

13TH ANNUAL

Graduate Multidisciplinary Conference

*An annual conference to recognize the
research and projects of
Clark University graduate students.*

APRIL 8, 2015 12 - 8 P.M.

HIGGINS UNIVERSITY CENTER



SCHEDULE OVERVIEW

Clark University's Graduate Multidisciplinary Conference is an annual tradition designed to highlight the important scholarship and research produced by our talented graduate community. This year, sixty-five graduate students from 10 graduate departments will be participating in order to showcase their important contributions to our understanding of the world.

12 - 1 p.m.	WELCOME LUNCHEON <i>Higgins University Center, Tilton Hall</i>												
12:45	Opening Remarks Davis Baird, Provost												
1 - 6:15 p.m.	ORAL PRESENTATIONS* <i>Higgins University Center, Lurie, Grace, and Rosenblatt Conference Rooms</i>												
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3:15 - 4:15 p.m.	POSTER SESSION** <i>Higgins University Center, Tilton Hall</i>												
6 - 8 p.m.	RECEPTION AND AWARDS CEREMONY <i>Higgins University Center, Tilton Hall</i>												
6:30 pm	Travel Award Ceremony												
6:45 pm	Closing Remarks William F. Fisher, Dean of the Graduate School												

* This year, our schedule of oral presentations has been organized by theme. Specific presenters and locations for oral presentations can be found starting on p.3.

** Poster presentations are organized by department, and are listed starting on p. 15.

TRAVEL AWARDS

Every year, the Graduate Student Council awards grants to fellow graduate students to assist in funding the travel costs for research or to new skill development. The Travel Awards Committee selects students based on the relevance of their research topic, the rigor of their methodological approach, and their project's theoretical innovation.

ORAL PRESENTATIONS

MEDIA

Grace Conference Room, Higgins University Center

1:00 Gap Analysis of Hotspots of Endemic Diversity and Protected Areas in the Dominican Republic

Presenter: Sean McCartney
Department: International Development, Community, and Environment
Adviser: Florencia Sangermano

The Caribbean, as one of the planet's biodiversity hotspots, contains an irreplaceable biological heritage that underpins the natural history of every island. This study aimed to identify where the locations of highest versus lowest species endemism are in the Dominican Republic, along with the current conservation status of these locations. Focusing conservation efforts on areas with the greatest concentrations of biodiversity will achieve the maximum impact on conservation efforts. The objectives of the study were to identify biodiversity hotspots of endemic species based on the International Union for the Conservation of Nature (IUCN) range polygons, and perform a Gap analysis of biodiversity hotspot protection. Sites regularly supporting significant populations of range-restricted species are global conservation priorities because there are few or no other sites in the world where conservation action for these species can be taken. Gap analysis is then used to compare the distributions of species with the distribution of conservation areas. Indices of biodiversity were based on Alpha Diversity and Range Restriction Index.

1:15 Use of App Analytics to Improve Customer Experience

Presenter: Dushyanthi Pieris
Department: MSIT
Adviser: Pat Gillogly

App analytics help the developers learn how, when, where and by what kind of audience using their app. There are several leading mobile analytics tools in the market such as Google Analytics, Mixpanel and Flurry. My project will focus on applying the capabilities of the web analytics software to an mobile and web app in order to recognize what are the key metrics and how the data from analytics can be used to better facilitate the user and the company's business model.

1:30 Tell Your Story: Creating Participatory Culture to Cultivate Personal Narratives and Social Messages for the Local and Global Agora

Presenter: Toma Mengebier
Department: International Development, Community, and Environment
Adviser: Anita Fabós

Diane Stone (2008) employs the concept of the Greek marketplace or public square known as the "agora" to embody the new public spaces where global policies occur. Today's 'global agora' embodies "the heart of intellectual life and public discourse" through "a social and political space - generated by globalization - rather than a physical space [...] an electronic or virtual global commons." (20-21) This public space; where politics, markets, culture and society intermingle; is transnational, highly influenced by its "actors," the public and their institutions, and as such requires their orderly participation. The global policy agora is where citizens may actively contribute to global policy processes, if they have access and rights to expression within these domains. Consequently, "universities are adapting to their changing environment to provide education and training for young professionals who need the skills and knowledge to traverse global policy processes. [...] Universities, their scholars, and their students are drawn into, and structure, the global agora." (25) Henry Jenkins et al. (2009) define a 'participatory culture' as one that enables artistic expression and civic engagement with a "strong support for creating and sharing creations," as well as some form of knowledge transaction between more experienced participants and beginners. Furthermore, members of a participatory culture "believe their contributions matter and feel some degree of social connection with one another." (xi)

1:45 p.m. The Future of Asian TV Business Pay-For-Content

Presenter: Mengjie Yu
Department: College of Professional and Continuing Education
Adviser: Julie Frechette, Nancye Araneo

The progression of media technology has been making huge differences in modern people's life. We all know the impact of new media, it changing information delivery and receive methods. Instead of broadcasting, narrowcasting focus on deliver custom-tailored contents to predisposed audiences. Two groups will benefit from narrowcasting: the audiences and the advertisers. Unlike the America narrowcasting industry, which already becomes predominant model of media delivery in American society today. The narrowcasting industry in Asia is still in beginning stage, which means the industry faces both opportunities and challenges. My paper analyzed the current situation of pay-tv in Asia, and provide sever suggestions for its future development.

