Communication is key for providing quality healthcare, but in a medium-sized Midwestern city, translators are at a premium and miscommunications are common. To this end, Mosaic is currently searching for affordable and flexible solutions to their struggles to identify proper translators to better serve the diverse population of St. Joseph. This poster will explore the possible uses of GIS technology to bridge language barriers in healthcare, such as those faced by Mosaic. The resulting tool will hopefully have broader uses in servicing the entire St. Joseph community.

Keywords: GIS, healthcare geographies, Missouri, language barriers

A5.31 Spatial Examination of Nebraska's Pioneer and Heritage Farms

Natasha Winfield and Jason Combs

Department of Geography, University of Nebraska-Kearney

Abstract: Land tenure and ownership rates have long been issues under consideration in the United States (Diller 1941; Clawson 1964). More recently, the examination of century farms—a term to note agricultural land held in a single family for more than 100 years—has also become popular. Studies examining century farms in several other states—Ohio and Tennessee, for instance—have evaluated patterns of land tenure and ownership over time (Van West 1986; Verstraten 2007). To our knowledge no studies have spatially analyzed Nebraska's

century farms. The Aksarben Foundation in Omaha maintains a database for Pioneer Farms (Century Farms) and Heritage Farms—those held by a single family for 150 years. This project determines what factors impact long-term land ownership rates in Nebraska. This study also incorporates historical geography principles and also employ GIScience to analyze and map findings.

Keywords: Heritage and Pioneer Farms, Land Tenure, and Nebraska Settlement.

B1.1 Changes in the Landscape of a Northern Plains Town: Antler, North Dakota (1900 to 2018)

W.A. Wetherholt (1) and G.S. Vandenberg (2)

(1) Department of Geography, Frostburg State University, Frostburg, MD, (2) Department of Geography & GISc., University of North Dakota, Grand Forks, ND

Abstract: Antler, North Dakota is located just south of the U.S./Canada border near the east/west boundary of the provinces of Saskatchewan and Manitoba. The town was established in 1905 and its population has ranged from 342 in 1910 to an estimated 25 in 2016. This study examines changes in the landscape of Antler using repeat photography. Images of the town from the early 1900's, 2007 and 2018 were compared to note changes in buildings, roads, utilities, fences, agriculture, grazing and vegetation at 11 site locations. Dominant changes noted to the landscape include an increase in vegetation abundance around buildings; building deterioration, abandonment and removal; building repurposing, and an increase in roads. Antler still retains a community center, bar, post office and auto repair shop as of 2018. The use of repeat photography shows the results of population decline and abandonment, a story central to many small Great Plains towns.

Keywords: Repeat photography, rural geography, historical geography, North Dakota, Great Plains

B1.2 Deconstructing the Rural Kansas Stereotype: The Story of Bradford, Wabaunsee County, a Lost Biracial Community, 1890-1941

Karl F. Bauer

Department of American Indian Studies, University of North Dakota

Abstract: Bradford, located in Section 23 of Wilmington Township, Wabaunsee County, Kansas, was a small community that tells a unique story of racial coexistence and rural population decline. Black and white residents both called the area home and coexisted in relative peace — taking classes at the same school, worshipping at the same church, shopping at the same businesses, and being buried in the same cemetery. In the 1890s and early 1900s, the community was bustling, but in the decades following, it witnessed closures and consolidations due in part to the increasing use and availability of the automobile. This study is mostly based on interviews with a local historian and publicly available historical society, library, and newspaper archives.

Keywords: Rural geography, African-Americans in Kansas, Wabaunsee County, rural decline, Kansas history, ghost town

B1.3 The Historic Preservation of Northern Rocky Mountain Ghost Towns

Krista Evans

Department of Geography, Geology and Planning, Missouri State University

Abstract: Perhaps no place better captures the spirit of the West than that of the forlorn ghost town. The remnants of these abandoned hard-rock mining towns sprinkle the Rocky Mountain landscape. Many ghost

towns are deserving of preservation efforts because of the significant role they have played in the expansion of the American West and in the development of our cultural collective memories. However, preserving and managing these remote ghost towns can be challenging. Ghost town heritage managers face several issues, from implementing a preservation strategy to achieving economic viability. This study examines ghost town preservation and management strategies at four geographically isolated Northern Rocky Mountain ghost towns. The case study research involved interviewing heritage managers and was supplemented by archival analysis and participant-observations of ghost town visitors. The study finds that ghost town preservation and management efforts frequently promote elements of the Mythic American West. The research also finds that these significant landscapes are becoming increasingly fragile and vulnerable due to such threats as increased forest fire activity and vandalism. This study provides geographers and heritage preservationists with information and suggestions regarding how to best manage these places in addition to contributing to a greater understanding of Western ghost town dynamics.

Keywords: American West, Rocky Mountains, historic preservation, Western landscapes, rural geography

B1.4 Pipelines, Protectors, and a Sense of Place: Media Representations of #NoDAPL

Katie Grote

Department of Geography and Atmospheric Science, University of Kansas

Abstract: The recent Dakota Access Pipeline protest near Cannonball, North Dakota is a unique case of Indigenous resistance and alliance building as news of the movement transcended grassroots scales to one that garnered national and international support. There are many cases of non-Indigenous peoples participating in alliances with the local Indigenous peoples, however, one of the most unique cases is the support of thousands of veterans. While solidarity was widespread, there were also many cases of opposition to the movement. This divergence in opinion is closely aligned with the political leanings of news outlets and their representation of the movement. With the aid of Atlas.ti Qualitative Data Analysis & Research Software, this research employs a qualitatively-based content analysis of nearly 100 news articles reporting on the Dakota Access Pipeline protest. Each of these articles ranges in quality of reporting and can be categorized in one of the following groups: Right Bias, Left Bias, Minimal Partisan Bias, Local News, and Alternative Native News. This research analyzes commonly occurring codes and themes within one or across several political categories. Sentiment and emotional language, word counts, and frequency of reporting are also considered to gain a more comprehensive understanding of the media representations as they develop through time.

Keywords: Indigenous Geography, Geographies of Representation, Content Analysis, Media, Protest - Dakota Access Pipeline

B1.5 A Cultural Geography of Visualizing Spatial Attributes of Human Trafficking in the American Great Plains

Rebecca Buller

Department of Geography, University of Nebraska-Lincoln

Abstract: Though public awareness of human trafficking in the American Great Plains has increased, some common misconceptions remain. These stereotypes are obstacles, slowing effective change of law enforcement, legislation, and service-provision. Cultural geography and illustrative representations can be of service. Cartographic representations and visualizations of data and qualitative information help to quickly and powerfully educate the public, including decision makers. Though it is not a comprehensive atlas, this paper serves to provide a snapshot of such sample visualizations. Law enforcement, lawyers, legislators, non-

governmental organizations (NGOs), researchers, service providers, victims, and survivor-thrivers serve as sources. Cultural geography approaches with cartographic and visualization methods illustrate spatial attributes, like trafficking in rural areas and clustered traits of special event trafficking. Maps can improve understanding, for instance, by revealing the sites and frequencies of advertisements. Though the process of mapping human trafficking has several roadblocks, these roadblocks can be useful. Our understanding can be improved, for example, by what maps do and do not show. Together, these agglomerated understandings can help move the public's dialogue forward and push for effective change.

Keywords: Cartography, cultural geography, Great Plains, human trafficking, social justice

B2.1 Making Places and Spaces of Memory in Nazi Germany: Semiotics, Performativity, and Affect

Joshua Hagen

College of Arts and Sciences, Northern State University

Abstract: Adolf Hitler and his Nazi Party launched a series of wide-ranging building programs immediately after seizing power in Germany. The Nazi regime intended these building campaigns to achieve an intensive and invasive spatial reorganization of place and space across Germany and eventually far beyond. Often overlooked among these expansive building programs is that the regime invested considerable time, effort, and resources in creating a thick archipelago of places, spaces, and architectures of memory buttressing Nazi ideology, power, and governance. These commemorative geographies stitched together a profusion of places and spaces into a totalitarian liturgy glorifying notions of struggle, sacrifice, and martyrdom on behalf of Hitler and his movement. Like any liturgy, this Nazi narrative featured its own seminal events, tragedies, and triumphs grounded in quasi-sacred places, spaces, and architectures of memory. Drawing from scholarly work on semiotics, performativity, and affect, this presentation articulates how these geographies of Nazi memory worked to articulate, inculcate, and translate intangible ideologies and mentalities into tangible places and experiences. In doing so, this presentation also highlights the mutable and multi-faceted nature of place-making and place attachment in conditioning specific identities, behaviors, and affects.

