



**Middle States Division
American Association of Geographers
Annual Meeting**

OCTOBER 18 - 19, 2019

KUTZTOWN
UNIVERSITY

The Meeting at a Glance

Friday, October 18th

- 12:00 PM – 5:00 PM Registration, Boehm Lobby
- 12:00 PM – 1:20 PM Field Trip, Pennsylvania German Cultural Center
- 1:30 PM – 1:45 PM Inaugural Remarks and Welcome, Boehm 145
- Dr. Michael Davis – President of MSAAG
Dr. Richard Courtney – Chair, Department of Geography, Kutztown University
Dr. David Beougher – Dean, College of Liberal Arts and Sciences, Kutztown University
- 2:00 PM – 3:20 PM Paper Session I – Boehm 105, Boehm 260, and Boehm 262
Rob Altenburg – Boehm 261
- 3:20 PM – 4:20 PM Coffee Break and Poster Session I – Boehm Lobby
- 4:20 PM – 5:40 PM Paper Session II – Boehm 260, and Boehm 262
Lightning Talks – Boehm 105
- 6:00 PM – 7:30 PM Dinner – MacFarland Student Union 218
- 8:00 PM – 10:00 PM Geography Bowl – MacFarland Student Union Rooms 157, 218, 223, 250

Saturday, October 19th

- 8:00 AM – 10:30 AM Registration, Boehm Lobby
- 8:10 AM – 9:40 AM Paper Session III – Boehm 105, Boehm 260, and Boehm 262
Panel Talk - Emerging Topics in Critical Geography – Boehm 261
- 9:40 AM – 10:40 AM Coffee Break and Poster Session II – Boehm Lobby
- 10:40 AM – 12:00 PM Paper Session IV – Boehm 260 and Boehm 262
Discussion with Editors – Paul Marr and Steven Schnell – Boehm 261
- 12:15 PM – 1:45 PM Luncheon, MacFarland Student Union 218
- Keynote Address: Dr. Amy Lobben, University of Oregon
Business Meeting: Michael Davis
Finance: Jo Margaret Mano
Invitation to 2020 Meeting: Jase Bernhardt
Paper and Poster Awards: Nate Gabriel
- 2:00 PM Field Trip, Walking Tour of Main Street

SCHEDULE OF PRESENTATIONS

Friday, October 18th 2:00 - 3:20 PM

PAPER SESSION I

Boehm 105 – Historical Geography

Session Chair – Jase Bernhardt, Hofstra University

- 2:00 – 2:20 PM** Samto Wongso – Colgate University – Locational History of Parks in Upstate New York Cities
- 2:20 – 2:40 PM** Charles Barbieri and Elijah Freiman – SUNY Geneseo – Green Book Listings: City-based diffusion, 1940-1960
- 2:40 – 3:00 PM** Jase Bernhardt – Hofstra University – Mining Weather and Climate Data from the Diary of a Forty-Niner

Boehm 260 – Geography of Energy and Sustainability

Session Chair – Megan Heckert, West Chester University

- 2:00 – 2:20 PM** Sydney Oluoch – Montclair State University – Future renewable energy options in Kenya: A Choice Experiment Study
- 2:20 – 2:40 PM** Ryan Dicce – West Chester University – Green light in the desert: Understanding solar energy investment in the United Arab Emirates
- 2:40 – 3:00 PM** Erik Lyttek*, Pankaj Lal, Eric Forgoston, and Taylor Wiczerak – Montclair State University – Forest disturbances and the potential for energy in the context of preserving productivity
- 3:00 – 3:20 PM** Gia Huynh Nyugen – Montclair State University – Optimal siting and transportation costs using a geographic information system apply for Loblolly pine cultivation in Virginia

Boehm 262 – Glaciers and Geomorphology

Session Chair – Paul Marr, Shippensburg University

- 2:00 – 2:20 PM** Jing Xiao – Rutgers University – Small-scale variability of meltwater refreezing in Southwest Greenland Ice Sheet firn
- 2:20 – 2:40 PM** Rohi Muthyala – Rutgers University – Seasonal evolution of supraglacial rivers in southwest Greenland

2:40 – 3:00 PM Paul Marr – Shippensburg University - The Green Cabin Rhyolite Prehistoric Quarry Site (36AD0569)

3:00 – 3:20 PM Sasha Leidman – Rutgers University – Organic Matter Dependent Sediment Deposition in Supraglacial Stream Channels

Boehm 261 – Rob Altenburg, PennFuture

Rob Altenburg, co-founder of the non-profit PennFuture, will give a talk on the current state of renewables and climate policy in the state of Pennsylvania. PennFuture advocates for a clean energy economy and protecting air, water, land, and sustainable communities in Pennsylvania and beyond. The recent announcement of Pennsylvania Governor Tom Wolf joining the Regional Greenhouse Gas Initiative and the competing bills in the state legislature will be discussed. Questions and answers session will follow the presentation.

Friday, October 18th 3:20 – 4:20 PM

Coffee Break and Posters – Boehm Lounge

Gizel Brewer – SUNY Oneonta - Volcano Crisis Communication: A Case Study in Guatemala

Gita Bhushal Adhikary – Montclair State University – Human Wildlife Conflict in Developing Countries: A case study of Nepal

Lauren Fosbenner – Nurture Nature Center – Understanding Earth Systems Interconnections - Six Degrees of Connection from Global to Local using Science on a Sphere and Art

Joy Fristchle* and Amanda Devers – West Chester University – Evaluating riparian reforestation efforts in the Brandywine Watershed, Pennsylvania

Joshua Marcinik – West Chester University – Mode Choice and Equity in Pennsylvania Controlled Access Transportation

Mitchell Oller – Kutztown University – Analysing Domesday in ArcGIS

Nicole Provost – Montclair State University – Climate Change Impacts on Energy Generation in the US East Coast

Alana Rader* and Laura Schneider– Rutgers University – Understanding the relationship of urban sprawl and forest cover change: A case study from the Mesoamerican Biological Corridor, Quintana Roo, Mexico

Sierra Taylor* and Michael Davis – Kutztown University - Nocturnal Tornado Vulnerability in Tennessee Counties

Bhagyashree Vaidya*, Diane F. Hagmann, Jennifer A. Krumins, and Nina M. Goodey – Montclair State University – Artificial Root Exudates Augment Extracellular Enzyme Activity in Metal Contaminated Soil

Friday, October 18th 4:20 – 5:40 PM

PAPER SESSION II

Boehm 105 – Lightning Talks

Session Chair – Moira Conway, Kutztown University

- 4:20 – 4:25 PM** Emma Baylor – Temple University – Opening Channels for the Reception of Water into Dhrangadhra Lake and Water Retention
- 4:25 – 4:30 PM** Codi Rhodes* and Michael Davis – Kutztown University - Variability in American Late-Spring Transitional Temperatures
- 4:30 – 4:35 PM** Anna Grayek* and Michael Davis – Kutztown University – Seasonal Wind Climatology of the Great Lakes Region of the United States
- 4:35 – 4:40 PM** Erica Bilotta – Temple University – The Value of Food and Community Gardens in Glenwood, Philadelphia

Boehm 260 – Geography of Food and Drink

Session Chair – Mathias Le Bossé, Kutztown University

- 4:20 – 4:40 PM** Meghann Smith – Montclair State University – Environmental Assessment of Hard Apple Cider
- 4:40 – 5:00 PM** Laura Pangolozzi – Binghamton University – Informality as a Concept for the Cities of the Global North: The Case of Water Infrastructure
- 5:00 – 5:20 PM** Lisa Jordan – Drew University - Rainfall, Conflict, and Food Insecurity in Post-Succession Sudan and South Sudan (2013-2016)
- 5:20 – 5:40 PM** Ibipo Johnston-Anumonwo – SUNY Cortland - Continuity and Change in Africa's Agricultural Landscape: A Gendered Analysis

Boehm 262 – Geography of Hazards

Session Chair – Greg Pope, Montclair State University

- 4:20 – 4:40 PM** Gabrielle Mastrantuono – SUNY Oneonta - Demographic and Cultural Changes in a Post-Katrina New Orleans Neighborhood

- 4:40 – 5:00 PM** Taylor Wiczerak – Montclair State University – A Hedonic Analysis of Combined Sewer Overflows (CSOs) in Northern New Jersey
- 5:00 – 5:20 PM** Eric Dammeyer – SUNY Oneonta – Super Storm Sandy and NYC Transportation Infrastructure: Preparations, Damage, and Resiliency Efforts
- 5:20 – 5:40 PM** Alexander Findeis – SUNY Geneseo – Land Subsidence in the Netherlands: Problems and Prospects