CAPITALISM

Lurie Conference Room, Higgins University Center

1:00 Open Public Big Data as a Resource of a Competitive Advantage for Start-Ups in South Korea

Presenter: Young-Long Kim
Department: Geography
Adviser: Yuko Aoyama

Abstract: The developmental state thesis has been a major vehicle to understand the rapid economic development in East Asia including South Korea. However, the role of start-ups which hardly have the resources and capacity has been overlooked in the thesis. This is also important to understand the adapted role of the Korean state for start-ups in the economy that chaebols have dominated. In this context, a crucial question is what kind of new resources facilitate the emergence of start-ups. In recent years, governments have increased their effort to collect data in the standardized form of metadata and provide them to the public. These open public big data are valuable resources for start-ups that lack their own resources but possess the knowledge to utilize the public resources. This paper, especially, takes South Korean start-ups based on open public big data as case studies to show how start-ups utilize the data as a resource of a competitive advantage. Moreover, the role of the Korean state which offers the open public big data provides evidence of the reconfiguration of the developmental state in the twenty-first century.

1:15 The Art of Rent: Painters, Tourists, and Change in San Juan la Laguna, Guatemala

Presenter: Laura Riddering
Department: International Development, Community, and Environment
Adviser: Ken MacLean

Abstract: This qualitative case study explores artisanal painters' views on tourism and their impacts on cultural change in San Juan la Laguna, Guatemala. They struggle with new cultural and economic identities through art. Painting is a way to overcome historical discrimination based on their identity, while they explore, develop, and communicate their cultural identities to themselves and outsiders. By selling paintings of cultural scenes that are of interest to them and to tourists, they strengthen their voices in the marketplace. Harvey's (2002) concept of "space of hope" and Appadurai's (2004) concept of "capacity to aspire" frame an understanding of this process of change. The painters in San Juan la Laguna create a space of hope through painting to support indigenous cultural identity and economic identity development. They use their identities to increase their unique position in the market and increase their capacity to aspire, that is, to engage with globalization on their own terms to shape their future. This is the "art of rent" (Harvey, 2002): the painters must artfully use their cultural and economic identity to earn rents from tourists. They must craft a space to negotiate the terms of the encounter with globalization to struggle for a better life.

1:30 Critiquing Capitalism in Abdelrahman Munif's "Cities of Salt": The Characterization of Ibn Rashed

Presenter: Jessica Thelen
Department: English
Adviser: Stephen Levin

Abstract: At the beginning of Abdelrahman Munif's "Cities of Salt", Ibn Rashed is a member of the desert community of Wadi al-Uyoun. Rashed, through his involvement with the Americans and the emirate, rises through the ranks of social and political power, and becomes part of the Arab elite in the coastal city of Harran. Through the characterization and transformation of Ibn Rashed from a fellow villager to a foreman, Abdelrahman Munif critiques how capitalistic practices not only damage the worker, but those who command the workers. Due to this transformation, Rashed becomes manipulative, greedy, and dehumanized—by dehumanizing the workers, he in turn dehumanizes himself. Rather than seeing himself as human, he instead sees himself as a capitalist, a master of labor and its products. Munif's characterization of Ibn Rashed emphasizes the psychological damage that the Arab elite also suffer at the hands of capitalism, asserting that capitalism negatively impacts all who are part of this all-encompassing and alienating socioeconomic system, a system that allows, and encourages, victims to become victimizers.

1:45 Participatory Public Services as Commons Practices Within/Beyond the State?