Keywords: Affect, memory, Nazi Germany, performance, place attachment, semiotics

B2.2 Exogenous Place Attachment and Amazonian Conservation

Stephen R. Cameron

Department of Geography and Atmospheric Science, University of Kansas

Abstract: Though place attachment is typically related to long term exposure, ancestral ties, or at the very least, personal experience, with a particular locale, strong attachment can develop to places never visited. Here I explore the idea of exogenous place attachment, and its role in shaping the discourse on Amazonian conservation. Since its earliest exploration by European ne'er-do-wells, the region has been portrayed as a unique locale evoking strong responses by exogenous actors, whether as a 'Green Hell', a 'Cornucopia of Biodiversity', or the 'Lungs of the Planet'. Recent characterizations of the region as a global resource, as opposed to the sovereign territory of a handful of South American countries, have promoted a conservation agenda that shapes regional human and biogeographic landscapes and is often at odds with local and national interests.

Keywords: Place attachment, Amazonia, conservation

B2.3 “Tied To The Land”: Pipelines and Place Attachment

Christina E. Dando, University of Nebraska Omaha

Abstract: This paper considers place attachment and its expression in media coverage of the Keystone XL and Dakota Access Pipelines. As Plainspeople resist the pipelines, place attachment is often articulated in their arguments against the pipelines. Who claims attachment to the Plains? In what ways? How is this attachment expressed? How are these arguments about place and place attachment mobilized in the efforts to block these pipelines? What are the similarities and differences between the two pipeline cases? Finally, what are the implications of land conflicts, such as over pipelines, to place attachment?

Keywords: Great Plains, pipelines, place attachment, sense of place, placelessness

B2.4 Attachment to Vanishing Places

Jeffrey S. Smith

Department of Geography, Kansas State University

Abstract: Geographical research on place attachment typically focuses on understanding the characteristics of place (a.k.a. *sense of place*) to which people develop deep emotional ties. Although there are numerous types of places that occupy an important place in one's heart, vanishing places is a particularly interesting one. In this presentation I provide an exploratory analysis of four types of places that are disappearing or in the process of being lost. Despite their ephemeral status, the connections people have with these places are as strong as ever.

Keywords: Place Attachment, Vanishing Places, Sense of Place

B2.5 Theorizing Multi-Scalar Territorialization in Central Asia: Russians in Kazakhstan’s Northern Borderland

Alexander Diener

University of Kansas

Abstract: This paper contributes to the theorization of place attachment by applying Robert Sack’s *Homo Geographicus* to the bond between people and specific places. Sack argues that humans are inherent place makers and that place and self/identity are mutually constitutive. Material, social, and ideational elements weave together in the very act of place making and place changing. This paper explores how notions of home/homeland are formed through similar dynamics. A core precept of Sack’s *Homo Geographicus*, as well as, this theory of place attachment is mutability. Recent literature on de- and re-territorialization critically considers place, generally, and home/homeland, specifically, as evolving rather than locationally fixed and socially static. I consider the Russian community within Kazakhstan’s northern borderland for this perspective. This case sheds light on the multi-scalar aspect of home/homeland, its mutability, and capacity to be leveraged for social and geopolitical goals. Notions of *malaya rodina* (small homeland) and *bolshaya rodina* (large homeland) are commonplace amongst diasporic peoples of Central Asia and this dualistic structure of place identity manifests in a complex negotiation of place attachment through diasporic identity, irredentism, and ethnic versus civic nationalization. Finally, this essay assesses the degree to which study of the former Soviet states offers unique insights into place attachment and the extent to which the study of place attachment may uniquely inform research on Central Eurasia.

Keywords: None provided by author

B3.1 Exploring the Impacts of Agricultural Landscape Diversity on Yields in the U.S. Using Bayesian Spatiotemporal Modeling

Katherine S. Nelson (1) and Emily K. Burchfield (2)

(1) Department of Geography, Kansas State University, (2) Department of Environment and Society, Utah State University

Abstract: Over the last century human activities, particularly the expansion and intensification of agriculture, have dramatically simplified global landscapes. Today agricultural systems cover one-third of global land area and more than fifty percent of land area in the United States. While simplified agricultural landscapes optimized for food production provide immediate local gains in agricultural productivity they are also associated with long-term degradation of beneficial ecosystem processes that support agricultural production such as pollination and pest management. While there is a growing body of evidence supporting the positive role of increasing diversity on ecosystem services and agricultural function at the field scale, the impact of diversity on agricultural function at larger scales has received little attention. This study examines the role of diversity in the agricultural landscape on yields of corn and soy across the conterminous U.S. using a panel dataset of county-level climate, yield, and land-use data constructed using PRISM and USDA NASS and CropScape data. Bayesian spatiotemporal modelling was employed to estimate the functional relationship between agricultural landscape diversity, measured in terms of the Shannon Diversity Index, and annual county yields while simultaneously accounting for non-linear climate effects and spatial effects. Model results suggest that the functional relationship between agricultural landscape diversity and yields across the conterminous U.S. is non-linear and saturating. This estimated functional relationship is in general agreement with a large body of experimental evidence on diversity and ecosystem function.

Keywords: Landscape diversity, agricultural production, Bayesian, spatiotemporal

B3.2 Using Remote Sensing to Detect Changes in Vegetated and Riparian Buffer in Agricultural Areas of Nebraska: Preliminary Results

Alex R. Mohr

Department of Geography & Geology, University of Nebraska at Omaha

Abstract: Areas of natural vegetation, wildlife habitat, and ecological connectivity have declined since the introduction and subsequent widespread expansion of center-pivot irrigation. Center-pivot irrigation made cultivation of more and larger areas possible in drier locations, displacing, fragmenting, and eliminating many non-crop vegetation areas. A 40-year time series of Landsat image data shows a decrease in herbaceous and woodland vegetation cover as well as changes in non-crop vegetation patch size, habitat connectivity, and habitat core area. All of these are key metrics of habitat quality for many species. Field-side tree and shrub cover also provide other ecosystem services such as protection from wind erosion, retention of soil moisture, and filtration of chemical runoff from fields. Classified images of vegetation cover from 1976 to 2016 were analyzed with Fragstats and ArcMap to measure landscape pattern changes and create maps illustrating the changing vegetation distribution. Preliminary results indicate fragmentation of vegetation and loss of woodlands around fields and streams. Reversal of this loss may be accomplished through education and the use of several available conservation programs.

Keywords: Vegetation change, landscape metrics, spatial analysis, remote sensing, Nebraska

B3.3 Dynamics of Soybeans and Cattle Production in Brazil

Rebecca Lima Albuquerque Maranhão (1), Osmar Abílio de Carvalho Júnior (2), Potira Meirelles Hermuche (2), Roberto Arnaldo Trancoso Gomes (2), Concepta McManus (2), and Renato Guimaraes (2)

(1) Department of Geography, Kansas State University, (2) Department of Geography, University of Brasilia (Brazil)

Abstract: Brazil has a privileged position in the agricultural world market notably because of its productivity gains and the incorporation of new agricultural frontiers. The expansion of agricultural frontiers has caused substantial changes in the land use and land cover, and is a driver in the process of crop substitution. This work aims to analyze the space-time dynamics of soybean production in the Brazilian territory from 1991 to 2015. We also calculated the correlation between soybean crops and livestock to evaluate the substitution process between these productions. Relative growth rate and acceleration of production were calculated and spatialized using ARCGIS. The correlation between soybean and livestock was determined from the results of the acceleration of these productions. Results evidenced high growth rate and acceleration of soybean production in the South, Midwest and MATOPIBA (which aggregates Maranhão, Tocantins, Piauí and Bahia states) regions. The midpoint map illustrated the direction of the soybean and the cattle production to the north and northwest, respectively. The inverse correlation production are prominent in the states of Rio Grande do Sul, Paraná, São Paulo, Mato Grosso do Sul, Mato Grosso, Goiás, Minas Gerais, Matopiba, Pará, and Rondônia. Based on our findings we conclude that the displacement of cattle production to North has been accompanied by the expansion of soybean production in the Midwest and Northeast. We further suggest that governmental actions are essential to identify the spatiotemporal dynamics of agricultural production which has been a driver for accelerated change in land use especially in the Amazon Frontier.