Friday, October 18th 6:00 – 7:30 PM

Dinner in MSU 250

Friday, October 18th 8:00 – 10:00 PM

Geography Bowl in MSU 157, 218, 223

~~~~~

*Saturday, October 19<sup>th</sup> 8:10 AM – 9:40 AM*

### **PAPER SESSION III**

Boehm 105 – Pedagogy and Geography Education

*Session Chair – Mathias Le Bossé, Kutztown University*

- 8:10 – 8:30 AM** Hadjer Ahner – West Chester University – International Collaborative Research: A Necessary Challenge With Limited Resources.
- 8:30 – 8:50 AM** Kolson Schlosser – Temple University – Public Pedagogy and the Wagner Free Institute of Science in Progressive Era Philadelphia
- 8:50 – 9:10 AM** Michael Minn – Farmingdale State College – The Geography of Geography: Spatial Insights From the AAG Guide to Geography Programs In The Americas.

Boehm 260 – Pop Culture

*Session Chair – Steven Schnell, Kutztown University*

- 8:10 – 8:30 AM** Bridgette Brandt\* and Michael Davis – Kutztown University - Tabletop Gaming: An Aspect of Geographic Learning
- 8:30 – 8:50 AM** Elisabeth Guardino – SUNY Geneseo – North Korean Cinema: Film as a Window into the Hermit Kingdom
- 8:50 – 9:10 AM** Steven Schnell – Kutztown University – Wakanda Forever: Black Panther’s Imagined Africa

## Boehm 262 – Urban Heat Island and Climate Change

*Session Chair – Mario Cardozo, Kutztown University*

- 8:10 – 8:30 AM** Alison Reynolds\* and Michael Davis – Kutztown University – Effects of Urban Heat on Precipitation Levels Downwind of Tampa, Florida, USA
- 8:30 – 8:50 AM** Tianna Andrews – Kutztown University – Analysis of Thunderstorm Occurrence and Spatial Synoptic Air Mass Classifications in the Mid-Atlantic United States, 2003 to 2012
- 8:50 – 9:10 AM** Mark Blumler – SUNY Binghamton – Societal Influences on Scientific Beliefs, and the Climate Change debate
- 9:10 – 9:30 AM** Megan Heckert – West Chester University – Green Stormwater Infrastructure and the Urban Heat Island – What are the Potential Impacts?

## Boehm 261 – Panel - Emerging Topics in Critical Geography

- 8:10 – 8:30 AM** Jenny Isaacs – Rutgers University – Animality/Coloniality: Power as de-humanization
- 8:30 – 8:50 AM** Jonah Walters – Rutgers University – Deciphering Nicaragua’s Popular Economy
- 8:50 – 9:10 AM** Ariel Otruba – Rutgers University – A more-than-human perspective on borderization
- 9:10 – 9:30 AM** Nathan Thayer – University of Delaware – Reading for Difference through Productive Consumption: Locating consumption and production in diverse economies

Discussant – Lindsay Naylor, University of Delaware

*Saturday, October 19<sup>th</sup> 9:40 – 10:40 AM*

*Coffee Break and Poster Session – Boehm Lounge*

**Bernadette R. Calderon – Montclair State University – Impacts of Forest Fire on Stream Sediment: A Chemical Analysis of the 16 Mile Fire in Delaware State Park, Pennsylvania, USA**

**Anastasia Figueroa – Montclair State University – Relation between black carbon sediment deposition and anthropogenic related organic and inorganic contaminants in an urban waterway using a multi-tiered geochemical approach.**

**Summer Looney – MacArthur High School – Public Awareness and Support of Town of Hempstead Preserves and Nature Areas**

**Hoang Bic Luong\*, Pankaj Lal, and Gia Nguyen – Montclair State University – Customer Satisfaction with Five-Star Restaurant Chain Under Khaisilk Corporation in Vietnam**

**Isabella Molina\* and Julia Gizzo – MacArthur High School – High School Students' Perceptions of School Security**

**Evan Peters – MacArthur High School – A Comparison Between High School Teacher and Student Perceptions of Technology Use in the Classroom**

**Archana Prasad – CESAC, Montclair State University – Investigating the impact of the ACMES Summer Camp on 6-8th graders environmental perceptions**

**Marie Smoyer – Virginia Tech – Analysis of Bluebird Nesting Structures at Blue Marsh Lake, Pennsylvania**

*Saturday, October 19<sup>th</sup> 10:40 AM – 12:00 PM*

**PAPER SESSION IV**

**Boehm 260 – Urban Geography**

*Session Chair – Moira Conway, Kutztown University*

**10:40 – 11:00 AM** Mario Cardozo – Kutztown University – Representations of care in Philadelphia animal murals

**11:00 – 11:20 AM** Moira O'Neill – University of Buffalo – Coordination Failure in a Rust Belt City

**11:20 – 11:40 AM** Caleb Gallemore and Daniel Gonzalez – Lafayette University – Urban Geography and the Diffusion of LEED Certification

**11:40 – 12:00 PM** Moira Conway – Kutztown University – Using GIS to examine Dental Care Accessibility: A Case Study of Pennsylvania



## Boehm 262 – Mapping and Geospatial Applications

*Session Chair – Richard Courtney, Kutztown University*

- 10:40 – 11:00 AM** Matthew Walter – University of Delaware – Assessment of Wetland Stress in Delaware using Remotely Sensed Landsat and Sentinel 1 SAR Data
- 11:00 – 11:20 AM** Thomas Owusu – William Patterson University - An Analysis of Poverty Among the Foreign-born Population in U.S. Cities: The Case of Paterson, New Jersey
- 11:20 – 11:40 AM** Sean McLaughlin – West Chester University and McKean County Planning Commission – Building a GIS department: Challenges, Triumphs, and Hopes
- 11:40 – 12:00 AM** Abdul Qadir – University of Delaware – Watching Through the Clouds: A Machine Learning Based Radar-Optical Satellite Data Analysis to Generate Dynamic Monsoon Crop Maps for Small-Scale Farms in Tropical Regions

## Boehm 261 – Discussion with Journal Editors – Paul Marr and Steven Schnell

Dr. Paul Marr, editor of *The Middle States Geographer*, and Dr. Steven Schnell, editor of *The Journal of Cultural Geography*, will host a session to speak with individuals looking to publish in geography journals. As they have both been editors of journals for years, they will share their thoughts and perspectives on how to be successful in the peer-review process.

## **ABSTRACTS – PAPER PRESENTATIONS**

### **Hadjer Ahner – West Chester University – International Collaborative Research: A Necessary Challenge With Limited Resources.**

International research is a valuable element of geography education. However, it is not without its challenges. This presentation will focus on my experience as a student doing fieldwork over the summer in a small community located in South Jamaica. Particularly, on the difficulties of data collection and working collaboratively with students and faculty with limited technological resources, transportation, and funding. The goal is to map the area accurately with all its features and attributes and assess the risk of sea-level rise to businesses in the community. I will share my efforts of data collection in the United States to map the area remotely and my process in developing instructions for students in Jamaica to help me with ground-truthing, using minimal technology and free communication across international boundaries

### **Tianna Andrews – Kutztown University – Analysis of Thunderstorm Occurrence and Spatial Synoptic Air Mass Classifications in the Mid-Atlantic United States, 2003 to 2012**

Literature indicates that there is a higher probability of severe weather occurring in instances of increased atmospheric instability. Recent work on the topic of Mid-Atlantic atmosphere instability suggests Convective Available Potential Energy (CAPE), a measure of atmospheric instability, increased over the timeframe of 2003 to 2012. Thunderstorm occurrence and Spatial Synoptic Classification (SSC) air mass classifications were used to further investigate the atmospheric instability of the Mid-Atlantic United States over the meteorological summer season (June, July, and August) from 2003 to 2012. Thunderstorm occurrence data were separated into two categories, early (2003 to 2007) and late (2008 to 2012), and the Wilcoxon Signed Ranks Test was used to test for changes between the timeframes. Similarly, SSC data were split into the same categories for each of the seven classifications and tested for changes between the timeframes, using Wilcoxon Signed Ranks or Matched Pairs T-tests depending on the normality of the data. The analysis of thunderstorm occurrence data yielded a significant increase in frequency from the early to late timeframes. The analysis of SSC data yielded significant results for five of the seven classifications.

### **Jase Bernhardt – Hofstra University – Mining Weather and Climate Data from the Diary of a Forty-Niner**

Primary sources such as personal diaries can provide insight into weather and climate conditions in times and places where quantitative instrumental observations are unavailable. The diary of Gideon Nichols provides an especially compelling case study of how such sources can be used to determine spatiotemporal patterns in meteorological conditions. Nichols, a farmer in Long Island, New York, elected to venture across the United States in 1849 to partake in the California Gold Rush, remaining there for two years before returning home via both oceanic and overland routes. Using content analysis, this chapter undertakes an investigation of his detailed records of weather conditions throughout his travels, as well as his firsthand account of major events such as the Sacramento flood of 1850. His daily recordings are supplemented by regular letters to relatives back home on Long Island, which contain ample details and emotional descriptions of his surroundings and how he experienced them. The result is a unique snapshot of the mid nineteenth century climate of numerous physical geographic regions across North America, along with a novel record of weather conditions during the early stages of the

California Gold Rush. Moreover, Gideon's meticulous attention to detail, especially geographic location, permits the spatial analysis of these patterns, using both a physical geographical approach (e.g., his comparisons of different climate regions) and chronological approach (e.g., tracking extreme weather events over the course of a year). Thus, this ongoing research complements past work by introducing a spatiotemporal component into the human interpretation of weather conditions, and can be replicated using the diaries of other pioneers who regularly observed environmental conditions.

### **Mark Blumler – SUNY Binghamton – Societal Influences on Scientific Beliefs, and the Climate Change debate**

Science developed within a Judeo-Christian context, and creationist ideas persisted after Darwin. Though modified and problematized as science progressed, they also frequently were reinforced and reinvigorated because of their persistence within society. The environmental movement originated at a time when equilibrium ecology prevailed, and on the whole the movement continues to subscribe to equilibrium views of nature. Because of the intense and highly polarized nature of the climate change debate, and the heavy involvement of non-academics, older beliefs are becoming more prominent again within environmental sciences, despite the lack of supporting evidence. In this talk I trace some of the threads of influence, such as in fire ecology, and draw some conclusions re ways that climate change science might be improved.

### **Bridgette Brandt\* and Michael Davis – Kutztown University - Tabletop Gaming: An Aspect of Geographic Learning**

Tabletop role-playing games (RPGs), such as Dungeons and Dragons and Pathfinder, can provide an outlet into creativity, critical thinking, and problem solving. However, research delving into the educational properties of role-playing games is severely lacking. One such tabletop game is The Dresden Files RPG derived from the successful novel series The Dresden Files by Jim Butcher. Within the construct of the game environment, playable characters (PCs) are able to interact with their environment in modern day settings. This allows the PCs to potentially learn about physical, cultural, economic, and social aspects of the landscape within the context of a role-playing adventure. This study examines whether students can learn about the geography of the city of Philadelphia through their PCs exploring iconic landmarks such as Penn's Landing, Fairmount Park, Reading Terminal Market, and Center City while fighting off human and supernatural forces. It is the hope that this research study will allow students to learn more geographical information about the city of Philadelphia as well as increasing retention at the university by forging friendships with the other PCs.

### **Mario Cardozo – Kutztown University – Representations of care in Philadelphia animal murals**

Philadelphia, Pennsylvania, is populated with street art that depicts varied themes and artistic styles. Many of the messages in Philadelphia murals relate to expressions of "care" that convey support towards humans and the environment. I illustrate such mural themes from the perspectives of two analytical frameworks in Geography, "Landscapes of Care" and "Animal Geographies." I identify four specific themes in Philadelphia animal murals: (1) care for the urban ecosystem; (2) care for the global environment; (3) care for domestic animals; and (4) care for humans of particular culture groups. I conclude that Philadelphia animal street art contributes to a project that underscores relationships of care within Philadelphia and the world, in this manner also contributing to specific narratives within critical geographies.

### **Moira Conway – Kutztown University – Using GIS to examine Dental Care Accessibility: A Case Study of Pennsylvania**

GIS methods have been increasingly used to analyze public health issues. However, there have been a limited number of studies that have spatially examined how access to dental care varies by geographic location and transportation accessibility. Oral health is linked to many other physical conditions, therefore having access to dental care is an essential health concern. This project seeks to spatially analyze the accessibility of dental care of residents in urban, suburban, and rural areas, using the state of Pennsylvania as a case study. Two counties in each of the three geographies were chosen. Socioeconomic characteristics of the counties are examined, and distance and transportation accessibility are used to determine the likelihood of interaction with private dental offices. By examining the differences in access between geographic locations of varying densities, specific issues preventing the availability of dental care can be identified, and policy recommendations can be developed to improve dental care access.