Presenter: Michelle Wenderlich
Department: Geography
Adviser: Mark Davidson

Abstract: Anti-capitalist commons literature sees commons as quintessentially non-commodifiable social practices of group collective ownership and organization. So what happens when we see practices that resemble commons-based organization within the state? I propose that participatory organization of public services, specifically municipal water organized through the participatory budget in Porto Alegre from 2001-2004, as well as an attempt to socialize electricity in Berlin through a referendum in November 2013, may be such examples. Here we see institutionalist commons practices such as direct participation, finding shared goals and ensuring accountability along with a qualitative change of power relationships. Yet both institutionalist and anti-capitalist commons literature see the commons necessarily in opposition to the state. However, it is also possible to assert that we cannot have a common good but that we are commons (Mattei 2011). Using this definition of the commons as social practice and coming from a theory of the state and of power that sees them also not as things but as practices that need to be reproduced, I propose that hybrid state-commons forms, most likely at the local scale, could change imaginaries and practices of the political and thus point in the direction of social transformation. Combined with ideas since Rosa Luxemburg (Luxemburg 2008) emphasizing common social practice to form political identities, and focusing on practices of everyday life as a site of revolutionary change (e.g. Sitrin 2014), such local practices gain in strategic significance. Whether it is possible for such forms of organization to be autonomous is a theoretical and practical problem to be discussed.

MINORITIES

Rosenblatt Conference Room, Higgins University Center

1:00 Narratives of Loss: The Significance of Genocide Survivor Refugee Testimony

Presenter: Abigail Miller
Department: Holocaust and Genocide Studies
Adviser: Debórah Dwork

Abstract: In the classroom and at the policy-making table, participants often presume to understand what constitutes significant losses by refugee victims of genocide: home, family, and security. Few analyze victims' narratives of loss to learn directly from them. By imagining what does/does not constitute a significant loss to genocide survivor refugees, policy-makers lose the opportunity to craft more effective and meaningful refugee policies. This paradigm has done a disservice to students and policy-makers of the past and, if it continues, will also have a negative effect on future surviving refugees of genocide. This paper will uncover first-hand narratives of loss by Jewish pre- and post-war refugees of the Holocaust who resettled in Argentina. It will highlight particular losses suffered by victims of genocide, situating them in the context of the refugee experience. And it will shed new light on the significance of genocide survivor refugee testimony as a resource for historians and policymakers alike. In my presentation, I argue that the collection and analysis of such narratives will both enhance academic literature and classroom resources, and provide invaluable data to post-genocide response aid programs and refugee services organizations as they work towards remedy and reparation in specific contexts. My paper also notes

the limitations of such efforts to remedy and repair, speaking to the devastating consequences of genocide. Utilizing testimony from the USC Shoah Foundation Visual History Archive, my paper analyzes genocide survivor refugee narratives of loss in a framework that draws upon the fields of memory studies, history, & refugee studies.

1:15 Beyond Hagiography: Memory of Rescue in the Polish Countryside

Presenter: Alicja Podbielska
Department: Holocaust and Genocide Studies
Adviser: Debórah Dwork

Abstract: My paper explores the memory of rescue in the Polish countryside as it emerged in interviews I conducted with rescuers and bystanders in two distinct regions, Łomża County and Lublin Province. Their accounts challenge the official public discourse on the "Righteous Among the Nations," and I plumb how they differ. The interviewees recounted a raw, unscripted narrative of rescue which they conveyed with unritualized language devoid of heroization: "keeping Jews" (trzymanie Żydów) instead of "rescuing" (ratowanie), for example. In my paper, I examine topics commonly discussed in the interviews, yet almost absent from the cultural representations of rescue, such as threat of denunciation by fellow Poles, rescue for profit, and rescuers who became perpetrators. I drill down on how rescuers' motivations and actions are perceived by their communities and argue that the war-time societal disapproval of rescue activities has prevailed until today. Juxtaposing the language of politicians and popular culture with rural people's memory of rescue, I pay particular attention to the generalizations, simplifications, and omissions of the hagiographic-like mainstream discourse on rescuers. As these oral histories show, there is a sharp distinction between rescue as practiced, rescue as remembered, and rescue as preached.

1:30 The Representations of Silence in Julie Otsuka's *When the Emperor was Divine*

Presenter: Lingyun Tao
Department: English
Adviser: Lorenzo Alexander Puente

Abstract: The main characters in Julie Otsuka's *When the Emperor was Divine* were silent all the time no matter during the wartime or after the war. Silence was a forced choice for them and the whole Japanese American community because they were both Others and alien enemies in the eyes of the dominant white Americans. In this paper, I will take the Japanese American family as an example to analyze the silence of Japanese American community from three overlapping aspects: who were silent; when and where were they silent; and what were they silent about. Through close textual analysis, I argue that the silence of Japanese Americans indicates the survival they made in order to fit into the American society and thus represents the suppression of Asian culture by the mainstream American culture.