Keywords: Multitemporal analysis, GIS, Soybeans, Cattle, Agricultural Expansion, Correlation

B3.4 Analysis of Dairy Cow Populations and Land Use in the Kansas City Milkshed

Dawn M. Drake

Department of History & Geography, Missouri Western State University

Abstract: Economic geographers examine the distribution of economic activities on Earth's surface, including distribution of the agro-food industry. Through this examination, they can develop models of economic behavior. One such model, Von Thünen's Isolated State Model predicted that dairy farms would locate near the central market. Historically this was due to the lack of refrigeration. Farm-to-market distances for dairy products needed to be short to prevent spoilage. Even though food preservation technology has advanced, many dairy farms remain near the central market. This is most commonly due to the fact that they are passed through the generations. Dairy farms remain in place while the landscape changes around them. As urban spaces expand, the farms are in competition with residential and commercial land uses. In other words, the dairy cows find themselves in suburban backyards.

Building on prior qualitative and quantitative analysis that evaluated von Thunen's model in reference to modern dairy farming, this research will apply the concept of milksheds first introduced by Durand (1964) to further examine of the model's current applicability. Through the analysis of land use land cover data and dairy cow populations within the Kansas City milkshed, economic geography can aid in understanding today's agricultural landscape in relation to historic models.

Keywords: Agricultural geography, economic geography, land use land cover, dairy farming, milksheds,

B3.5 A Hidden Past: The Historical Geography of Agricultural Drainage in Iowa

Jakob Hanschu

Department of Geography and Department of Sociology, Anthropology, and Social Work, Kansas State University

Abstract: Drainage refers to any land modification that serves as a means of removing unwanted water content from a soil, and lays at the intersection of questions concerning food, the economy, policy, health, and environmental degradation. Agricultural drainage has a long history in Iowa, and throughout this association, drainage practices and infrastructure have played a major role in shaping the state's landscape. The pre-settlement Iowa landscape was mostly wet prairies and wetlands. Alteration of the prairie pothole ecosystem through drainage systems has made Iowa one of the most agriculturally productive and profitable areas in the world. Draining the wet prairies allowed for the creation of the artificial, uniform environment of neatly arranged fields that has come to be a defining feature of Iowa and the American Midwest. However, Iowa drainage systems have recently come under question for their role in adding to the hypoxic zone in the Gulf of Mexico. In this cross-disciplinary paper, completed as part of a National Science Foundation research program, the history of drainage and its effects on Iowa's landscape are traced, with both positive and negative impacts being discussed. The study draws from Census of Agriculture data spanning over a century, historic accounts, and modern research to give a concise narrative of the historical geography of agricultural drainage in Iowa.

Keywords: Historical geography, environmental history, landscape, Iowa, agricultural drainage

B4.1 Participatory Mapping the Public Perceptions of Browns Canyon National Monument, Colorado

John Harner (1), Lee Cervený (2), Rebecca Gronewold (3)

(1) Department of Geography and Environmental Studies, University of Colorado Colorado Springs, (2) Pacific Northwest Research Station, U.S. Forest Service, Seattle, WA, (3) Department of Geography and Environmental Studies, University of Colorado Colorado Springs

Abstract: Natural resource managers need up-to-date information about how people interact with public lands and the meanings these places hold for use in planning and decision-making. This case study explains the use of public participatory GIS to generate and analyze spatial patterns of the uses and values people hold for the Browns Canyon National Monument in Colorado. Participants drew on maps and answered questions at both live community meetings and online sessions to develop a series of maps showing detailed responses to different types of resource uses and landscape values. Results can be disaggregated by interaction types, different meaningful values, respondent characteristics, seasonality, or frequency of visit. The study was a test for the Bureau of Land Management and US Forest Service, who jointly manage the monument as they prepare their land management plan. If the information generated is as helpful throughout the entire planning process as initial responses seem, this protocol could become a component of the Bureau's planning tool-kit.

Keywords: Participatory mapping, GIS, public lands

B4.2 Assessing the Quantitative and Qualitative Differences between 3D Models Produced from LiDAR and Structure from Motion

Matthew Moebes and Clayton Blodgett

Department of Geography, University of Missouri

Abstract: With the advent of the photogrammetric technique of Structure from Motion (SfM), researchers have been granted a lower cost alternative to LiDAR. SfM uses overlapping images to create 3D models as opposed to

the laser range finding of LiDAR. There are many commercial and open source SfM solutions but there is a dearth of information detailing the accuracy of this method opposed to the industry standard of LiDAR. It is the purpose of this research to fill that gap. An Unmanned Aerial System (UAS) was used to acquire images over a section of the Grand River Grasslands in Harrison County, Missouri. The data was then processed and put through various free to use SfM pipelines including VisualSfM, COLMAP, and openMVS with post processing with Meshlab. The resulting 3D point clouds were then converted to usable geographic products such as Digital Elevation Models and Digital Surface Models. These models were then compared to their corresponding LiDAR products using statistical analysis with IBM SPSS. Initial results show a much higher resolution with SfM over LiDAR with a loss of accuracy with SfM. The accuracy of SfM with this research was limited by the GPS equipment available for the Ground Control Points and could be improved with better equipment. Never the less, the models produced by SfM are in color which is a vast improvement over traditional LiDAR and grants the possibility of spectral information in addition to the spatial data.

Keywords: LiDAR, UAS, Structure from Motion, photogrammetry

B4.4 The Compounding Threat to Brazilian Cerrado Biodiversity: Exploring Land and Climate Change Impacts on Amphibian Habitats

Marcellus Caldas (1), Gabriel Granco (1), Paulo de Marco Jr (2)

(1) Department of Geography, Kansas State University, (2) Department of Ecology, Federal University of Goiás (Brazil)

Abstract: While the consumption of sugarcane-based ethanol has been proposed as a mitigation action against global climate change, the production of this fuel has raised concerns over its impact on the environment. More recently, impact on biodiversity have gained attention because the production of feedstock for biofuel can promote fragmentation of the landscape thus threatening the environment's capability of sustaining biodiversity. The Brazilian Cerrado (also known as Brazilian Savanna) is the new frontier for sugarcane production, at the same time, the Cerrado is a biodiversity hotspot. The goal of this study is to assess sugarcane expansion impacts on Cerrado biodiversity and future impacts given climate change and sugarcane expansion by 2050. We focus on the amphibian species living in the Cerrado. The conversion of natural vegetation and global environmental change are the main causes for a strong trend of decreasing number of amphibian species globally, thus it is a good proxy for the biodiversity decline in the Cerrado. Records of amphibian species are from the International Union for Conservation of Nature's Red List of Threatened Species. To achieve our goal, we develop an Ecological Niche Model of land suitability for sugarcane production and to 68 species of amphibians. For this analysis, the impacts of climate change on habitat were greater than the impacts of sugarcane. After incorporating the impacts of climate change on habitat, species richness diminished from 47 to 25, and areas with <2 species predicted became the most common result.

Keywords: Biodiversity, ecological niche model, species richness, biofuel, climate change

B4.5 Geotagging and Geobragging

J. Stubbendeck

University of Nebraska-Lincoln

Abstract: Social media and social networks (SM/N) have become what some would describe as a pervasive part of our everyday life. Sixty-nine percent of adults in the United States, an all-time high, use social media and networking sites. A feature in SM/N's is geotagging, the process of adding geographical information to various

media in the form of metadata. The data usually consists of coordinates like latitude and longitude, but may even include bearing, altitude, distance and place names. Several apps like Snapchat, Instagram, and Facebook now give users the option to tag or share where they are. Instagram and Facebook allow you to share exactly where you are, like at a popular restaurant, at a national monument, or getting an oil change. The subject of this project is to better understand the use of the geotagging/geolocation feature. Who are the people geotagging, how often do they use the feature and what are the reasons people geotag? A survey was constructed to identify the usage of social media applications, the amount of geotagging, the reasoning for geotagging, and the user demographics. Survey respondents were asked about what apps they used, the frequency of their usage, and a list of possible responses to why they geotagged. Results demonstrated, for instance, that users were most likely to geotag while visiting new places or on vacation. Further research could investigate the use of other geolocation tools, applications, or media.