### **Eric Dammeyer – SUNY Oneonta – Super Storm Sandy and NYC Transportation Infrastructure: Preparations, Damage, and Resiliency Efforts**

The Metropolitan Transportation Authority is the sole agency responsible for transporting millions of New York City residents, commuters, and visitors every day around our nation's most populous city. On October 29th, 2012, Super Storm Sandy struck the region with historic intensity, grinding this robust transportation system to a standstill. This paper analyzes the extensive destruction sustained by New York's transportation infrastructure, including the flooding of numerous rail and automobile tunnels, the complete loss of subway and commuter rail service, and other difficulties. Attempts to reestablish public transportation to New Yorkers was a struggle in the days and weeks following Sandy's exit, and permanent damage still remains today. Efforts have been initiated, such as storm surge walls and watertight equipment, to better protect the city's transportation network. However, many fear that these projects are not materializing fast enough or that they lack the capability to truly protect New York from a future of increased natural disasters due to climate change.

### **Ryan Dicce – West Chester University – Green light in the desert: Understanding solar energy investment in the United Arab Emirates**

Despite a global reputation as a hydrocarbon superpower and amidst budget shortfalls, the United Arab Emirates (UAE) has unexpectedly invested in the development of solar and sustainable energy sources. Leveraging its geographic location within the global 'sun belt,' the desert federation has enacted plans for both vast utility scale projects as well as distributed solar generation. Although the academic literature offers potential rationales underpinning renewable energy investment, little research has examined how and whether the presence of a mature oil economy impacts renewable energy development. Key informant interviews with industry actors in the UAE provide insight into the complex rationales underpinning the country's considerable solar energy investments. The findings elucidate the role of environmental, technical, economic, social, cultural, and political rationales, which condition energy transition in the UAE. These findings challenge notions of renewable energy investment as "post-hydrocarbon" by examining how the presence of hydrocarbons facilitates and incentivizes renewable energy investment in an oil-rich state.

### **Alexander Findeis – SUNY Geneseo – Land Subsidence in the Netherlands: Problems and Prospects**

The Netherlands is suffering from a slow but serious threat. For the past one thousand years, the country has been slowly subsiding. If nothing is done to abate subsidence in the Netherlands then the

threat will worsen and the risk of flooding will increase. This paper is a literature review of scholarly work on land subsidence in the Netherlands and elsewhere. It discusses the scientific understanding of how subsidence occurs, the damage it causes, and the ways in which it may be slowed or stopped in the Netherlands. This paper shows that, among other factors, the draining of peat soils is the main culprit of subsidence, that over abstraction of aquifers can exacerbate the problem, and that there are many feasible technological and policy options that respond to the threat of subsidence.

**Elijah Freiman and Charles Barbieri – SUNY Geneseo – Green Book Listings: City-based diffusion, 1940-1960**

Before the eponymous movie released last year, the Green Book was a little-known feature of African-Americans' struggle to achieve safe and easy travel throughout the United States. It afforded opportunities to obtain accommodation, fuel, and food from businesses receptive to African American customers. Our paper explores the geography of Green Book listings across a spectrum of 15 cities between 1940 and 1960, the latter shortly before the Green Books ceased publication as the Civil Rights movement made the listings increasingly superfluous. The results demonstrate shifts in the composition of businesses, such as the decline of "tourist homes" and the ascension of motels. The results also show stagnation and decline in northern cities when listings remained numerous in the Jim Crow South. This research is preparatory to a fuller investigation of 50 cities currently underway.

**Caleb Gallemore and Daniel Gonzalez – Lafayette University – Urban Geography and the Diffusion of LEED Certification**

In an effort to reduce global carbon emissions, the United States Green Building Council (USGBC) created Leadership in Energy and Environmental Design (LEED), offering various levels of certifications that showcase a commitment to creating a more sustainable world. These certifications allocate points in five main categories: Sustainable sites, Water efficiency, Energy & atmosphere, Material & resources, and Indoor environmental quality. While there has been considerable geographic and economic research assessing the location of LEED certified buildings at the national or individual urban scales, there has been relatively little work studying how LEED buildings are situated at the urban scale across multiple cities and countries. Using data on all certified building locations and all publicly available building scorecards on USGBC's public data site, we study the relationship between driving and transit accessibility and certified building locations across hundreds of global cities. We argue that urban geography shapes the potential for sustainable building and affects who may benefit therefrom.

**Elisabeth Guardino – SUNY Geneseo – North Korean Cinema: Film as a Window into the Hermit Kingdom**

Though it owes much of its creation to Soviet involvement, in the decades following the division of the Korean peninsula the North Korean film industry developed its own culture and language of propaganda – one that was distinct from its Soviet counterpart. This paper suggests that the development of North Korean film can be divided into four phases, distinguishable from one another in their prevailing narrative themes and cinematic techniques. The first phase, (1949-1971), was characterized by themes of militarism and family separation. The second phase (1971-1985), was largely influenced by Kim Jong-il's 1971 dissertation on cinema and was characterized by themes of communal and national development frequently revolving around the socialist worker hero. The third phase (1985-2000), was influenced by the work of South Korean director Shin Sang-ok. This period carried some of the economic themes of the previous era but was distinct in its move away from classic socialist narrative tropes, as well as the introduction of new cinematic techniques. The fourth and current era (2000 - present), has

thus far been characterized by an increased involvement with extranational production companies, and themes of nuclear and economic development. As a form of additional analysis, four movies considered emblematic of their respective phase were subjected to close scrutiny in the form of a scene by scene study. Overall the close ties between the ideology of the Kim dynasty and the emphases of its movies are an unsurprising feature of such a totalitarian society.

### **Megan Heckert – West Chester University – Green Stormwater Infrastructure and the Urban Heat Island – What are the Potential Impacts?**

The Philadelphia Water Department (PWD) adopted Green Cities, Clean Waters, its green infrastructure approach to managing stormwater runoff and reducing combined sewer overflow events, in 2012. PWD sold the project with the promise of not only reducing CSO events, but also providing additional co-benefits to surrounding communities, including increased jobs and improved health. The promise of co-benefits was largely based on general research on greenspaces and vegetation, rather than specific measurements of the kinds of projects implemented as green stormwater infrastructure. Efforts are now underway to determine the nature and extent of those benefits. This paper will focus on a project attempting to measure the impact of green stormwater infrastructure on surrounding temperatures. The urban heat island (UHI) effect, whereby city infrastructure traps heat and keeps temperatures significantly warmer than less densely developed areas, is not just a matter of discomfort, but a potential threat to the health and safety of city residents. It has long been understood that parks and vegetation can help to mitigate the UHI through multiple mechanisms including shading and transpiration. However, it has also been clear that larger parks have outsized impact compared to their smaller counterparts. This research seeks to understand what, if any, impact can be made in mitigating the UHI through small projects such as rain gardens and tree trenches designed for stormwater management.

### **Jenny Isaacs – Rutgers University – Animality/Coloniality: Power as de-humanization**

In this paper, we propose a joint research agenda for animal geography and de/postcolonial theory around 'animality/coloniality.' We review areas of theoretical convergence between these two disciplines, specifically citing recent examples and discourses of "de-humanization" and "animalization". We assert that animality must be understood through coloniality and vice versa. A focus on performativity and practice is suggested to work across disciplines and identify exactly where, when, and how reductive notions of the animal underwrite colonial violence. We describe how a more-than-human contact approach might be used by geographers and other scholars to deconstruct and challenge asymmetrical relations between different others. In so doing, we affirm and hope to elevate the importance of animal geography as a key frame for understanding some of the most challenging and deadly conflicts of our time.

### **Ibipo Johnston-Anumonwo – SUNY Cortland - Continuity and Change in Africa's Agricultural Landscape: A Gendered Analysis**

Over the past fifty years, increased attention to women's role in economic development in countries of the global south including those in Africa has focused on agriculture. The geography of gender literature on African agricultural livelihoods extends from uncovering the importance of gender relations and countering myths about female farmers, to addressing structural forces and the emergence of feminist political ecology for advancing agricultural practices and policies across the continent. Using a framework of looking back and stepping forward, the presentation draws on case studies to chart through past challenges and contemporary realities of rural and urban farmers. The research evidence

on gender and agriculture in Africa warns against one-sided generalizations of women as passive unproductive farmers or successful agricultural entrepreneurs, and proposes future research needs that examine environmental problems while addressing the well-being aspirations of women farmers especially.

### **Lisa Jordan – Drew University - Rainfall, Conflict, and Food Insecurity in Post-Succession Sudan and South Sudan (2013-2016)**

Past discussions of conflict in Sudan and South Sudan have evoked climate change as a causal factor in violence, but more recent descriptions consider a wider variety of circumstances to characterize these evolving, complex emergencies with more sophistication. This article explores the association of localized weather patterns, principally rainfall during the lean season, in relation to conflict, as a way to visualize disparities in weather-related trends, where rainfall may accumulate to much more or much less than previous averages.

July precipitation anomalies from 2013–2016 for Sudan and South Sudan, which may have negatively affected agrarian populations during the lean season, are generated from NASA TRMM/TMPA 3P43 (Tropical Rainfall Measuring Mission/Multi-Satellite Precipitation Analysis). These anomalies are then analyzed in relation local population estimates (WorldPop), reported conflict events and fatalities (Armed Conflict Locations and Events Data Project), food security classification (Integrated Phase Classification, Famine Early Warning Systems Network), and other sources for measuring crop access to water (Climate Hazards Group InfraRed Precipitation with Station data).

We find that areas anomalous for lower rainfall tended to exhibit a higher density of conflict events (ranging from 0.10 – 3.85 events per 100km<sup>2</sup>); however, this did not translate to higher densities of fatalities, which were distributed across regions with different deviations in rainfall patterns. Regions anomalous for higher than average rainfall tended to exhibit lower rates of conflict fatalities.

The possibility of a wetter than average Sahel may have a dampening effect on conflict fatalities in Sudan and South Sudan, if past trends extend into the future. However, urbanization will offset the influence of weather on conflict in states transitioning away from majority rural populations.