1:45 An Oasis of Humanitarian Aid in the Southern Arizona Desert: A Critical Analysis of Actors Working to Mitigate the Deadly Factors of the Undocumented Migration Over Arizona's Mexican Border

Presenter: Erika Marchant
Department: International Development, Community, and Environment
Adviser: Ken MacLean

Abstract: Through an analysis of literature, case studies, and GIS tools, I introduce, describe, and analyze what I argue is strong contention in southern Arizona between the US federal government and non-governmental actors over efforts to mitigate the deadly factors of the undocumented migration across the US/Mexico border. One major finding from the GIS spatial and statistical analysis of the 2001-2013 period demonstrated that the percent of deaths related to the environment is going down while the number of people dying each year remains in the same range. Four interpretations of why this is happening have emerged. First, the steady increase in undetermined deaths in the category of "undetermined" is not clearly defined and therefore, many of these deaths may be due to environmental causes. Secondly, the decline in environmental deaths could be because of the higher likelihood of migrants being apprehended due to the increase in Border Patrol agents, and not because of an increased utilization on rescue beacons or other humanitarian resources. Third and most likely, the change in the number of migrant deaths and causes could be a combination of the last two conclusions. The final interpretation of my research shows that no matter why, the deaths caused explicitly by hypothermia, dehydration, and other environmental factors are consistently decreasing.

WORK

Lurie Conference Room, Higgins University Center

2:15 Hypocrisy in the Name of Christianity in *Clotel: or, The President's Daughter*

Presenter: MD Shamim Ahmad

Department: English

Adviser: Meredith Neuman

Abstract: William Wells Brown's *Clotel: or, The President's Daughter* is a vivid presentation of slave status of the African American in the United States. Brown has blended his real slave experience and fictional representation of other slaves at that time in the narrative. The novel is an ironic documentation that uncovers the scandal of President Jefferson's holding slaves, who was the writer of the Declaration of Independence and narrates the story of Clotel, the president's daughter who was being sold and treated as slave. Actually the novel is a satirical attack on the hypocrite Christians who were holding slave while they were claiming that they were good Christians. In my discussion, I will emphasize how Reverend Peck holds slaves and tries to legalize his business by saying that the Bible sanctions slavery and he is doing good with the slaves. Peck's daughter Georgiana is an example of abolitionist who tried to emancipate the slaves and establish them in society. Carlton is also a hypocrite who is studying the South but does not take any action for freeing slave supporting Georgiana. The hypocrisy of the slave owners is manifested in Snyder's sermon to the slaves who says that it is God who has made these people slaves and they should be obedient to their masters. It is the affectation of the slave owners who dehumanize the black people in the name of Christianity and traded on them for their personal and monetary benefits.

2:30 Effects of Free Primary Education on Educational Outcomes

Presenter: Gbeton Somasse

Department: Economics

Adviser: Wayne Gray

Abstract: Education is a key factor of economic development. To reduce disparities and achieve universal primary education, the Government of Benin adopted in 2006 a policy of Free Primary Education (FPE), by abolishing parent-paid tuition fees in public primary schools and increasing resources towards schools. In this paper, I examine whether the policy reduced the wealth and gender gap as well as prior geographical disparities in educational outcomes. I also evaluate how the expanded access has affected student achievement. The identification strategy relies on pre-FPE differences in dropout rates across municipalities in a difference-in-differences approach. Using municipality and household level data, I find evidence that the fee elimination attenuated the inequality of access by increasing primary school completion for traditionally disadvantaged groups, including girls, low-income, and the northern region populations. The increased enrollment had no significant adverse effect on student achievement as measured by the probability of passing the primary school exit exam (CEP). These results suggest some welfare improvements and may have important policy implications for Benin and other developing countries with similar strategies.

2:45 Child Labor in Indonesia: Households Response to Income Shocks

Presenter: Alejandro Mina Calvo

Department: Economics

Adviser: Marc Rockmore

Abstract: The discussion on child labor has shifted from theory to the empirics as more sources of information have become available in developing countries, where the phenomenon is more prevalent. This paper tries to examine how households resort to child labor in the aftermath of an income shock using data from the latest round of the Indonesian Long Family Survey (IFLS). The ongoing survey tracks households and individuals across time which allows to separate the time of the shock and the response. I find little evidence that households use child labor as a buffer against a shock. However there is evidence that holding some specific assets could protect against child labor.

3:00 The Impact of Sustained Attention on Labor Market Outcomes: The Case of Ghana

Presenter: Dhanushka Thamarapani
Co-Author(s): Chih Ming Tan
Department: Economics
Adviser: Marc Rockmore

Abstract: In this paper, we go beyond traditional measures of cognitive abilities (IQ) in explaining labor market and social outcomes in developing countries. We exploit a rich dataset from Ghana that provides information on demographics, labor market outcomes, and a direct measure of cognitive ability along with other test scores to construct a measure of sustained attention. We find that, at least for the case of Ghana, after controlling for IQ and other covariates, higher levels of sustained attention are associated with higher annual income, higher education and a higher likelihood of being employed in a white collar job.