Keywords: Social media, location services, geolocation, geotagging

C1.1 How Does Place-based Culture Influence on Pro-Environmental Policy Support? An Examination using Agent-based Simulations

Gabriel Granco (1), Marcellus Caldas (1), Matthew Sanderson (2)

(1) Department of Geography, Kansas State University, (2) Department of Sociology, Anthropology, and Social Work, Kansas State University

Abstract: Humans have placed enormous pressures on natural resources. Freshwater is a natural resource vital to human life; water provides environmental services, enables food and electricity production, and supports livelihoods. Although some practices and policies to mitigate environmental change have been adopted, there is a knowledge gap about the conditions that shape resource users' support for freshwater conservation policies. New pathways to sustainability may be developed by examining how human culture informs the decision-making process related to environmental issues. The Values, Beliefs, and Norms (VBN) theory is a culture-dependent conceptual framework that relates human actions to their beliefs and values about the environment. Our goal is to study the cultural factors behind humans' pro-environmental behavior. The study area is the Smoky Hill River Watershed, Kansas, in the Central Great Plains of the USA. A survey with general population collected data to the development of the VBN model and profiles. An agent-based model integrates natural and human system processes and the feedback loops and interactions among the systems. The feedback from the natural system to the human system is mediated by a VBN-based decision rule, while the feedback from the human to the natural system is mediated by economic decisions on land use, with land use/land use change impacting biodiversity and water availability. This model can identify how much of the population belong to each VBN profile and simulate different proportions until we observe tipping points toward pro-environmental behavior.

Keywords: Coupled natural-human systems, Culture, Sociohydrology, Agent-based model, Water geography

C1.2 Indus the Blue Gold: - Rethinking on the Transboundary Water Distribution Between India and Pakistan

Puja Jana

Department of Geography, Oklahoma State University

Abstract: The Indus River rising in the Tibetan Plateau and its tributaries, flows through India and Pakistan forming an integral water resource responsible for the development of the agrarian countries of India and Pakistan. Since the partition of India and Pakistan in 1947, there have been repeated conflicts regarding transboundary water sharing between the two nations due to faulty boundary planning and recently due to Chinese interference in the upstream Indus. My study area involves the entire drainage area, starting from the source of the Indus and its tributaries to the Indus Basin in Pakistan. The importance of this water research lies in the fact that this water conflict led to one of the oldest and most successful water sharing agreements (Indus Water Treaty) in the world which has survived two wars and numerous terrorist attacks between the two countries. This research will help in forming a deeper understanding of the water sharing issues persisting in one of the largest river systems in the world that has led to the formation of the largest irrigation canal system in the world. Qualitative analysis involving surveys of the farmers cultivating in the Indus Basin and key informant interviews, will help in understanding changing political perceptions and real-life experience with water issues. GIS technology will be used to map the changing patterns in agricultural activity. The importance and uniqueness of this research lies in its broad study area and its attempt to understand the views and perception of the people at the ground level.

Keywords: Transboundary water sharing, geopolitics, GIS

C1.3 A Preliminary Examination of Wildfire Evacuation Zoning: Evidence from the Vineyard Fire and the Carr Fire

Dapeng Li

Department of Geography, South Dakota State University

Abstract: In wildfire evacuations, the incident commanders need to divide the risk area into different evacuation zones and issue protective action recommendations for the zones to protect life and property. Wildfire evacuation zoning plays a significant role in wildfire evacuation but remains under-researched. This work provides a preliminary examination of wildfire evacuation zoning by analyzing evacuation zone and other ancillary data from two fires—the Vineyard Fire and the Carr Fire. Specifically, we aim to address two questions: 1) what types of geographic features were used to delineate the evacuation zones? 2) The workflow includes three steps. First, we compiled polygon and textual evacuation zone data and matched them. Second, we used reverse geocoding to derive geographic features along the boundaries of evacuation zones and compared the derived features with the features used in the textual descriptions. Lastly, we used the land use data from the National Land Cover Database to examine the homogeneity of the zones with regard to land use. The preliminary results from the two fires reveal that prominent geographic features such as neighborhood, roads and other points-of-interest (POI) are widely used in these two fires. The evacuation zones are also homogenous with regard to land use. Lastly, based on our preliminary findings, we provide a discussion on the challenges and opportunities in wildfire evacuation zoning.

Keywords: Wildfire evacuation zoning, wildfire evacuation warning, GIS, reverse geocoding, geographic features

C1.4 For the Greater Good: How Flood Control and Stream Management Became a Federal Concern

Michael A. Urban

Department of Geography, University of Missouri

Abstract: Culminating in the decades of the 1950's and 1960's, watersheds throughout the United States were subject to a rapid and dramatic expansion in dam construction leading to a wholesale shift in how water and

sediment move through these systems. This dam boom coincided with the federal government taking responsibility for controlling, preventing, and mitigating the effects of floods: what had previously been only a local responsibility. In this paper I examine a number of inflection points in the early 20th century culminating in a fundamental shift in stream management and flood control policy from a local problem to a federal responsibility. From Pittsburgh, Dayton, and Oklahoma City to the great Mississippi River flood of 1927, a number of catastrophic flood events and the ways in which local communities responded ultimately shaped a series of public debates. Some of these discussions concerned the responsibilities of government, the limit of States rights relative to the commerce clause in Article 1 of the US Constitution, and the division between rural uplands and urban centers downstream. Using the core concepts of Critical Physical Geography as a framing mechanism, it is possible to trace how a series of policy debates related to flood control generated concussive ripples as humans asserted themselves as a dominant physical force which continue to this day to resonate throughout these biophysical systems.

Keywords: Flood Control, Dams, Critical Physical Geography, Environmental History

C1.5 Public-private partnerships with public transit, local government agencies, and ridesourcing in Denver, CO

Sylvia Arriaga Brady

Department of Geography and the Environment, University of Denver

Abstract: In recent years, there has been an explosion in the shared economy that has brought innovation and efficiency to many sectors. Shared mobility in particular has boomed since the introduction of bikesharing, carsharing, and ridesourcing and their interaction with the on-demand economy. Ridesourcing, the use of private vehicles and drivers summoned by smartphone apps such as Lyft and Uber, along with the entrance of autonomous vehicles (AVs), could contribute to the end of private vehicle ownership. Public-private partnerships between ridesourcing companies and public agencies are just getting off the ground around the U.S., with pilot programs between local governments and transit agencies and several of the largest ridesourcing companies, Uber and Lyft. The full benefits and shortcomings of utilizing ridesourcing as a partner to provide services or integrate with public transit has not yet been fully researched. Using interviews with public and private agencies involved in ridesourcing P3s and data analysis of pilot program results, this research seeks to address the gap in the literature of P3s and ridesourcing by documenting the characteristics of pilot programs across the U.S, and specifically in the Denver metropolitan region. This research identifies how transit agencies and local governments are partnering with ridesourcing companies, documents the pilot programs produced thus far, and measures their success in achieving the goals of both the private and public sector partners.

Keywords: Transportation, public-private partnerships, ridesourcing, transportation network companies, public transit

C2.1 How Many Monolingual Countries Are There? Language Diversity in Small Island Developing States (SIDS)

Bimal Kanti Paul

Department of Geography, Kansas State University

Abstract: Fifty-seven countries of the world are considered by the United Nations as Small Island Developing States (SIDS). All of these countries are very small both with respect to population and area. Despite their small size, a considerable number of these countries are linguistically diversified. Numerous different languages are in

use in many SIDS. For example, there are 70 living languages in Solomon Islands with a population of slightly over half a million. In some countries, number of speakers ranges from few to several thousand people. Using Weaver's Minimum Positive Deviation Method, SIDS is classified as Monolingual, Bilingual, and Multilingual countries. These language groups are analyzed by their location, population size, and area. Explanations are provided for presence of many languages in Small Island Developing States.