### **Sasha Leidman – Rutgers University – Organic Matter Dependent Sediment Deposition in Supraglacial Stream Channels**

Sediment consolidates in supraglacial stream channels and darken the surface of the Greenland Ice Sheet. Little is known about how sediment in these streams is distributed, what causes them to deposit in certain areas, and the impact of sediment on the albedo of the ice surface. Here we present in-situ field observations of a supraglacial stream in southwest Greenland. Through UAV imagery, we show that sediment is mainly distributed in meander bend floodplains that are wetted during daily high flow. Analysis of the grain size distribution of these sediments shows that sediment has an average D50 of  $27 \pm 5.7 \mu\text{m}$ . The grain size distribution is applied to a theoretical framework based on the Shield's criterion to determine the minimum water depth for sediment movement. This relationship is then tested with GPS'ed bathymetry measurements and classified UAV imagery of sediment cover. Theoretical effective critical depths are significantly lower than observed values indicating that organic matter within the sediment causes extensive flocculation. Without this flocculation source, sediment in supraglacial streams would not deposit within floodplains. The relationship between stream slope and depositional areas may be applied to a wide range of supraglacial streams on the ice sheet and help infer sediment cover across the Greenland Ice Sheet. Understanding the dynamics of sediment deposition in supraglacial systems is vital for constraining the variability of albedo on the Greenland Ice Sheet and this

research will give a process-based framework for how the spatial distribution of stream albedo might change in response to increased melting.

Keywords: customer satisfaction, repeat purchase intention, satisfied, dissatisfied, guest dining experience.

### **Erik Lyttek\*, Pankaj Lal, Eric Forgoston, and Taylor Wiczerak – Montclair State University – Forest disturbances and the potential for energy in the context of preserving productivity**

Woody biomass has often been suggested as a source for sustainable energy. However, as with all biofuels, land use change can be seen as a large negative externality. To this end, salvaged forest biomass has the potential to become a sustainable source of biomass that does not require the transformation of land into large scale coppice forestry. Globally, large scale forest disturbance has become an increasingly common issue, with millions of tons of timber being impacted. Much of this disturbance is the product of invasive species and diseases that often cause whole species and ecosystems to falter. Across the United States, numerous species have experienced declines in the last century, and large swaths of forest have become heavily overburdened with fuel wood and thus have reduced biodiversity as they reach end stage succession. The impetus for this has been caused by the no-burn policies of the last several decades coupled with more lands closed to logging activities. One solution then is to harvest, or burn, some portion, but which trees and how much? Salvage harvesting of impacted species is one solution to this issue; by harvesting trees that are already dead or dying, the impacts to forest productivity can be minimized while at the same time opening a market for this underutilized resource. Woody biomass is light, energy efficient, low ash, low particulate, is near carbon neutral, and can generally be a useful source of biomass for bioenergy. For example, ash (*Fraxinus* spp.), a large, straight grained, late succession hardwood, has been in decline for 20 years due to the influence of emerald ash borer (EAB), and with no solution to the plight of ash, they provide a spectacular case study for harvest and beneficial reuse. In this study, we examine the effects of harvesting ash in New Jersey, remediating the site, and using the recovered timber as either a feedstock for dedicated biomass burners, or as co-combustion input in coal power plants. We utilize a stochastic pest spread model coupled with other analytical techniques to evaluate the economic and environmental potential of salvaged ash timbers for bioenergy. With the continued introduction of forest pests and diseases from international trade, it is likely that these impacts will continue, and thus our proposed model may provide a novel solution to continued pest inundation.

### **Paul Marr – Shippensburg University - The Green Cabin Rhyolite Prehistoric Quarry Site (36AD0569)**

South Mountain rhyolite was an important raw material for stone tool manufacturing from the late Archaic to middle Woodland periods (6800 BP – 1000 BP) in Pennsylvania and was quarried extensively along ridgetop exposures in and around the Carbaugh Run Natural Area (CRNA). Rhyolite degrades quickly and previous research suggests that quarries were dug to access unweathered material suitable for tool-making at the bedrock contact zone. The recently recorded Green Cabin prehistoric quarry site (36AD0569) differs from other South Mountain quarry sites in that it is mid-slope (rather than ridgetop) and all of the quarry pits appear to have been dug into a single periglacial mass-movement feature. Why did prehistoric inhabitants select this feature to obtain the raw materials for stone tools? Ground penetrating radar transects obtained from the site indicates that the quarry pits did not extend through the flow material to the bedrock contact. Our research suggests the natural slope movement processes may have fractured fresh bedrock and pushed blocks close to the surface. The occurrence of abundant surface rocks adjacent to the area, the selective occurrence of quarry pits on the flow, and, the lack of



quarry pits upslope near the feature's start point where similar material would have been exposed remains enigmatic.

Keywords: Prehistoric quarries, periglacial features, stone tool-making, GPR

### **Gabrielle Mastrantuono – SUNY Oneonta - Demographic and Cultural Changes in a Post-Katrina New Orleans Neighborhood**

Hurricane Katrina, a category 5 storm, made landfall just east of New Orleans on August 29th, 2005. The resultant storm surge over-topped the protective levees and devastated many of the low elevation neighborhoods. This research examines the demographic and cultural changes to the Lower 9th Ward neighborhood, a geographically vulnerable residential area of New Orleans. This neighborhood was ~98% African American. The extremely slow recovery and neglect of this particular neighborhood during recovery and rebuilding had significant impacts on the residents. The paper discusses the current state of the Lower 9th Ward, 14 years post-hurricane, and how the extreme cultural changes have affected residents. Using Census Bureau Data, imagery, first-hand accounts, and ground work, this paper analyzes the environmental justice issues faced by the community as a result of this hazard event.

### **Sean McLaughlin – West Chester University and McKean County Planning Commission – Building a GIS department: Challenges, Triumphs, and Hopes**

McKean County Pennsylvania is a large rural county in Northwestern Pennsylvania. In May of 2019 I was hired as the GIS Coordinator, operating out of the planning commission. I was tasked with not only providing GIS to all county departments excluding the tax assessment department, but also providing any and all GIS services to the 22 municipalities of McKean County, any organizations within the county, and any citizens that were interested. The main challenge is working with limited GIS software. Despite this, I enjoy my position immensely and have been able to incorporate GIS into five departments that previously did not have GIS, assist two departments that have had GIS previously, incorporate three field data collection applications, build web maps and applications for a department and municipality, assist a forester from the Allegheny National Forest with invasive species mapping for grant proposals, and much more. During this presentation I intend to elucidate upon my experiences, my challenges, my triumphs, and where I hope to see this job, department, and county grow to.

### **Michael Minn – Farmingdale State College – The Geography of Geography: Spatial Insights From the AAG Guide to Geography Programs In The Americas.**

The AAG has published some variant of its Guide to Geography Programs since 1968. Although intended as a general reference work, the guide contains implicit spatial information about programs and faculty. Once the challenge of extracting information from the semi-structured data is addressed, that information can add additional insight into the state of geography as a discipline and offer guidance to aspiring academics as they plan their entry into or path through the profession.

### **Rohi Muthyala – Rutgers University – Seasonal evolution of supraglacial rivers in southwest Greenland**

Meltwater on the Greenland ice sheet surface is routed through supraglacial streams and river networks before descending into moulins and crevasses. These networks impact the timing and amplitude of moulin discharge which in turn may influence basal sliding and ice motion. However, despite its importance, surface routing through these stream networks is poorly understood. In this study, we collected 45 discharge measurements and continuous water level stage measurements from 13 June – 13 August 2016, which provide an unprecedented record of stream flow within a ~0.53 km<sup>2</sup> supraglacial catchment near the ice sheet margin in southwest Greenland. We calculate a robust rating curve ( $R^2 =$

0.928) relating stage to discharge, revealing discharge variations from 0.0-1.0 m<sup>3</sup>/s with a peak in mid-July. Changes in the efficiency of meltwater transport of the supraglacial stream network were investigated using amplitude and time to peak of the daily stream hydrograph. Model studies show that large amplitudes and early peak times characterize a well-developed stream network when meltwater is evacuated quickly from its origin to the outlet. In our study, we found that the amplitude of daily discharge increased from 0.2 m<sup>3</sup>/s in mid-June to 0.8 m<sup>3</sup>/s in mid-July, followed by a continuous high plateau until month's end and a gradual decrease starting early August. Time to daily peak discharge decreases by 2 hours from mid-June through the end of July. These results suggest that the stream network efficiency has marked seasonal variation and peaks in mid to late July near the ice sheet margin in southwest Greenland. Understanding seasonal changes in the efficiency of supraglacial stream network is vital for determining the impact of surface mass balance on ice dynamics and should be incorporated into ice sheet models to accurately predict the short-term timing of Greenland's contributions to sea-level rise.

### **Gia Huynh Nyugen – Montclair State University – Optimal siting and transportation costs using a geographic information system apply for Loblolly pine cultivation in Virginia**

The U.S. government has set an aggressive mandate on cellulosic biofuels, yet production targets have been reduced yearly owing to a wide range of factors. Hence, assessing the potential for cellulosic-based bioenergy has become a growing field of research to identify opportunities and limitations for this promising alternative energy. Analytical approaches deriving from geographical information systems (GIS) – based analysis, including those rooted in mathematical programming, optimization, and practical techniques, have been used to evaluate the potential for feedstock cultivation across various parts of the world. Our study applies GIS-based strategies that suit specific spatial attributes and are sustainable, economically viable, and socially desirable to assess available pine-based feedstocks within the U.S. Loblolly pine (*Pinus taeda* L.) is found throughout the southern United States, and is essential for commercial timber; it proliferates readily, has low maintenance needs, long life expectancy, and is a dependable source of woody biomass. We utilize a fuzzy logic model combined with analytical hierarchy process (AHP) to identify potential ideal regions for the pine cultivation. We use the Survey123 for ArcGIS tool to define the perceptions of four stakeholder groups regarding their management practices and preferred geographic growing conditions of loblolly pine. Furthermore, we apply Gaussian function, transforming original values of impacting factors into normal distributions. These transformed values and weights from the AHP survey, then, are employed with weighted overlay analysis to identify potentially suitable locations for growing loblolly pine in Virginia as a case study.

### **Moira O'Neill – University of Buffalo – Coordination Failure in a Rust Belt City**

Deepening globalization and a rapidly evolving technological landscape have forced many cities and regions to reconfigure their economic bases and, in some cases, the physical size of the city. This has proven especially challenging in places like Youngstown, Ohio, where private and public investment had centered on heavy industry for over a century, and workforce skills reflected these needs. Yet this paper argues that for the Youngstown area, the transition to a more modern economy has been as much an institutional collective action problem as a capital one. A series of interviews with development professionals, community organizers, and city government officials across the area and at the neighborhood, municipal, and regional scales hints at these challenges. To illuminate them further, their responses are analyzed in the context of a non-cooperative game that produces multiple equilibria. Using the logic of the game as a guide, this paper demonstrates how low levels of trust, high levels of cynicism, poor communication, and a lack of leadership among institutional actors is likely anchoring the

Youngstown area in a sub-optimal state of development, and contributing to spatial inequalities within the region.