UNIVERSITIES

Grace Conference Room, Higgins University Center

2:15 The Business and Environmental Case for Energy Management at Vassar College

Presenter: Ryan Collins
Department: GSOM & International Development, Community, and Environment
Adviser: Jennie C. Stephens ; Donna Gallo

Abstract: The primary cause of anthropogenic climate change is the release of global warming greenhouse gases (GHGs) from the combustion of fossil fuels for energy. Global warming is predicted to have significant detrimental impacts on both the environment and economy, and major sources of GHG emissions are buildings across all sectors - residential, commercial, and industrial. Rising energy costs over time further emphasize the need to better manage building energy consumption. This project presents the role building energy management can play to reduce GHG emissions, while enhancing an organization's financial solvency. Relevant energy consumption trends and energy management considerations offer context for presentation of the state of energy management at Vassar College. Located in Poughkeepsie, New York, Vassar enrolls 2,400 students and utilizes over 70 buildings for its operational needs. Opportunities for Vassar to improve energy management practices, decrease GHG emissions by 715 metric tons and capture energy-cost savings of over \$175,000 annually are presented. Cost-savings analyses were completed on behalf of the Environmental Defense Fund Climate Corps and in collaboration with members of Vassar College's Campus Committee on Sustainability.

2:30 Clark Composts! : Organic Waste Diversion at Clark

Presenter: Jake Kailey
Department: International Development, Community, and Environment
Adviser: Sam Ratick

Abstract: Over three years, Clark Composts! has been working on implementing organic waste diversion at Clark. Clark was the first University in the US to have composting available in resident halls, and has since been slowly expanding to include most major areas of campus.

2:45 International Development, Community, and Environment's (IDCE) Unplayed Trump Card: Experiential Learning as a Driving Force for the IDCE Department

Presenter: Javier Yopez Vargas
Department: International Development, Community, and Environment
Adviser: Jude Fernando

Abstract: This practitioner's report looks at Experiential Learning (EL) as a new pedagogical model based on Freire's seminal work, "Pedagogy of the Oppressed", in which students become main actors in their graduate education; exploring the principles of Experiential Learning (EL) and its importance in higher education, and particularly in international development. In addition, I delve into FOBESII, a binational cooperation in higher education and research, especially regarding important areas for innovation in businesses in México and the U.S.A. Finally, I look at three different case studies; American University, Brandeis University, and University of Pittsburgh as the basis for a blueprint pilot service-learning and study abroad program for the International Development Community and Environment (International Development, Community, and Environment)

Department at Clark University. Finally, I provide the lessons learned throughout this institutional assessment for Experiential Learning (EL).

3:00 Chasing the Elusive Alpha: What would you do with \$140,000?

Presenter: Andrew Musler

Co-Author(s): Andrew Musler, Oiver Samples, David Polansky, Jai Sung Lee

Department: Graduate School of Management

Adviser: Steve Ng

Abstract: Our group is going to elaborate on the investment process of the investment fund class and how we focus on a top down bottom up approach actively managed by students. We are going to share our market research and where we think the market is headed. The presentation is going to include a sample stock pitch that would be performed in the class. In addition the presentation will show the performance of the investment fund against our benchmark and other funds.

FORESTS

Lurie Conference Room, Higgins University Center

3:30 Governmentality and Dispossession in Kenya's Mau Forests Complex

Presenter: William Collier

Department: Geography

Adviser: Dianne Rocheleau

Abstract: Kenya has an extensive history of conflict based on competing claims to land and natural resources, which continues today. The Mau Forests Complex (MFC), a forested area and water catchment in western Kenya critical to social, economic, and environmental services, is undergoing extensive deforestation and forest degradation. Large-scale efforts to conserve the MFC are currently underway as the Kenyan government develops new strategies for forest governance. Institutional arrangements, participation, and representation are poorly understood. The causes and consequences of deforestation and degradation in the MFC are contested. I analyze current forest management strategies and the complex network of actors involved in the conservation of the MFC using Foucault's 'governmentality', Marx's 'primitive accumulation', and Harvey's 'accumulation by dispossession' to better understand how land tenure conflicts are unfolding in the highlands of Kenya. Combining qualitative and quantitative data and analyses, I explore theories about resource exploitation, capital flows, and environmental governance in Kenya and in the wider context of tropical developing countries.