Keywords: Monolingual, bi-lingual, multilingual, SIDS, population

C2.2 Large Development Projects in Shaping Land Use and Livelihood: A Case Study of the Padma Multipurpose Bridge Project, Bangladesh

Jawata Afnan Saba (1), Abu Suphiyan Shekh (2), Manjur Morshed (3)

(1) Department of Geography, South Dakota State University, (2) Department of Development Studies, Jahangirnagar University (Bangladesh), (3) Department of Urban and Regional Planning, Khulna University of Engineering and Technology (Bangladesh)

Abstract: Development-induced resettlement has become a global issue. The purpose of this study is to learn how the resettlement and compensation policy associated with the Padma Multipurpose Bridge Project affected the people who were forced to move. The project is considered one of the most significant development projects in Bangladesh because it will connect 30 million people in southeast Bangladesh to the capital city, Dhaka. The main component of the project is a 6.12 km long two-level steel truss bridge (4-lane divided highway on the top and single-track rail on the bottom). The project acquired 1,062 ha of land and forced 75,000 individuals to move. Qualitative and quantitative surveys have been conducted to gather information regarding the project's resettlement policy results, including the results of the resettlement program. Forty-five surveys were conducted, and fifty affected people were interviewed. The results of the study showed that no in-kind compensation has been provided to the people, and resettlement camps remain vacant because people are not interested in buying those plots. Many women property owners became more vulnerable because their property ownership was not recognized during the compensation process. Only 33% and 20% of women landowners were compensated from Madaripur and Shariatpur districts respectively. Additionally, the acquisition of agricultural land marginalized many farmers. An information gap has prevailed in every step of resettlement. Affected people have complained that local leaders, government, and NGO officials were the prime beneficiaries of this resettlement.

Keywords: Resettlement, Compensation, Resettlement camp, livelihood change, Padma Multipurpose Bridge Project

C2.3 Determinants of Human Migration in the Climate Change Affected Indian Sundarbans

Subarna Chatterjee, Bimal Kanti Paul, Audrey Joslin

Department of Geography, Kansas State University

Abstract: Climate change (CC) related environmental degradation severely threatens the low-lying coastal communities around the world. The Indian Sundarbans, the world's largest deltaic coastal lowland in South-Asia, is severely affected by global climate change. Sea level rise, salinity intrusion, increasing sea-surface temperature, rainfall variability, storm surges, increased frequency of river flood, storms, over siltation of the rivers, soil erosion, and island subsidence all contribute to local environmental degradation and which results in a loss of habitat and income for the residents mostly the agricultural community. The residents have responded to the environmental degradation through in-situ adaptation and out-migration. This paper particularly

examines the environmental and non-environmental determinants of out-migration from the Sundarbans. Primary data was collected from the residents by conducting 300 household level semi-structured interviews in two different blocks in the eastern and the western parts of the Indian Sundarbans. The data includes resident's perception towards CC, causes of migration and adaptation to environmental degradation. Multivariate statistical analysis was applied to examine the determinants of migration. Expected results will provide insights on the relationship between the environmental and the non-environmental variables determining out-migration. It will also illustrate the relative importance of migration to survive the environmental degradation.

Keywords: Climate Change, Environmental Degradation, Migration, South Asia

C2.4 Deteriorating Groundwater Quality Causing Health Hazards in Selected Villages of Gautam Budh Nagar District, Uttar Pradesh, India

Vijendra K. Boken (1), Khajanchi Lal(2), Irani Mukerjee(3), Rajendra K. Yadav (4), and Man Singh (2)

(1) Department of Geography, University of Nebraska-Kearney, (2) Water Technology Center, Indian Agricultural Research Institute (India), (3) Division of Agricultural Chemicals, Indian Agricultural Research Institute (India), (4) Soil and Crop Management Division, Center for Soil Salinity Research Institute (India)

Abstract: Severe health hazards such as cancer were increasingly reported in recent years from selected villages in Gautam Budh Nagar district of Uttar Pradesh, India. One of the reasons attributed to these hazards included the deteriorating quality of the groundwater used for both drinking and irrigation in these villages. The water quality deteriorated apparently due to the wastes released by nearby industries as well as due to the changing cropping patterns requiring greater applications of fertilizers and pesticides. Twenty one water samples were collected from 10 villages in the district in July 2018. These villages included Badalpur, Baidpura, Bambavar, Dairy Machha, Dairy Skinner, Dujana, Kalda, Kurikhera, Mahavar, and Sadopur. Samples were tested for the presence of pesticide residues and heavy metals such as cadmium (Cd), copper (Cu), chromium (Cr), iron (Fe), manganese (Mn), zinc (Zn), nickel (Ni), and lead (Pb). In addition, the pH value, electrical conductivity (EC), Sodium Absorption Ratio (SAR), and Residue Sodium Carbonate (RSC) concentration were also tested. Initial test results obtained from the Pesticides Referral Laboratory of the Indian Agricultural Research Institute indicated that none of the samples contained pesticide residues in excess of their permissible limits (5 ppb). However, a few of the selected heavy metals were found in much higher concentration than their permissible limits, as tested in the laboratory at the Center for Soil Salinity Research Institute, for both drinking-water and irrigation-water samples in the majority of cases. In the case of the irrigation-water, the approximate ratio of the maximum concentration detected in the samples to the corresponding permissible limit set by the Bureau of Indian Standards was 1.4 for copper, 4 for cadmium, and 7 for chromium. In the case of drinking-water, most of these ratios were much higher – 1.4 for copper, 6 for lead, 17 for cadmium, and 23 for chromium (a cancer-causing carcinogen). Further analysis of results is continuing.

Keywords: Water quality, heavy metals, cancer, chromium, lead, cadmium, industrial pollution

C2.5 Kerala Floods: Should India Change its Foreign Aid Policy?

Avantika Ramekar and Bimal Kanti Paul

Department of Geography, Kansas State University

Abstract: India's tropical State of Kerala saw unprecedented rainfall since May of 2018 resulting in the worst flood in a century for the State. India is known to natural disasters. Its physiographic and climatic conditions make it of the most disaster-prone areas of the world (NDMP, GoI). Since 2005, India has laid down institutional

and coordination mechanism for effective Disaster Management at local, state and federal level. India's National Disaster Management Plan (NDMP) of 2016 is an action framework designed is consistent with United Nation's (UN) Sendai Framework for Disaster Risk Reduction 2015-2030. It aims to improve the disaster management cycle by adopting globally accepted best practices. Other than agriculture and tourism, Kerala's economy depends extensively on remittances from migrant workers. Not surprising, Kerala has a huge diaspora outside the country, the floods have attracted international attention. As a matter of policy, the Government of India does not issue any appeal for foreign aid in case of a natural disaster. This policy has sparked debates during the recent Kerala floods. On one hand, the policy reflects India's desire to change its international image from a poor country to one capable of dealing with its own problems, while on the other hand, the federal-state conflict is turning into a question of whether the government is being indifference and ignorant towards Kerala's needs. But, with is diaspora and acknowledgement of its citizens contributing to another country's economy, this paper explores if India should make an exception and accept voluntarily offers of aid?

Keywords: Disaster management, disaster risk reduction, policy planning, relief, foreign aid

C3.1 Two Arguments in Favor of Characterizing Additional Proglacial Soil Chronosequences

Arnaud J. Temme

Department of Geography, Kansas State University

Abstract: The world's mountains are among the regions that feel the effects of climate change first and strongest. This is mainly because even small increases in average annual temperatures may cause large changes in the extent and severity of permafrost, and in the extent of glaciation. Retreating glaciers, particularly, receive attention – for their stark visual message, but also for the negative on-site and off-site effects of their decrease. There is, however, a positive note to strike: glacial retreat leaves new land where soils develop, vegetation grows, fauna lives and some water can get stored.

We are not currently able to predict the speed of such developments for valleys worldwide, which leaves mountain communities even less certain of their future. I will show that proglacial rates of soil development, the main precursor to provision of the new ecosystem services, have been measured in only a few dozen proglacial valleys worldwide, that they vary widely, and that they cannot yet be reliably related to driving factors that are globally known. This constitutes my first argument in favor of characterizing additional proglacial soil chronosequences in the world's mountain ranges. My second argument is that such studies will allow us and our students to document disappearing yet stunningly beautiful landscapes.