### **Sydney Oluoch – Montclair State University – Future renewable energy options in Kenya: A Choice Experiment Study**

Global studies attempting to identify public preferences for different forms of energy technologies have been previously conducted. In Kenya, such studies are lacking resulting in the need to conduct studies investigating social and environmental effects of renewable energy investments. To obtain relevant public perspective that is important for designing suitable policy that will guide renewable energy development. Kenya has been selected as a case study as it offers an excellent model for the Sub-Saharan African (SSA) context.

This study estimates the magnitude of external costs and benefits of renewable energy technology in Kenya. We employed the choice experiment technique using the Conditional Logit Model and Random Parameter Logit Model. With the rapid growth of renewable energy investments in Kenya, there will be anticipated impacts on the environment, price of electricity and employment. We intend to measure preferences over the potential trade-offs related to renewable energy development, such as type of renewable energy, distance and visibility, ownership, impact on the environment, community job creation and effect on the price of electricity.

From the preliminary results using 1020 respondents in the survey, it was evident that both rural and urban households demonstrated various levels of welfare gains that depended on the type of renewable energy technology. The results indicated that consumers in Kenya are likely to accept solar powered energy plants which are publicly owned, with a low impact on the environment, that are located between 10 to 20 miles from their homes and result in creating more than 20 jobs.

### **Ariel Otruba – Rutgers University – A more-than-human perspective on borderization**

This paper broadly asks about the contributions of more-than-human geographies to understanding border violence. It explores the entanglement and co-constitution of human and nonhuman vulnerabilities across the borderland through ethnographic fieldwork conducted in the bifurcated pasturelands, forests, and waterways of conflict-affected villages adjacent to Georgia's disputed territory, South Ossetia. Decentering the human to expand our understanding of the governmentalizing power of borders serves as a tool for decolonizing the sovereign imagination and recognizing nonhumans as essential political subjects as matters of care in the reimagining of territory.

### **Thomas Owusu – William Patterson University - An Analysis of Poverty Among the Foreign-born Population in U.S. Cities: The Case of Paterson, New Jersey**

The study explores the link between immigration and poverty in the U.S. cities, using the city of Paterson, New Jersey as a case study. Using data from the American Community Survey (ACS) 5 year (2013-2017) Public Use Microdata Sample (PUMS), this study examines the incidence and levels of poverty among the foreign-born population in Paterson; variation in poverty rates within the foreign-born population; variation in poverty rates among foreign-born and native-born populations, and the individual-and group-level characteristics and contextual factors that may contribute to poverty. Poverty rates and inter-and intra-group differences in the rates are analyzed in terms of a variety of human capital and personal factors including education, occupation, period of immigration, race, English language proficiency, age of householder, size of family, marital status, gender, race,

**Laura Pangolozzi – Binghamton University – Informality as a Concept for the Cities of the Global North: The Case of Water Infrastructure**

This paper situates the recent conflict over lead in drinking water in Newark, NJ, within the literature on urban informality, particularly application of the idea to the global North. What, exactly, does informality mean in the recent literature, and how has it been applied to specific cases in the developed world? Does it, indeed, make sense to talk of it with regard to the built form of cities of the global North? Water infrastructure, the aspect of city building with perhaps the least claim to informality because of large upfront capital costs and national regulation, is used as a test case to talk about the possibilities and limits of the applicability of the notion to the United States. The water infrastructure of Newark, NJ, and the development of the recent lead issue form the basis of empirical analysis.

**Abdul Qadir– University of Delaware – Watching Through the Clouds: A Machine Learning Based Radar Optical Satellite Data Analysis to Generate Dynamic Monsoon Crop Maps for Small-Scale Farms in Tropical Regions**

Monitoring the monsoon crops in tropical regions is challenging due to many reasons including consistent cloud cover, small field size, and highly dynamic cropping pattern through space and time. To address these issues, we proposed a novel method Radar Optical cross Masking (ROM) for masking non-crops and to produce high-resolution monsoon crop map. It is a two-stage synergistic approach to combine temporal aggregation of Normalized Different Vegetation Index (NDVI) obtained whenever cloud free patches are available in optical data during the crop growing season and to mask the non-dynamic land use/land cover (LULC) features obtained from radar images. A machine learning based random forest (RF) classifier was applied in Google Earth Engine (GEE) platform for generating ROM. For validation of the proposed method, a contiguous region composed of eight different Agro-Ecological Regions were taken. The classification accuracy obtained to generate monsoon crop map using ROM method was 89% compared to 84% obtained without using ROM. The proposed method is particularly effective in regions having cropland mixed with plantation/mixed forest typical of small-scale farms in tropical regions.

**Alison Reynolds\* and Michael Davis – Kutztown University – Effects of Urban Heat on Precipitation Levels Downwind of Tampa, Florida, USA**

The phenomenon of the Urban Heat Island has been recorded in scientific research since the 19th century. Many past studies focus on the presence and level of severity of urban heat. Recent studies have been identifying the potential influence that urban heat has on the local climate, specifically downwind from the source of urban heat. The location of Tampa, Florida has yet to be the focus of published works regarding this occurrence. The proximity to the Gulf of Mexico, as well as the adjacency to the Tampa Bay may provide a source of moisture advection that is added to the urban heat influenced precipitation occurring downwind from city centers. In this study, monthly precipitation averages and prevailing wind direction data of 10 locations in and around the Tampa area between the years of 2012 and 2016 are statistically analyzed to identify if precipitation is being enhanced by the urban heat of Tampa, Florida.

**Kolson Schlosser – Temple University – Public Pedagogy and the Wagner Free Institute of Science in Progressive Era Philadelphia**

Unless collapsed into what we call public space or the public sphere, public pedagogy has been infrequently studied in Geography. As with all forms of the public, its emergence and form vary greatly across time and space, and must be understood in its particular invocations. This paper contributes to a

historicized understanding of public pedagogy by analyzing the pedagogical activities of the Wagner Free Institute of Science in north Philadelphia in the Progressive Era. Incorporated in 1855, the Wagner Institute continues to this day as a center of free science education for children and adults, while also serving as a museum of nineteenth century science. This presentation, based on research in the Wagner Institute's archives, focuses on the manner in which institute officials sought to make their pedagogical aims public. This not only sheds light on the cultural politics of education in the Progressive Era, but also helps ask important questions about the public forms pedagogy has taken and might continue to take. The purpose is not to task what public pedagogy necessarily is, but how it has been enacted in a certain time and place, to what ends, and with what constraints.

### **Steven Schnell – Kutztown University – Wakanda Forever: Black Panther's Imagined Africa**

In 1966, Marvel Comics' Black Panther became the first black comic book character in mainstream American comics. Black Panther, a.k.a. T'Challa, calls the fictional country of Wakanda home. From the beginning, Wakanda was posited as a technologically advanced African country that had never been colonized, and indeed, remained a "dark continent" to outsiders – except in this case, the unknown heart of Africa hides technological sophistication, driven by vibranium, a valuable metal unknown elsewhere. This paper will explore the ways that different comic authors and artists have imagined and depicted Wakanda and deployed it as a means of probing a wide range of issues – colonialism, national identity, race, and urban African-American experience among them.

### **Meghann Smith – Montclair State University – Environmental Assessment of Hard Apple Cider**

Improved accessibility to and availability of fresh produce has allowed the general population to rely heavily on corporate agribusiness, which has forced small farms begin to seek other means of profitability. This trend is reflected within orchard management, where farmers are beginning to produce hard apple cider as a means to increase profit through product sales and agritourism. The increasing popularity of high-value artisan products as demonstrated by the craft brewing industry has allowed a path for cider to enter the craft beverage market. This business venture represents a potential method to improve inter-generational transition of land ownership and management by engaging new markets. While entering the cider market may be a step towards revitalizing private orchards, as with any industry growth, there is potential for increased pressure on the environment and natural resources. In order to evaluate agricultural and cider production methods that may have environmental impacts, life cycle assessment (LCA) can be used to identify opportunities for improvement in production systems. In this study, LCA is applied to multiple management scenarios (such as organic and conventional growing techniques), fermentation and product storage techniques, and packaging type to assess areas of high and low impact in this cradle to grave assessment. In the agricultural phase, nutrient exchange, irrigation, fertilizers, pesticides, herbicides, supplies and fuel are considered. In the cider production phase, cold storage, water and detergent/sanitization needs, pressing equipment and energy requirements, filtration, yeast, and preservative agents are considered. In the packaging phase, cleaning and sanitization needs, primary and secondary packaging, labels and marketing material, transport equipment and fuel requirements are considered. The application of LCA helps to identify improvement opportunities within the cider production system to reduce environmental impacts, which can be useful for the development of regional legislation to could support orchard's attempts to seek other means of profit in a manner that ensures environmentally conscious practices.

**Nathan Thayer – University of Delaware – Reading for Difference through Productive Consumption: Locating consumption and production in diverse economies**

Beginning with Gibson-Graham's seminal 1996 *The End of Capitalism (as we knew it)*, diverse economies research has pushed on geographers to read for difference in economic relations in order to see a world beyond capitalocentrism. In this paper I engage the diverse economies framework with Marx's dialectic of production-consumption, thinking through the ways that analyses of productive consumption enrich diverse economies approaches to re-reading economic landscapes. I argue that using productive consumption as a starting point for re-reading in diverse economies brings into focus the diverse outcomes and possibilities produced through consumptive acts. Concluding with a re-reading of extractive relations in Appalachia through productive consumption, I offer new directions for future research.

**Matthew Walter – University of Delaware – Assessment of Wetland Stress in Delaware using Remotely Sensed Landsat and Sentinel 1 SAR Data**

Understanding the impact that humans have on natural environments is critical when making environmental planning and policy decisions. Wetland ecosystems are important resources, providing great economic benefits for surrounding communities. The current methods for measuring humans' impact on wetlands involve the collection of field data at the site-specific scale. This makes the large-scale mapping of wetland stress difficult due to time restrictions and the restriction of wetlands that fall on private land. By utilizing remotely sensed and geographic data, large scale mapping can easily be preformed and information can be obtained about private lands. Through the establishment of metrics that are commonly used to measure humans' impact on wetlands and can be analyzed through remote sensing and geographic data techniques, large scale mapping of human induced stress to wetlands is mapped. We apply these techniques to the coastal state of Delaware to understand the spatial scale and patterns of stress to Delaware wetlands. Through our analysis we better understand how humans' impact on land cover, vegetation, and hydrology is effecting wetlands in Delaware. By providing quantifiable and visual results, our analysis can be used to identify the wetlands in Delaware that may need further protections.