3:45 Local Politics and Deforestation in the Brazilian Amazon

Presenter: Sharon Pailler

Department: Economics

Adviser: Jacqueline Geoghegan

Abstract: The role of Brazilian local politics in Amazonian deforestation is not well understood. Yet local politics are a potentially important factor influencing deforestation rates since vote-maximizing politicians are influenced by, and respond to, their constituencies. Subject to pressures from interest groups, local politicians may resist conservation efforts and/or turn a blind eye towards activities that increase deforestation. Local politicians themselves are often involved in agribusiness or logging, contributing to policies and practices that encourage unsustainable forest use. Using a rich panel dataset that combines municipal-level deforestation and election data, I test the following research questions:

- Does deforestation increase when an incumbent runs for re-election?
- Do deforestation rates increase or decrease during an incumbent's second term?

I implement a fixed-effects model to estimate the effect of an incumbent mayor (either pre-election or in second term) using only variations in deforestation within his/her municipality while controlling for general fluctuations in deforestation rates over time. Preliminary results provide evidence that municipalities where incumbents running for re-election have significantly higher deforestation in the year following elections and second-term mayors deforest more than first & single term mayors. Additional sources of heterogeneity among mayors, such as occupation and political party ideology, are also considered.

CLIMATE CHANGE

Lurie Conference Room, Higgins University Center

4:15 Technology Substitution and the Spatial Transfer of Environmental Effects

Presenter: Yifan Cai
Department: Geography
Adviser: Yuko Aoyama

Abstract: Technology innovations that improve energy efficiency might, however, result in the increase in the total energy consumption. This study examines the rebound effects of technological substitution in the display industry with the application of LCA (life-cycle assessment) methodology. The result proves that there are significant rebound effects in the PM2.5 and carbon emission. This study further analyzes the redistribution of environmental hazards after the technological substitution, focusing on the change of amount and ratio that China has taken. The result reveals that the manufacturing process of higher intensity of pollution and energy has been transferred to China, which contributes to the consumption process of lower carbon footprint and higher sustainability in developed areas. This papers further discusses the increasing geographical imbalances of the distribution of environment hazards in the context of environmental justice.

4:30 Establishing Mosquitoes as Vectors of Amphibian Pathogens.

Presenter: Mandy Gaudreau
Co-Author(s): Todd Livdahl
Department: Biology
Adviser: Todd Livdahl

Abstract: Pathogens are a leading cause of amphibian population decline and extinction. Amphibians commonly found in New England have tested positive for the chytrid fungus, Ranavirus, and trypanosomes in the past. Evidence suggests that frog-biting mosquitoes may be vectors of these pathogens. Environmental factors have shown to increase virulence of pathogens and range of vectors, making the geographical distribution important to know in light of climate change. This initial investigation was conducted to establish the spatial distribution of amphibian disease across central Massachusetts so subsequent field seasons could be spent investigating the suitability of mosquitoes as vectors of amphibian pathogens. Skin swabs, toe clips, and blood samples were taken from bullfrogs (*Lithobates catesbeianus*), green frogs (*Lithobates clamitans*), pickerel frogs (*Lithobates palustris*), and gray tree frogs (*Hyla versicolor*) from 10 field sites. Seventy percent of sites tested positive for at least one pathogen. We also investigated whether environmental factors were correlated with the distribution of pathogens. Future directions of this study include testing adult mosquitoes for amphibian pathogens at established field sites, a laboratory study to confirm the results of the field study, and creating species distribution landscape models to project disease and vector range expansion/shifts in varying global environmental change scenarios.

4:45 A Hostile Takeover of Nature? Placing Value in Conservation Finance

Presenter: Kelly Kay
Department: Geography
Adviser: James McCarthy

Abstract: Conservation finance is an emerging field which aims to “deliver maximum conservation impacts while, at the same time, generating returns for investors” (Huwyler et al. 2014a). Driven partially by the tremendous growth in so-called impact investing, big players like JP Chase Morgan, Goldman Sachs, and Credit Suisse are collaborating with land trusts and other non-profit environmental groups in hopes of finding ways of making conservation pay; eventually aspiring to scale up existing projects and to produce conservation as a standardized and recognizable asset class of its own. Much of the necessary groundwork for testing the viability of conservation finance programs is happening within vast and resource-rich landscapes of the United States. In this paper, I aim to explain how conservation finance is produced as an asset class and how that asset comes to circulate as a financial product. Drawing from a Marxian understanding of finance as fundamentally redistributive, rather than productive, I ask: how is conservation finance producing value, and in turn, shareholder returns? This paper looks at the Northern Forests of Maine and ranching lands in Colorado as two illustrative cases, and draws upon semi-structured interviews conducted with conservation-minded timber investment management organizations, farm and ranch land investors, restoration ecologists, land trusts, and conservation financiers.