Keywords: Chronosequence, proglacial, soil, pedogenesis, soil forming factor

C3.2 Dynamics of Lodgepole Pine Forests in Fire-Driven Landscapes: Past, Present and Future

Barrie Chileen (1), Kendra K McLauchlan (1) and Philip Higuera(2)

(1) Department of Geography, Kansas State University, (2) Ecosystem and Conservation Sciences, University of Montana

Abstract: Wildfire is a ubiquitous disturbance agent in Rocky Mountain subalpine forests, and the frequency of large fires is projected to increase in the 21st century due to warming climate and increased drought. Lodgepole pine, a dominant species in subalpine forests of western North America, is largely resilient to high-severity fires. However, recent studies suggest that the resilience of lodgepole forests may be compromised with predicted changes to climate and moisture availability. While much is known about modern post-fire dynamics of these systems, less is known about post-fire responses of lodgepole forests over increased temporal scales and varying

climate settings. This study investigates fire occurrence and post-fire vegetation change in lodgepole forests over the past several millennia to understand ecosystem responses to changes in wildfire and climate.

We assessed the impacts of wildfires on lodgepole forests over the past 2500 years, a period including significant changes in regional climate. We focused on Chickaree Lake, Colorado, U.S.A., in Rocky Mountain National Park because of its catchment size and existing paleoecological datasets. To investigate long-term ecosystem variability, we analyzed pollen over multiple high-severity fire events previously reconstructed with charcoal analysis. We found reductions in *Pinus* pollen after fire events, and small (<4%) but potentially ecologically significant quantities of *Alnus* and *Sarcobatus* pollen, which could replenish nitrogen stocks in post-fire successional sequences. These results help understand the mechanisms that confer resilience within lodgepole forests to fire activity and reveal that variability in post-fire vegetation recovery times can be important in understanding long-term ecosystem dynamics.

Keywords: Paleoecology, Pollen analysis, Colorado-Rocky Mountains, Rocky Mountain National Park, Wildfire

C3.3 Spatiotemporal Patterns of Human-Induced Landscape Change in a German Agricultural Landscape

W. Marijn van der Meij (1, 2), Arnaud J.A.M. Temme (3,4), M. Sommer (2)

(1) Soil Geography and Landscape Group, Wageningen University and Research (The Netherlands), (2) Research area Landscape Functioning, Working Group Landscape Pedology, Leibniz Centre for Agricultural Landscape Research (ZALF) (Germany), (3) Department of Geography, Kansas State University (4) Institute of Arctic and Alpine Research, University of Colorado, Boulder

Abstract: Humans have affected the landscape they live in since prehistoric times. Agricultural activity such as deforestation and tillage induced or increased erosion processes and changed the properties of soils and the terrain. Present day soil and landscape properties can help us quantify the impact humans had on the landscape since their first activities.

We examined a 4 ha agrarian kettle hole catchment in northeastern Germany to identify phases and rates of human-induced erosion and deposition. Kettle hole catchments are suitable test sites for studying the effect of erosion on the landscape, because the detached soil material is stored locally in the closed depressional catchments. We used a set of 160 detailed soil descriptions to reveal spatial patterns of erosion and deposition and we used Optically Stimulated Luminescence (OSL) to date 32 sediment samples from five positions in the depression to reveal detailed spatiotemporal patterns of deposition.

The hillslopes show a highly variable pattern of soils with different grades of erosion. Most soils are strongly eroded, showing the large impact humans had in the area. The OSL ages show that the onset of deposition occurred ~5000 years ago. Remarkably, the oldest ages were found on the fringes of the depression, while the center of the depression is only affected by the most recent, ongoing phase of deposition, which started ~200 years ago. The combination of geochronological techniques such as OSL with soil surveys enabled us to correctly interpret the landscape dynamics, which was not possible with one of those methods separately.

Keywords: Physical geography, Erosion, kettle hole, landscape evolution

C3.4 Assessing the Influence of Parameters for Agricultural Flood Loss Estimation in the Middle Cedar River Watershed, Iowa

Md Abu Sayeed Maroof

Department of Geography, Kansas State University

Abstract: Agriculture is one of the major economic drivers for many countries around the world. The production is highly dependable on the climatic conditions and very sensitive to natural hazards like the flood. The Federal Emergency Management Agency (FEMA) of United States developed Hazard-US model (HAZUS), a tool to estimate the loss to several sectors like infrastructures, transportation, and agriculture due to natural hazards like floods, hurricanes, and earthquakes. The study assesses the influence of input model parameters for HAZUS flood loss to crops. The study findings can help to optimize the resource allocation for running a level 3 analysis in HAZUS for agricultural loss estimation. The analyzed parameters for this study are the return period, flood date, duration, crop type, and crop price per unit. This study analyzes different combinations of input parameters for the Middle Cedar River Watershed in Iowa. The parameters have been modified based on the cropping pattern of the study region and the pricing trends. The results include the computation of the loss distribution and the determination of the most influential parameters. The study has found that the flood date, duration, and return period are the most influential in the loss estimation. Corns are more at risk than soybean because of the longer cropping season. Some counties experience more loss than others based on average annual loss (AAL) but some can be affected highly with a lower probability event. The loss estimation can help emergency planning for floods affecting agriculture, and optimizing the agricultural resource management.

Keywords: Flood Modeling, HAZUS, Agricultural loss, Natural Hazard, Flood loss estimation

C4.1 Encroachment or Opportunity? Geography in a World of Environmental Studies, Global and International Studies, GIScience, Environmental Science, and Sustainability Studies

Deb Thomas

Department of Geography and Earth Sciences, University of North Carolina at Charlotte

Abstract: With the creation and expansion of interdisciplinary programs, geography must position itself strategically. Departments and/or curriculum in sustainability, such as global studies, international studies, environmental science among others, run the risk of encroaching on geography majors and enrollments or can complement and augment geography degrees. This facilitated workshop will explore opportunities, strategies and challenges to this dilemma.

D1.1 An Analysis of Advertising Revenue in Early Automobile Route Guides

John T. Bauer

Department of Geography, University of Nebraska Kearney

Abstract: The most widely used and successful early automobile route guide in the United States was the *Official Automobile Blue Book*. Published between 1901 and 1927 as an annual, multivolume series, it provided simple maps and turn-by-turn directions between towns in North America. The guide was a commercial success because *Blue Book* publishers sold advertisements for hotels, restaurants, and other tourist services along the hundreds of touring routes described in its pages. These routes were the work of professional “pathfinders” who formed the publisher’s data-gathering infrastructure. Pathfinders were essentially professional field mappers. Although pathfinders did not call themselves cartographers, they were geographical field data collectors and considered their work to be an “art and a science,” much the same as modern-day cartographers. Publishers generated a significant amount of income revenue from advertising, which was necessary to support the high cost of pathfinding and production. This research analyzes the series’ advertising revenue. By summarizing advertisements by size, location, and frequency, the amount of revenue generated by advertising can be estimated. Primary sources for the research include over one hundred forty guides, period newspaper stories,

articles from early automobile trade magazines, advertisements, company correspondence, and court records from a 1921 bankruptcy case in the United States District Court of southern New York.

Keywords: Cartography – history, automobile route guides, United States

D1.2 New Colossus, New Nationalisms? *Affective-Discursive Practices* and The National Body of “Lady Liberty”

James E. Baker

Department of Geography, University of Nebraska Lincoln

Abstract: This paper considers the Statue of Liberty in the everyday meaning-making of “affective-discursive practices” (Wetherell, et al. 2016) of nationalism in the United States. I examine two visual discourses: cinema and political cartoons published around the 2016 Presidential election. My approach interrogates how media discourse situates the Statue of Liberty, mobilizing and mediating commonplace affective-discursive practices of shame, abjection, and joy for the nation. I contend that this is accomplished in editorial cartoons through the use of a repertoire of embodied depictions of the sexed body of the Statue which passionately contest political subjectivities, namely through immigration policy and LGBT rights in the United States. I analyze how semiosis and embodied affect imbricate the Statue of Liberty in films such as *Escape from New York* (1981) and *Ghostbusters 2* (1989). I assert that three modes of seeing – the *personal*, the *colossal*, and the *penetrable container* – root these pervasive affective-discursive formulations in a “heterosexual matrix” of cultural production (Butler 1993). Yet, these discourses consistently produce abjection *and* joy – depictions of the Statue in films such as *Independence Day* (1996) and *Lives of Liberty* (2017) generate national anxieties and foreground the transformative powers of shame (Sedgwick 2003). Given these tensions, I conclude that discourses of the Statue of Liberty operate as emotionally-charged ciphers for cathexis between the subject and when the viewer, as cultural actor, “feels the national,” (Militz and Schurr 2016). Through these displacements and penetrations, affective-discursive practices reveal post-Election resistances and comings-together within American political life and semiotic order.