**Jonah Walters – Rutgers University – Deciphering Nicaragua's Popular Economy**

In 2012, the FSLN government in Nicaragua established the Ministry of the Household, Community, Cooperative, and Associative Economy. The creation of this agency institutionalized inside the state a key component of Sandinista development ideology— namely, that capitalism can be constrained and ultimately transcended by a “popular economy” comprised of cooperatives and associated worker-producers. In this paper, I bring recent literature on neoliberal governmentality and class formation to bear on Nicaraguan social theories that identify the popular economy as an insurgent social agent. Drawing on my own fieldwork and archival research, I show that Nicaraguan cooperative organizations have historically exhibited an exuberant and opportunistic orientation towards state institutions. As social actors, the protagonists of Nicaragua's popular economy pursue a range of tactics in their dealings with the state, including confrontation, collaboration, even strategic appropriation of prevailing state ideologies in the service of non-state ends. Finally, I argue that in the absence of a politically independent cooperative movement, the expansion of the associative economic activities valorized by Sandinista developmentalists, far from subverting or transcending prevailing routines of private capital accumulation, in fact fortify neoliberal governmentality.

Keywords: Nicaragua, welfare, popular economy, informality

### **Taylor Wiczerak – Montclair State University – A Hedonic Analysis of Combined Sewer Overflows (CSOs) in Northern New Jersey**

Significant water pollution caused by flooding due to heavy precipitation and extreme weather events such as Hurricane Sandy and similar storms of the past have become a considerable problem, and changing weather patterns and sea level rise attributable to global climate change stand to further exacerbate the issue. During heavy precipitation events, combined stormwater and untreated sewage may be diverted to adjacent water bodies, resulting in contamination and water pollution that can be harmful to human and environmental health. This contamination, especially in urbanized areas of northern New Jersey, is largely a product of discharge events from combined sewer overflows (CSOs). Though the effects of the contamination caused by polluted water discharge through CSOs has been studied by some researchers, the socio-economic aspect of these issues has not received much scientific attention. This study seeks to understand the socio-economic facets arising due to of the continued use of CSOs in Elizabeth, Newark, and Paterson by using a hedonic analysis of homes near CSOs to evaluate its detrimental effect on the price of residences in these urban areas. We use real estate and county data in a GIS overlay to map residences and features in these urban New Jersey areas and undertake geospatial analysis to reveal the effects of household, neighborhood, and environmental attributes on sale price. We use the data from GIS analysis in logistic regressions in order to analyze the significance of a number of these factors, including proximity to the nearest CSO, and estimate the economic effect that each factor has on a residence's final price. This information is critical for revealing the socio-economic consequences of continued CSO operation, and can provide data for preventing the worst of CSO problems in the case study cities and similar urban areas. Further, these results can be used to inform CSO management strategies, including the use of green infrastructure, to understand economic impacts and intuit public perceptions of various strategies.

### **Samto Wongso – Colgate University – Locational History of Parks in Upstate New York Cities**

This project investigates the relationship between the history of urban park-thinking in the United States and the geographical history of park development in American cities by examining histories of park development in three cities in upstate New York: Utica, Syracuse and Buffalo. Galen Crazz's (1982) and Julie Tuason's (1997) works are used to frame the analysis of the significance of park eras to spatial characteristics of urban parks. An inventory of parks for each city containing information regarding names, creation dates, sizes, centralities, and types was created and analyzed chronologically. The overall results of this study confirm the generalizability of Crazz's (1982) and Tuason's (1997) frameworks in understanding chronological histories of park development in big, medium, and small cities. It also fills some gaps in the theoretical frameworks by showing transitional periods in park-planning, an additional park-planning era (the Public Square Era), the spatial diversity of playgrounds, and the potential beginning of a new era of Sustainable Park.

### **Jing Xiao<sup>1</sup>, Åsa K. Rennermalm<sup>1</sup>, Sash Leidman<sup>1</sup>, Federico Covi<sup>2</sup>, Regine Hock<sup>2</sup>, Kierin Rogers<sup>3</sup>, Mike MacFerrin<sup>4</sup>, and Marco Tedesco<sup>5</sup> – Rutgers University – Small-scale variability of meltwater refreezing in Southwest Greenland Ice Sheet firn**

Ice lenses formed from meltwater refreezing in the firn can prevent further infiltration and increase surface runoff. Most previous studies in Greenland use a single core to represent the refreezing pattern at each site and the small-scale variability within each location is not taken into much consideration. To better understand the spatial distribution of meltwater refreezing and its local variability, we present the top five meters of thirteen cores drilled at six sites in Southwest Greenland in 2017 and 2018. Through analyzing the thickness and distribution of ice lenses in each core, we see that ice content,

maximum, and average thickness of ice lenses decrease with increasing elevation. However, the local variability of these measurements at the sites with multiple cores overlapped with the data range of sites at as much as 250 meters higher/lower elevation. Also, depths and thicknesses of the majority of individual ice lenses in one core appear uncorrelated with depths and thicknesses of ice lenses in other cores collected at the same site. One exception is that several pronounced ice layers with similar widths and depths are traceable across six cores drilled at one site. This research shows that single cores can provide data of bulk statistics and dominant ice layers which appear to be more evenly distributed at a study site.

<sup>1</sup>Department of Geography, Rutgers, The State University of New Jersey, Piscataway, New Jersey, USA

<sup>2</sup>Geophysical Institute, University of Alaska Fairbanks, Fairbanks, Alaska, USA

<sup>3</sup>Mason Gross School of the Arts, Rutgers, The State University of New Jersey, New Brunswick, New Jersey, USA

<sup>4</sup>Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado at Boulder, Boulder, Colorado, USA

<sup>5</sup>Lamont-Doherty Earth Observation, Columbia University, Palisades, New York, USA

## **ABSTRACTS – LIGHTNING TALKS**

### **Emma Baylor – Temple University – Opening Channels for the Reception of Water into Dhrangadhra Lake and Water Retention**

This research project takes place in Dhrangadhra, India: a small town in central Gujarat state, an agricultural, semi-arid region. This project seeks to support a proposal to construct a water retention project in the town in order to more sustainably develop existing water management practices. Using GIS, I identify the most cost-efficient location and course for a pipeline from a canal to Dhrangadhra Lake, a reservoir for monsoon rain which provides water for agricultural and municipal use. Seasonal monsoon rains support agriculture and replenish water resources in the wet season, but is supplemented by groundwater irrigation, particularly in the dry season. The town, specifically farmers and herders suffer disproportionately from water scarcity in the dry season. This project is potentially significant to the people of Dhrangadhra who are disadvantaged by the water scarcity in the region and may serve to convince regional officials that this pipeline is cost-efficient and worthwhile to construct. It will also contribute to our understanding of geopolitics and climate justice in a local environment to address water retention projects and groundwater scarcity.

### **Erica Bilotta – Temple University – The Value of Food and Community Gardens in Glenwood, Philadelphia**

North Philadelphia has experienced dramatic changes in development for the past few decades, primarily motivated by the expansion of development around Temple University's main campus. However, while the original residents of North Philadelphia neighborhoods have been experiencing the effects of gentrification, the food environment the residents navigate has changed as well. What has been historically a low-income area of the city, this growth of development has transformed the urban landscape to accommodate the needs of college life with more grocery stores and restaurants. The



purpose of this research is to uncover how residents of the Glenwood neighborhood in North Philadelphia, just north of Temple's area of expansion, perceive their local food environment and alternatives to traditional food ways to achieve food security. Five formal, semi-structured interviews were conducted throughout the month of November 2018. The research concludes that alternatives to achieving food security in the form of community gardens should be considered as valuable resources for the Glenwood neighborhood when there are pressures to develop the space around low-income communities.

### **Anna Grayek\* and Michael Davis – Kutztown University – Seasonal Wind Climatology of the Great Lakes Region of the United States**

Wind climatology in the Great Lakes region of the United States has accumulated a lengthy research archive. However, most of these past research endeavors have focused on mesoscale to synoptic scale features (i.e., lake effect snow during the winter season) and the production of wind energy. Seasonal variations in the wind speed have been less studied and have not encompassed the entire Great Lakes region. This paper aims to address those deficiencies and to strengthen the overall understanding of wind patterns within the Great Lakes region.

By gathering wind data from Environmental Science Research Laboratory and coupling it with GFDL climate model future projections of wind and sea level pressure assuming a 1% increase in carbon dioxide, information can be obtained as to the future of wind in this economically important region. Rotational principal component analysis was conducted to assess the regionality of the wind and to establish spatial regimes regarding wind patterns. Shifting circulation patterns can affect shipping, agriculture, and energy production/consumption rates. Identification of seasonal variations and year-to-year variations can provide a more robust understanding of the climatology of the region as well as how the climate may change over time.

### **Codi Rhodes\* and Michael Davis – Kutztown University – Variability in American Late-Spring Transitional Temperatures**

Temperature transitions during the late-spring period, defined as April to May, have experienced greater extreme shifts. Locations within the United States have observed freezing temperatures, temperatures below 32° F, in April give way to intense heat, such as 90° F days, in May. Extreme shifts in temperature over a short temporal period have been predicted by climate modeling experiments due to anthropogenic activities. This quick transition has created a colloquial proverb of “the week of spring” in meteorological and public arenas. This project aims to assess the spatial properties and quantitative relationships over more than a century of spring temperature data within the United States. By analyzing this data, additional climate information can be gathered to assess this critical transitional period within the annual climate regime.

The spring season corresponds to numerous facets of American society. Switching between heating and cooling can have economic and comfort impacts on Americans. The spring time is critical to the cultivation and germination of some crops leading to potential agricultural losses. Furthermore, extreme shifts in spring temperature can disrupt ecological systems that impact the behaviors of flora and fauna. Large swings in temperature can result in earlier snow melt which impacts hydrological balances on local and regional scales. Understanding the vulnerability to rapid, extreme temperature changes is essential to community adaptation and resiliency.

## **ABSTRACTS – POSTER PRESENTATIONS**

### **Gizel Brewer – SUNY Oneonta - Volcano Crisis Communication: A Case Study in Guatemala**

Volcano Crisis Communication is a wicked problem faced by scientists and disaster managers. In Guatemala, challenges exist such as remote locations, socio-economic factors, and cultural norms. Each volcano has its own unique geologic character, adding to the complexities of disaster risk planning in Guatemala. In this paper, the various factors surrounding this wicked problem are analyzed, as well as investigating possible planning strategies. Field visits and historical geographies are used to develop a comprehensive view of the risk perception in this location. This contributes to the relatively new field of study of crisis communication. Results show that this is truly a wicked problem and is difficult to plan for volcanic eruption risk in Guatemala.