CITIES

Rosenblatt Conference Room, Higgins University Center

4:15 City Walls and Path Dependence: Evidence from Chinese Prefecture Cities

Presenter: Rui Du
Department: Economics Department
Adviser: Junfu Zhang

Abstract: This study attempts to examine the persistence of prefecture-level economic activity in China using historical city wall data. Even though the original commercial or military advantages of walled cities have become obsolete, our study documents their continuing importance in modern china. Ancient city walls have been playing a role in sustaining the economic growth and city size, which can be interpreted as path dependence (Bleakley and Lin, 2012). This paper shows that path dependence is empirically relevant for city growth in walled cities.

4:30 Did community-based greening reduce crime in New Haven, CT. from 1996 – 2007?

Presenter: Dexter Locke
Co-Author(s): Colleen Murphy-Dunning, Michelle C. Kondo, SeungHoon Han and Molly Cox
Department: Geography
Adviser: Colin Polsky

Abstract: Many volunteers and supporters of the Community Greenspace program at the Urban Resources Initiative in New Haven Connecticut program believe that there is a potential reduction in crime from community greening activities, even though it is not an explicit goal of the of the program. For some volunteers neighborhood safety is a primary reason for becoming involved in community greening. We used a Difference-in-Differences approach to test whether more than a decade of tree planting had an effect on crime levels at planting sites (n=300) compared to control sites that received no trees (n=893). The spatial unit of analysis is the block face - an individual street segment that includes the adjacent properties. Violent, property, vandalism, prostitution, and narcotics crimes were all examined individually and jointly to test for crime-type specific effects from 1996 through 2007. Findings will indicate whether or not community members' visible investments in green infrastructure provide the co-benefit of crime reduction, which may have policy implications.

4:45 Racial and Socioeconomic Equity in Urban Park Access: A Geostatistical Analysis of Philadelphia

Presenter: Tim St. Onge
Department: International Development, Community, and Environment
Adviser: Sam Ratick

Abstract: Environmental justice research suggests that urban neighborhoods in the United States of low-income and ethnic minority populations may have fewer options and more limited access to public parks and recreational spaces than wealthier, more racially white areas. As parks have been tied to improved physical and mental health outcomes for nearby residents, income- or race-based inequality to this resource should be a serious concern for urban and public health officials. This study aims to test the concept of unequal park access and measure relationships among racial and socioeconomic variables using Geographic Information Science (GIS) and geostatistical techniques. I applied multivariate regressions, cluster analysis, and multivariate Local Indicators of Spatial Association (LISA) to Census and park access data for Philadelphia. These methods aimed to explore potential correlations at both city-wide and more localized scales. The resulting statistical and spatial outputs of the analyses detail conditions of park access in Philadelphia and inform discussions of urban park accessibility more broadly.

IDENTITY

Lurie Conference Room, Higgins University Center

5:15 Impact of Emerging Adults on Parents' Perceived Future Support

Presenter: Achu Johnson Alexander

Department: Psychology

Adviser: Jeffrey Jensen Arnett

Abstract: The prolonged, complex transition into adulthood of emerging adults (EA; ages 18-29) cannot be successful without the support of parents. During this period, parents are also synonymously entering midlife development. As parents re-assess life choices, they are involved with their EA in a qualitatively different way. Based on Clark University Poll on Parents of Emerging Adults (2013), a survey was used to interview 1,006 adults (parents of at least one child between ages 18-29) on how EA and related factors affect parents' perception of future support (when in need) from their child. The two hypotheses were (1) relationship between parents' worry about their EA's progress and parents' expectation of future support from EA mediated by parent-EA relationship, (2) relationship between parent-EA relationship and future support mediated by parents' level of positive perceptions about EA staying home. Results indicate that (1) although the relationship did not fully predict the link between parents' worry and future support, approximately 79% of the effect of worry on future support was mediated by parent-EA relationship, (2) although positive perception partially explained the link between relationship and support, approximately 37% of the effect of parent-EA relationship on future support was mediated through positive perception of EA staying home.

5:30 The Power of Exposure in Contemporary Passing Narratives

Presenter: Ashley Barry

Department: English

Adviser: Professor Esther Jones

Abstract: In narratives containing a tragic mulatto figure, the plot often hinges upon the character's inevitable exposure and demise. The conditions surrounding the inescapable exposure vary among narratives, but the person or circumstances responsible are generally not clearly discernible. For example, many critics have argued that in Nella Larsen's *Passing*, Clare's husband Tom is the one who reveals the "true" racial identity of his light skinned African American wife and causes her tragic death. Tom storms into a party filled with African Americans to confirm his suspicions regarding Clare's race by her presence there; Clare immediately falls to her death through an open window. However, it is Clare's friend Irene who surreptitiously exposes Clare's race to her husband and sets in motion the events that lead to Clare's fall, which Irene may or may not have directly caused by pushing her. In my master's thesis, I will explore contemporary narratives concerning African American characters who pass as white and examine the nature of those characters' exposure; specifically, who wields the power to expose and what this role reveals about the nature of constructed racial categories. For this conference, I will present the material that will lay the foundation for my thesis.