Keywords: Critical geopolitics, popular geopolitics, bodies, embodiment, monuments, affect, nationalism

D1.3 Becoming Laura: Performing Gender at *Little House* Tourist Sites

Kimberly Johnson Maier

Department of Geography, Oklahoma State University

Abstract: Historical fiction provides a link between the past and present through storytelling, where children and adults learn about the significance of people and places. Geography fosters important understandings of how these historical and spatial narratives are interpreted in the present. While some geographers focus on the link between historical fiction and tourism, none have explored the *Little House* book series, or the contemporary landscapes presented at various *Little House* tourist sites. The *Little House* series, by Laura Ingalls Wilder, chronicles the experiences of the Ingalls family as they move west from Wisconsin to Dakota Territory during the mid to late 1800s. In addition, the series has provided an avenue for reflecting and constituting various aspects of social memory situated in the American West, including gender. I collected 290 surveys completed by tourists as well as conducted participant observation at the 2017 Wilder Pageant in DeSmet, South Dakota. In this paper, I address the ways gender is manifested and performed within the landscape and how tourists (re)interpret it. In survey responses, tourists discuss how this site represents traditional gender roles, while some see Wilder’s life as a reaction against them. Gender is often shown in the landscape through tourist dress, especially bonnets, mimicking attire worn by women during this time period and Laura herself.

Some tourists use dress as a way to *become* Laura and a vehicle which work to transport them back in time. Additionally, the placement and dress of female staff and volunteers work to perpetuate certain gender roles.

Keywords: Gender, tourism, historical fiction, *Little House* book series

D1.4 Mate Between Mates: The Evolving Social Relations of Yerba Mate Consumption

Adam S. Dohrenwend

Department of Geography and Atmospheric Science, University of Kansas

Abstract: Yerba mate, a cornerstone of Argentine culture for centuries, has been thrust on the global commodification stage in recent years. With the vast majority of Argentines consuming the caffeinated infusion, the industry is seeking a new global market through which it can expand profits. In order to accomplish this, a discourse has been constructed and harnessed to define and market the product— however, segments of this discourse do not match reality. This paper examines one of these— in which consumption is romanticized with images of sharing and the resulting relationships with others and the environment in Argentina (past and present). This occurs while the industry perverts the product in Global North economies with increasingly different modes of consumption. Beyond this, the environmental and socioeconomic impacts of agricultural intensification and consolidation on northeastern Argentina will be examined.

Keywords: Latin America, Argentina, consumption, food geography

D1.5 Geographies of Opera in Communist Slovakia

Brett R. Chloupek

Department of Geography, Northwest Missouri State University

Abstract: Research on aspects of “city-text,” a term first popularized by Maoz Azaryahu, has primarily focused on the arena of streets names, memorials, and statutes within a city that serve as signifiers of the “ownership” of the official culture by a particular political regime. Recent scholarship on opera as an art form is increasingly attentive to issues of the cultural and political roles opera houses themselves play within the urban landscape. Thus, I argue that the most logical orientation for future research in this realm is to consider the urban opera house an essential element of city-text. Opera as an art form came to be closely associated with nationalist movements throughout Europe in the late nineteenth and early twentieth centuries. However, the relationships that developed between socialist regimes and opera in the mid-twentieth century were much more complex. This paper utilizes the State Theatre in Košice, Slovakia as a case study for examining the role of the opera house from the perspective of city-text.

Keywords: Opera, nationalism, socialism, Košice, Slovakia

D2.1 David Rankin: America’s Greatest Farmer

Jason Combs

University of Nebraska Kearney

Abstract: A century ago Americans were familiar with stories of banking and industrial giants like Carnegie and Rockefeller, of Morgan and Vanderbilt. Many were also familiar with David Rankin’s story. Rankin, who died in 1910, enjoyed notoriety on a national scale and was widely known as America’s greatest farmer. Rankin, from

Tarkio, Missouri, was not just known as America's greatest farmer, he was referred to as the King of Corn and Cattle. Despite his national prominence a century ago only one academic account of Rankin's life has been published. Since that time no other scholars have pursued any "Rankin" projects. This project expands on the previous study by utilizing family records, newspaper accounts, local histories, and Rankin's personal records to provide background information on Rankin, insight into his farming operation, and highlight the efficiency of Rankin's ranch system to manage both land and livestock. Plat book data and land records are also used to examine Rankin's empire, place his activities in a larger national context, and dispel many of the once popular myths surrounding America's greatest farmer. In addition to a detailed examination of Rankin's ranch system, other ventures, such as the Midland Manufacturing Company and his establishment of Tarkio College, are discussed. Rankin's story is important because it reflects economic shifts occurring at a pivotal time in the development of our national economy.

Keywords: Agriculture, Cattle, Farming, Hogs, Missouri, and Ranch.

D2.2 Neo-Isolationism in the US Presidential Election of 2016

J. Clark Archer (1), Fiona M. Davidson (2), Erin H. Fouberg (3), Fred M. Shelley (4), and Robert H. Watrel (5)
(1) University of Nebraska, Lincoln (2) University of Arkansas, (3) Northern State University, (4) University of Oklahoma, (5) South Dakota State University

Abstract: "Build the wall!" was a recurrent theme at rallies organized for GOP candidate Donald Trump during both the primary nomination stages and the general election stages of the 2016 US presidential election. Other neo-isolationist appeals by Candidate Trump included threats to withdraw from global and regional climate, trade, and security agreements, including the United Nations Global Climate Accord, the Trans-Pacific Partnership, the North American Free Trade Agreement, and the North Atlantic Treaty Organization.

First, this presentation opens with a review of long-term trends in U.S. foreign relations involving alternating periods of foreign policy introversion and foreign policy extroversion which began to emerge very early in the history of the American Republic. Second, this presentation turns to its main focus on maps and analyses drawn from the recently published *Atlas of the 2016 Elections* (Watrel, et. al.; Rowman & Littlefield; 2018) to examine the impact of neo-isolationism on the outcome of the 2016 US Presidential election. Comparisons with geographical patterns of electoral support for various candidates and parties in the 2016 and recent previous US presidential elections show that the attraction of neo-isolationism was not nationally uniform, but varied significantly from region to region across the United States. Third, this presentation concludes with evidence from public opinion surveys which indicate widening attitude differences on foreign policy issues among different segments of the American electorate, and between average citizens and foreign policy specialists.

Keywords: Political geography, United States, presidential elections, cartography, atlas

D2.3 The Electoral Geography of Iowa Territory and Early Iowa Statehood

Robert Shepard

Digital Scholarship and Publishing Studio, University of Iowa Libraries

Abstract: In 1845, the United States government had voted to grant statehood to Iowa and Florida. Iowa Territory, however, still required majority approval from its residents to adopt a new constitution and approve statehood. The statehood vote initially failed in 1845 before passing narrowly in 1846. These votes were collected at the county level and documented by state officials, but the records are available only in the form of original handwritten notes in the state archives. This paper, part of a chapter in the forthcoming *Historical Atlas*

of Iowa, explores the unique electoral geography of the Iowa Territory popular votes for statehood and critically analyzes these returns against subsequent elections in the state, drawing particular attention to the highly unusual (and possibly suspicious) circumstances of the 1846 electoral returns.

Keywords: Political geography, electoral geography, historical geography, Iowa, voting

D2.4 Rural Depopulation and the Resurgence of Six-Man Football in Nebraska

Andrew Husa

University of Nebraska Lincoln

Abstract: Indicative of its large number of small high schools, Nebraska is one of only eleven states with high schools playing six-man football. Due to six-man football being synonymous with schools with small enrollments, the historical geography of the six-man football landscape of Nebraska offers a unique look into the patterns of rural depopulation that have plagued the state since the early twentieth century. While my research is specific to Nebraska high schools, many Great Plains states can relate to the relationship between rural depopulation and having many high schools with low enrollments. Beginning with the invention of six-man football in Nebraska in 1934, this paper tracks the rapid rise in the number of high schools across the state who adopted the reduced-player version of the game to give their young men an opportunity to play football. This is followed by a look at the rise in the number of high schools playing six-man football to its peak in the early 1950s, and the eventual decline and disappearance of six-man football in the 1960s. After discussing the return of six-man football to Nebraska high schools in the 1980s, this paper focuses on the resurgence of the game across the state, especially over the last two decades, as the number of six-man teams climbed from single digits in the early 2000s to over thirty for the 2018 high school football season, and a look towards the future of six-man football in both Nebraska and the Great Plains region.