### **Gita Bhushal Adhikary – Montclair State University – Human Wildlife Conflict in Developing Countries: A case study of Nepal**

Human wildlife conflict is a global issue in which wildlife species and humans affect each other in negative and sometimes fatal ways. Generally, households in closer proximity to protected areas are prone to experiencing crop loss and livestock depredation as forms of human-wildlife conflict. There exist various forms of compensation programs via non-profit agencies, private corporations, and governmental agencies to make up for the loss of livelihood in terms of livestock, crops, and property. However, in developing countries, victims face more challenges pertaining to reporting losses to authorities, and thus may not report or be undercompensated. As this problem is largely understudied, this study was carried out at Banke National Park in Nepal, where we found no literature addressing human-wildlife conflict. The main objective of this study was to explore possible factors influencing the likelihood to report losses. We surveyed 197 participants; 100% reported suffering from crop raids by wild animals, and about 60% reported livestock death. Results revealed that socio-demographic factors such as age, gender and family size, in addition to the wild animal species responsible for loss, were statistically significant in influencing the likelihood of reporting loss. We used our findings to suggest improvements to policy measures for compensation schemes by tailoring the program to affected populations. Data and implications of this study can benefit conservation stakeholders in Nepal and other areas in the world that experience similar conflicts.

Keywords: Human-wildlife conflict, Protected area, Report loss, Developing Countries, Banke National Park, Nepal

### **Bernadette R. Calderon – Montclair State University – Impacts of Forest Fire on Stream Sediment: A Chemical Analysis of the 16 Mile Fire in Delaware State Park, Pennsylvania, USA**

Wildfires are known to have significant impacts in most terrestrial and aquatic ecosystems which will occur naturally or produced from anthropogenic activities. Following wildfire, burning of soil and vegetation can lead to increased erosion rates and generate runoff that may cause input of contaminants such as trace elements into nearby aquatic ecosystems. Therefore, for this study, sediment samples were examined from the 16-Mile Fire that occurred in the Delaware State Forest, Pennsylvania, USA, to determine major and trace elements present in streams. While major and trace elements have been previously examined in soil from the 16-Mile Wildfire research, it has not been extensively studied in sediments, particularly tributaries within and outside the fire burn. Investigating chemical changes following the 16-Mile Wildfire will help to determine if trace elements and ash or charcoal particles reside within the sediment. Sediment cores were collected from a stream within the burned area of the 16-Mile fire as well as outside

the fire zone to compare results. Inductively coupled plasma mass spectroscopy (ICP-MS) was conducted for major, trace, and rare earth element (REE) concentrations of the sample to determine the presence of fire signatures. The data reported here are preliminary and the first results on sediment chemistry in the 16-Mile fire research, as more samples are analyzed it could portray a better understanding where fire signatures reside and its impact on aquatic environments.

**Anastasia Figueroa – Montclair State University – Relation between black carbon sediment deposition and anthropogenic related organic and inorganic contaminants in an urban waterway using a multi-tiered geochemical approach.**

Black Carbon ('BC') is commonly defined as the remaining carbon fraction from the incomplete combustion of biomass and/or biofuels. Once introduced into the environment via fine particulates, BC can reside relatively undisturbed due to its stable nature and resistance to further biological and chemical breakdown, thus allowing it to act as a significant carbon sink. The highly condensed aromatic structures which exist in the BC matrix are largely responsible for such resistance to further degradation, as well as, its efficient sorption properties in soils and sediments. While, BC has been well studied in various terrestrial environments and is often regarded as ubiquitous in deposition, it has not been as extensively researched in marine environments, particularly in regional urban waterways. Additionally, the relationship between BC deposition and pollution emission sources has historically been overlooked in urban waterways, primarily due to the assessment complexity of available analytical extraction techniques and varying chemical properties of the specific environment and contaminants. Quantifying and determining the chemical properties and relative abundance of BC can provide valuable information regarding local physiochemical properties, weathering processes, transport mechanisms and sorption capabilities of the depositional environment. Using a multi-tiered chemical-fingerprinting approach, quantification of BC in the highly urbanized/industrialized Hackensack River (New Jersey) allows for a better understanding of the accumulation and mobility of contaminant compounds in relation to regional BC deposition fluxes.

**Lauren Fosbenner – Nurture Nature Center – Understanding Earth Systems Interconnections - Six Degrees of Connection from Global to Local using Science on a Sphere and Art**

Local environmental risks - such as flooding, or threats to water quality from land use management decisions - appear urgent and personally relevant, rivet public attention, and increase public engagement in learning about science topics. Research suggests focusing on local impacts, personal experiences, and framing issues in ways that make them matter to the audience are effective for communicating science issues. But what is the best way to communicate global issues that don't seem local, like climate change? How do we establish the urgency for more remote, but critical, environmental risk topics?

To address the educational challenge of personally connecting students to the sciences, the Nurture Nature Center, Maryland Science Center, and Lehigh University developed a Six Degrees of Connection approach (a modification of the six degrees of separation theory that everyone is connected in less than six steps). The approach uses a carefully scripted and interactive Science on a Sphere program that develops systems thinking and connections between global and local issues, combined with arts-based approaches to help participants visualize and physically diagram their connections to global issues through cascading effects that relate to human activity, Earth's climate, systems, and environment. In addition, the program includes highlights on STEM careers and the personal experiences that inspired STEM professionals to pursue their research.

The program was tested with several hundred middle school students and through five teacher workshops. Evaluation of the Six Degrees of Connection program provides supportive evidence of the positive impact of the approach, including higher retention of science concepts and enjoyment of the program. In particular, the inclusion of the Science on a Sphere technology and creative arts-based activities significantly enhanced understanding of key objectives about earth system connections, were highly liked by participants, and were effective for communicating global to local environmental issues.

**Joy Fristchle\* and Amanda Devers – West Chester University – Evaluating riparian reforestation efforts in the Brandywine Watershed, Pennsylvania**

Successful restoration of a forest that is resilient to changing climate, population pressures, and other disturbances requires an understanding of tree-planting and maintenance strategies that are the most cost-effective and capable of maximizing environmental benefits. These benefits include storm water management to reduce sediment and nutrient contamination of streams, improved air quality through the removal of pollutants, carbon sequestration for climate change mitigation, and biodiversity conservation. The Brandywine Watershed in southeastern Pennsylvania has been home to substantial riparian reforestation efforts. This particular study evaluates the costs, benefits, and tree mortality at eight reforestation sites. High tree mortality rates have lessened the potential environmental benefits that some sites could provide, although the benefits are still expected to outweigh the costs over time. The results of this research inform future research, planning, and management approaches that seek to maximize the environmental benefits of forest restoration.

**Matthew Friedman<sup>1</sup>, Summer Looney\*<sup>2</sup>, and Alishbah Saddiqui<sup>3</sup>– MacArthur High School – Public Awareness and Support of Town of Hempstead Preserves and Nature Areas**

Environment-behavior research has shown society's increased concern for our environment (Dunlap and Van Liere, 1978; Fransson and Garling, 1999). Research related to environmental awareness and commitment shows differences across sociodemographic categories, with general increases in concern over time (Fransson and Garling, 1999). This study explores suburban resident's conservation awareness and commitment, and their awareness and support of local preserves and nature areas; parks that have a clear focus on child play, sports, and recreation were not included in the study. The area of concern, the Town of Hempstead (ToH), is one of the three towns in Nassau County, New York, occupying 191.3 square miles in the southwestern portion of the county. The ToH has six designated preserves and nature areas: Norman J. Levy Park and Preserve, Marine Nature Study Area, Twin Lakes Preserve, Lido Beach Passive Nature Area, Tackapausha Museum & Preserve, and Theodore Roosevelt Nature Center. Following IRB approval, the adult participants involved in this study were taken from the following groups on Facebook: Long Island Moms, Nassau County Moms, and Long Island Moms and Dads. Preliminary results show statistically significant differences in the number of preserves heard of and the frequency of preserve visitation when comparing low vs. high conservation commitment score groups. When comparing low vs. high conservation awareness score groups, there was only a significant difference in frequency of visitation, not for the number of parks heard of.

<sup>1</sup>Oceanside High School, Oceanside, New York 11572

<sup>2</sup>General Douglas MacArthur High School, Levittown, New York 11756

<sup>3</sup>Hofstra University, Hempstead, NY 11549

### **Hoang Bic Luong\*, Pankaj Lal, and Gia Nguyen – Montclair State University – Customer Satisfaction with Five-Star Restaurant Chain Under Khaisilk Corporation in Vietnam**

In a competitive market, excellence in service is the hallmark of success, and every industry is expected to offer reliable service. Customer satisfaction is the measure of service quality. Since customer's expectations and perceptions of service are typically a top priority for self-evaluation, many restaurants use consumer orientation to establish and monitor customer satisfaction to better meet their customer's needs. Thus, this research describes attempts to address critical issues in customer satisfaction, namely, the relationships between customer satisfaction, customers' repeat-purchase intentions, and restaurant performance. The objectives of this study aimed to (i) distinguish the relationship between customer satisfaction and restaurant performance (ii) identify which attributes of guests' dining experience are the most likely to increase guests' intent to return (iii) determine the factors that lead to the success of customer service system chain by surveying and observing six restaurants under Khaisilk Corporation in Vietnam. The research findings indicated that quality of service, food price, cleanliness, waiting time, the ambiance of the facilities, menu design and variety, food quality, responsiveness of front-line employees, and atmosphere contribute to customer satisfaction. These findings illustrated that there is a remarkable relationship between multiple variables of a guest's dining experience and their repeat purchase intention.

### **Joshua Marciniak – West Chester University – Mode Choice and Equity in Pennsylvania Controlled Access Transportation**

The state of Pennsylvania has several controlled access transportation systems, notably including the Pennsylvania Turnpike and the Southeastern Pennsylvania Transportation Authority public transit network. The Pennsylvania Turnpike provides significant supplements to SEPTA's income, and is responsible for nearly \$232 million yearly through toll payments. As turnpike consumer costs consistently rise, the issue of inequity based on geographic location arises. The primary research question we aim to address is whether these two systems provide access to overlapping service areas. Additionally, we seek to determine if key demographic indicators in each service area are comparable. Data for each transportation system was obtained from secondary sources. Three methods of approximating service areas were applied to access points. Using these derived areas, it was possible to extract demographic data at the census block level to examine differences between represented populations. While the area served by SEPTA is smaller, the total population served and number of public transit riders are higher; the PA Turnpike covers a much larger area with generally higher median incomes. These results inform a discussion on issues of equity and consumer modal choice.