Keywords: Rural geography, sports geography, rural depopulation, Nebraska, Great Plains

D2.5 Chain Migration as a Factor in Migrants' Income – a Case Study of the Informal Recycling Sector in Beijing, China

Jia Feng

Geography, History Department, Washburn University

Abstract: About 1% of Beijing's residents (close to 200,000 people) are working in the informal recycling sector. Starting around the late 1980s, rural-to-urban migrants joined Beijing's recycling business, outcompeted the state-run companies, and gradually dominated the sector in Beijing. Although they have built a very efficient recycling system, their activities and living conditions are still labeled as "informal" in the city. In the past 30 years, migrants from *Henan* province have become the dominant group among the migrant recyclers in the city. But very little is known about the complexity and variability of the informal income for migrants from different provinces. This study tries to understand the impact of chain migration and the hometown identities on migrants' unstable and fluctuating income. With multi-year fieldwork, a questionnaire of 304 is used to collect the disposable income data from the rural-to-urban migrants. The results indicate that migrants' origins are significant in determining migrants' income in both "good" and "bad" business years. Specifically, business run by migrants from the dominating *Henan* province is more profitable in a "bad" business year. In a "good" year, migrants from *Henan* province have less disposable income than the elite migrants from other provinces. We argue that the role of the chain migration and hometown identities is complicated in migrant-run businesses.

Although elites from other provinces have more disposable income in “good” business years, the dominant Henan identity works more effectively as a safety net mechanism for migrants during a “bad” business year.

Keywords: Recycling, informal sector, migrant enclaves, Beijing

D3.1 Parameterization of the Prospect Leaf Reflectance Model for Tallgrass Prairie

Douglas G. Goodin

Department of Geography, Kansas State University

Abstract: The PROSAIL model is among the most widely used models for simulating the spectral reflectance of vegetated surfaces in the VNIR and SWIR spectral regions, and retrieving biophysical information from canopies. PROSAIL consists of two component radiative transfer models; Prospect, which predicts reflectance from leaf surfaces, and SAIL, which uses individual leaf reflectances modeled from Prospect to simulate bulk canopy reflectance. Accurate simulation of canopy reflectance depends on a number of parameters in each of the component models, some of which are not necessarily available for all canopy types. This paper describes an effort to parameterize the Prospect model for tallgrass prairie, using in-situ spectroscopy and field sampling at the Konza Prairie Biological Station (KPBS), near Manhattan, KS, USA. Five parameters of the Prospect-4 model; total chlorophyll content (C_{ab}), anthocyanin content (C_{xc}), equivalent water thickness (EWT), dry leaf mass per area (LMA), and a leaf structure parameter (N) were determined by laboratory analysis for the four dominant graminoid species at KPBS, *Andropogon gerardii*, *Sorghastrum nutans*, *Schizachyrium scoparium*, and *Panicum virgatum*, at three phenologic stages during the 2018 growing season; vegetative, heading, and seeding. Simulated spectra were then compared with measured spectra to evaluate the accuracy of Prospect model results under a variety of parameterization strategies. Results show that leaf model parameters vary significantly across the growing season, and that accurate simulation of reflectance depends most critically on proper parametrization of leaf pigments. Implications of these findings for remote sensing of tallgrass prairie canopies are discussed.

Keywords: Reflectance model, PROSPECT, tallgrass prairie, remote sensing

D3.2 Predicting and Estimating Land Cover Mapping at Bento Rodrigues dam disaster area using Machine learning and Landsat images

Dong Luo, Marcellus M. Caldas, Douglas G. Goodin

Department of Geography, Kansas State University

Abstract: Land use and land cover mapping is still a popular topic in remote sensing community, and prediction and estimation it can help the government manage limited land resource and effective use of it. The objectives of this study were examining the performance of machine learning algorithms to classify and predict remote sensing imagery using Landsat 7 ETM+ and Landsat 8 OLI images. Landsat 7 ETM+ and 8 OLI images of dry season at Bento Rodrigues tailing dam disaster area were used to pixel-based images processing. We created two datasets to apply machine learning algorithms, one is 6 bands, and the other one is 6 bands and the normalized difference vegetation index (NDVI). After images preparation, we used 10 fold cross-validation to validate training models and accuracy is higher than 90%. The results indicated that the support vector machine had a better performance than the decision tree in this study. We also calculated each class sensitivity of processing results and found that agriculture, forest, urban and mines had higher sensitivity. The results concluded that it is possible to use machine learning algorithms to predict land use and land cover map using different landform Landsat images. In addition, we also estimated land use and land cover variation at this area from 2000 to 2017;

the forest decreased approximately 202.56 km²; urban area increased about 13.69 km² and agriculture area also increased about 170.84 km². Besides, the mining area (Bento Rodrigues) is near twice size than 2000.

Keywords: Land use and land cover, machine learning, prediction, Landsat images, remote sensing, support vector machine, decision tree

D3.3 Contrasting Effects of Dams on River Morphology and Sand Transport in the Colorado River Basin

Erich R. Mueller (1), David J. Topping (2), and Paul E. Grams (2)

(1) Department of Geography, University of Wyoming, (2) Grand Canyon Monitoring and Research Center, U.S. Geological Survey

Abstract: Dams disconnect downstream river channels from upstream sediment supply. Corresponding changes in flow hydrology typically result in channel narrowing and changes in the extent and composition of riparian plant communities. In the Colorado River basin, most of the water originates at high elevations from snowmelt, and most of the sediment originates stochastically from lower-elevation semi-arid basins. Flaming Gorge Dam traps sediment originating from the upper Green River basin, likely resulting in sediment deficit conditions downstream. However, recent analysis suggests that natural changes in the frequency or magnitude of sediment supplying events within the largely unregulated Yampa River basin has a similar effect on current fine sediment fluxes downstream of the Yampa-Green River confluence, partially because sand moves relatively slowly through the network as an elongating wave. Very large sediment supplying events thus have an important legacy effect on modern interpretations of sediment transport. Farther downstream, Glen Canyon Dam traps the fine sediment flux of the entire upper Colorado River basin, resulting in a reduction in sandbar area and volume in Grand Canyon. Periodic controlled floods are used to rebuild sandbars, and these floods are timed to occur after recent tributary sediment inputs. Monitoring and morphodynamic modeling demonstrate the importance of these floods for maintaining or increasing sandbar size, although they may not prevent continued vegetation encroachment and channel narrowing. These results demonstrate the importance of near continuous monitoring of sediment fluxes to accurately identify long-term changes in sediment supply and corresponding channel and riparian vegetation changes – whether natural or dam-induced.

Keywords: Geomorphology, physical geography, dams, environmental change, Colorado River

D3.4 Use of Oklahoma's Mesonet and Severe Environmental Events

Steve Stadler (1) and Chris Fiebrich (2)

(1) Department of Geography, Oklahoma State University, (2) The Oklahoma Mesonet, Norman Oklahoma

Abstract: The Oklahoma Mesonet has over 120 environmental stations operationally reporting quality-assured data every few minutes to public Web servers. Data tables, summaries, and applied products are available and some of these are updated every 5 minutes. There have been many basic and applied research articles using subsets of Mesonet's output from more than 5 billion observations. Yet, there is little knowledge of the connection of these near-real-time data and information to the timing of significant environmental events. We studied seven years of our Web site's usage using Google Analytics and sorted usage by season, day of the week, time of day, and environmental events such as tornadoes, floods, and fires. These slices show there is no doubt that season, day of the week, and time of day factor strongly in the frequency of use. However, overshadowing the background passage of time is the presence of ongoing or near-immediate environmental danger. As our knowledge from such analyses becomes greater, we hope that our suite of public products can be improved to best suit users.

Keywords: Oklahoma Mesonet, Web server use, weather events

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