### **Isabella Molina\* and Julia Gizzo – MacArthur High School – High School Students' Perceptions of School Security**

School security has become a topic of increasing prevalence in the United States due to increasing prevalence of school shootings in recent years, such as the Parkland shooting and Sandy Hook massacre. Because of such occurrences, schools across the country have been implementing new security measures to prevent such events from happening. However, this may take a toll on students and faculty psychologically. For this reason, it is crucial to analyze the effects that added measures of security have on people in the school environment. To do this, studies have been conducted to analyze how students perceive new security items in their school. This project analyzed the perception of high school students on security in their school. Results have shown that males more strongly disagreed with comfort in

telling a school teacher or administrator about potential violence. Additionally, females more strongly disagreed with feeling less safe in school after recent school shootings. Having a better understanding of factors that influence perceptions of safety may lead to the development of a more positive climate in high schools.

### **Mitchell Oller – Kutztown University – Analysing Domesday in ArcGIS**

The Domesday Book is one of the most comprehensive sets of historical data to ever exist. This wealth of data does come with challenges, for research it can be cumbersome text and parsing through the data can be challenging. This case study provides a proposed solution to the difficulties in studying Domesday, by using modern technology. The case study paired data from the Domesday Book with the the map making program ArcGIS. Using these two in conjunction made analysing the Domesday data much more approachable. It allowed for the development of maps that displayed the data in Domesday in an easy to view way. This project further discusses how technology, such as ArcGIS, can be used to approach historical subjects in the future and create new perspectives on how to analyse historical data.

### **Evan Peters – MacArthur High School – A Comparison Between High School Teacher and Student Perceptions of Technology Use in the Classroom**

The increasing prevalence of tablets, personal laptops, and Smartboards in the classroom has led numerous researchers to question their actual usefulness and consider the opinions of those affected by them. More advanced technologies are beginning to have a greater influence over education and even supersede traditional methods (Collins and Halverson 2018). It is important that the revolutionary trends presented by these technologies are better understood in the context of the perceptions of those using them most: teachers and students. For example, a study conducted by Baker, Lusk, and Neuhauser (2012) examined the relationship between college student and teacher perceptions of technology use in the classroom but no research has compared high school teachers and students in the suburban north east. This project aims to study the differing perceptions of technology use in the classroom between these two groups. There were 134 total participants; 87 of them being students and 47 being teachers. Two similar questionnaires were handed out to these two groups which had questions relating to age, technology self-efficacy, and technology perceptions. The questions in these surveys were taken and slightly modified from a previous study that conducted similar research on teachers (Wozney, Venkatesh & Abrami, 2006). Analysis showed that, for certain questions, such as perceived cost of using technology there was a statistical significance ( $p < 0.001$ ) between teachers and students, but for most questions, there was no significance, thus contesting past research, which has alternatively shown a clear difference between students and teachers.

### **Archana Prasad – CESAC, Montclair State University – Investigating the impact of the ACMES Summer Camp on 6-8th graders environmental perceptions**

Studies have shown that extracurricular activities improve academic performance and learning capacity. The impacts of these activities on high school graduation and substance abuse amongst many other factors have been widely observed. However, the effect that extracurriculars have on children's' environmental perceptions are difficult to find. Climate change is drastically changing our environmental landscape; educating young people about the state of the environment is amongst the most important proactive, preventative measures we can take towards resiliency. Understanding the factors that influence young students and their perception of the environment is incredibly important in determining how to improve attitudes. To investigate the potential factors influencing students' environmental perceptions, researchers from Montclair State University organized a week-long STEM Summer Camp

for students entering grades 6-8 in Fall 2019. At the end of a week-long STEM camp, campers participated in a day-long excursion to Stokes State Forest. This research analyzes their feelings towards the environment, recorded through surveys taken before and after their outing. Results from the Cochran-Armitage statistical test indicate that campers felt more optimistic about the future after their trip and increasingly that nearly all human activity was damaging to the environment. Students in grade 6 felt more strongly about the impact of humans on the environment, suggesting that the camp may see more impact by focusing on younger students. Boys also reported improvement in feelings of safety after their time in the forest, leading to interpretation that more time in nature is beneficial to positive feelings about it.

### **Nicole Provost – Montclair State University – Climate Change Impacts on Energy Generation in the US East Coast**

The United States is the top consumer of energy in the world, which puts stress on the nation's energy industry to supply enough electricity and meet the high demand. Considering the growing climatic stressors in the United States, such as severe drought in the West and flooding in the East, it becomes critical to address the connection between energy demand and the various changes in climate that temper with its availability. Therefore, life cycle analysis (LCA) will be used to find the business as usual case for water usage in energy generation, as well as other scenarios where water becomes too scarce or too abundant on the US East Coast. Moreover, LCA will provide information on the emissions coming from each energy source, which will be used in an energy network optimization model to find the least water-intensive and greenhouse gas-emitting energy sources to meet the energy demand. More specifically using dispatch modeling to optimize the energy network will result in the availability of relevant data for electricity industries to adapt to such changes, while also making a better impact on the environment and its natural resources. Factors that may affect the ability to generate electricity, and will be examined in the optimization model, includes drought and flood occurrences, water usage by energy sources, emissions from the energy sources, imports and exports of electricity and water for the state, and the price of electricity and water. It is expected that by using these factors in the model, an accurate representation of climate change's impacts on the US East Coast's energy sources will be apparent, and the costs for electricity under these conditions will be useful for local energy suppliers.

### **Alana Rader\* and Laura Schneider– Rutgers University – Understanding the relationship of urban sprawl and forest cover change: A case study from the Mesoamerican Biological Corridor, Quintana Roo, Mexico**

Forest frontiers of the Mesoamerican Biological Corridor (MBC), Quintana Roo (QR), Mexico, saw a surge in deforestation during the establishment of resource commons communities in the 1960s. Forest use continues to be common throughout the MBC, although recent observations suggest the potential for a new wave of forest transformation, characterized by areal expansion of cultivated areas through land consolidation. Simultaneously, the touristic areas of Quintana Roo have been expanded, specifically urban centers of Playa del Carmen and Cancun. Research across Latin America suggest that rural-urban migration and urban development can alter patterns of land-use through both land abandonment and consolidation. As such, spatially explicit research of varying land uses and resulting patterns of land cover change are critical at regional scales.

Following a telecoupling framework, this study will explore the relationship of urban sprawl in Playa del Carmen to forest cover change in the MBC in Quintana Roo, using time-series analysis of remotely sensed imagery to detect changing patterns of both urban and forest land covers. Building on previous research on telecoupling, land use, and forest transitions in Latin America, we hypothesize that an increase in urban expansion in touristic areas of QR is occurring simultaneously with decrease in shifting cultivation and increase in large scale agriculture in the MBC. Results from this study will offer insight on

the complex dynamics of forest transformation in the MBC, beyond local land use decisions, contributing a more thorough understanding of the drivers of forest transformation into the future.

### **Marie Smoyer – Virginia Tech – Analysis of Bluebird Nesting Structures at Blue Marsh Lake, Pennsylvania**

The Eastern Bluebird (*Sialia sialis*) population, native to Pennsylvania, was harmed by the introduction of the English Sparrow (*Passer domesticus*) and the European Starling (*Sturnus vulgaris*) in the 1800s and, more recently, the use of pesticides, including DDT (banned in the U.S. in 1972). In 1978, the North American Bluebird Society was founded to promote the preservation of bluebirds. The study area, Blue Marsh Lake, is a U.S. Army Corps of Engineers project area in Eastern Pennsylvania. The area has a nesting structures program for the Eastern Bluebird. This program was developed in the mid-1990s with the Pennsylvania Game Commission and the Bluebird Society to locate nesting boxes in preferential habitats for this species. House Wrens (*Troglodytes aedon*) and Tree Swallows (*Tachycineta bicolor*) may also use the boxes without affecting bluebirds in the area. Aggressive sparrows and starlings are unwelcome and removed from boxes when sighted. Boxes for bluebirds were placed in close proximity to pasture land cover, the species' preferential habitat, and have been consistently monitored by park rangers and volunteers since 2012. Based on field visits and data on boxes' location and bird surveys during 2012-2017, this study explores the influence of GIS-derived spatial factors on bird species' nesting preferences. Results of statistical analyses suggest that the most influential factors in determining bluebirds' nesting success are accessibility measures: Bluebirds appear to prefer nearness to water. This study is relevant to management plans evaluating future placement of bluebird nesting boxes.

### **Sierra Taylor\* and Michael Davis – Kutztown University - Nocturnal Tornado Vulnerability in Tennessee Counties**

Nocturnal Tornadoes are two times as deadly compared to tornadoes that occur in the daytime. According to research conducted at Northern Illinois University, Tennessee is considered one of the most vulnerable states because of the high percentage of nocturnal tornadoes in the American South. Using GIS, vulnerable counties in Tennessee will be identified. This will be accomplished by examining the number of nocturnal tornadoes, increase in population from 1980-2010, and number of mobile home parks. GIS mapping techniques will identify the potential vulnerability to these hazards based on the infrastructure in place. Previous research on nocturnal tornadoes has been conducted to the best of the author's knowledge, but not down to the county level. The current hypothesis is the counties with the most mobile home parks will show the most vulnerability since mobile homes have the highest fatality rate in nocturnal tornadoes.

### **Bhagyashree Vaidya\*, Diane F. Hagmann, Jennifer A. Krumins, and Nina M. Goodey – Montclair State University – Artificial Root Exudates Augment Extracellular Enzyme Activity in Metal Contaminated Soil**

Soil contamination entails either novel clean-up and restoration strategies or desertion of the site, permitting natural elements to ameliorate the impact. Scientific efforts made to understand the biochemical processes occurring among plants, soil organisms, and pollutants can navigate "gentle green" remediation approaches to augment such brownfield sites. We tested the hypothesis that adding artificial root exudates will restore the enzymatic function in barren heavy metal contaminated soil 25R faster than plant root exudates. High heavy metal loads and organic pollutants were displayed at our study sites 25R and 25F. Site 25R shows negligible plant growth and poor extracellular enzyme activity



while site 25F is highly vegetated with high enzymatic activity. We examined the effect of primary production and artificial exudates: a solution of amino acids, sugars, and organic acids; by potting these soils in an automatic growth chamber over 205 days. Soils from both sites were subjected to four conditions: none, plants, plants plus artificial exudates, and exudate solution with four replicates per condition. Besides adding sterile tap water to each pot, the conditions with plants received 20 switchgrass seeds on day 1, while those with exudates received 20 mL exudate solution from the seventh-day post-experimental set-up. We found that artificial exudates increased extracellular phosphatase enzyme activity at day 37 in the barren 25R soil; similar to soil 25F that displayed high enzymatic function from day 1. These results indicated rise in soil enzymatic function due to the regular addition of artificial root exudate, thereby nourishing the contaminant tolerant soil microbial communities. Thus, this study suggests an alternate strategy to augment brownfield soils.