5:45 Learning Her Place: The Importance of Identity Formation and Self-Discovery in Educational Spaces

Presenter: Lindsay Hildebrandt

Department: International Development, Community, and Environment

Adviser: Cynthia Caron

Abstract: More often than not, students are asked to leave their previous conceptions of the world behind when they enter a school setting. This stripping of individual experience can be extremely harmful to students' well-being, their self-esteem, and their ability to learn at all. It is only when alternative ways of knowing are considered that learners are able to discover and become their true selves, create authentic learning communities, and participate in a process of self-actualization. Based on information gathered through qualitative observations and in-depth interviews with participants and alumnae (ages 12-84) in a single-gender, wilderness adventure program that claims to do this very thing. This program, Camp Arbutus Hayo-Went-Ha (AHWH), exemplifies these concepts through its emphases on discovering and living "who you are", building genuine, long-lasting relationships with others, and removing pressures from the "outside world" through the limiting of technology and social media. In doing so, they provide a space for young women to connect, grow, and learn in a unique, but necessary, way.

6:00 Religious and Spiritual Identity Development in Emerging Adulthood: A Retrospective

Presenter: Justin Laplante
Department: Psychology
Adviser: James Cordova

Abstract: Emerging Adulthood is a time of increased engagement with questions of various identities, including religious and spiritual identities. The current paper investigates the ways in which religious and spiritual identity develop into emerging adulthood: what are the important current aspects of religious or spiritual identity? What are the important influences that led to these identities? How do emerging adults see their identities progressing into the future? The current study utilizes a grounded theory approach to analyze semi-structured interviews conducted with fifty self-identified religious and spiritual-but-not-religious emerging adults, with an emphasis on the development of these identities. Results indicate a similar progression for both religious and spiritual participants, with religion seen as something external which undergoes a gradual maturing as the individual grows and comes to hold different relationships with the religious tradition of their childhood. This maturing can either result in a deepening of the faith of origin, as is the case in religious participants, or a turning towards a wider conception of the Divine, as is the case in spiritual participants. Other developmental themes are also analyzed. Implications for those working with emerging adults are highlighted, particularly those interested in the religious or spiritual worlds of emerging adults.

INVISIBLE

Rosenblatt Conference Room, Higgins University Center

5:15 In Silico Evolution of Oscillatory Dynamics in Biochemical Networks

Presenter: MD Zulfikar Ali
Department: Physics
Adviser: Ranjan Mukhopadhyay

Abstract: We are studying in silico evolution of complex, oscillatory network proteins, kinase (activator) and phosphatase (inhibitor). In our model. Each protein can either be phosphorylated (active) or unphosphorylated (inactive), represented by binary strings. Active proteins can modify their target based on the Michaelis-Menten kinetics of chemical equation. Reaction rate constants are directly related to sequence dependent protein-protein interaction energies. This model can be studied for non-trivial behavior e.g. oscillations, chaos, multiple stable states. We focus here on biochemical oscillators; some questions we will address within our framework include how the oscillatory dynamics depends on number of protein species, connectivity of the network, whether evolution can readily converge on a stable oscillator if we start with random initial parameters, neutral evolution with additional protein components and general questions of robustness and evolvability.

5:30 Erosion of Granular Bed by Fluid Flow

Presenter: Benjamin Allen
Department: Physics
Adviser: Arshad Kudrolli

Abstract: We discuss experiments investigating the evolution of a granular bed packing and the entrainment of the grains by a fluid flow as a function of shear rate at the fluid-bed interface. This is a model system to investigate a variety of examples where such a situation arises including wind blowing over sand, sediment transport in rivers, tidal flows interacting with beaches, flows in slurry pipelines and mixing tanks with sediments, mud cake formation in bore holes and sand proppants in hydraulic fracturing. In order to examine the onset and entrainment of the granular bed under steady state conditions, we have constructed a novel conical rheometer system which allows a variable amount of shear to be applied to the granular bed. The grain-fluid system is index matched so that we can visualize the grains away from the sides as well as visualize the fluid flow above and below the interface by using fluorescent tracer particles. We demonstrate that the onset of erosion arises as particles rotate out of their stable position highlighting the importance of torque balance to onset. We find significant armoring of the bed, as the bed is sheared over significant periods of time by the fluid flow. Above onset, at least three distinct regions of bed mobility can be found. We will discuss the measured integrated granular flux as a function of shear rate and compare them with empirical laws found in the geophysical literature.

5:45 Buckling Dynamics of an Elastic Filament In A Viscous Fluid

Presenter: Moumita Dasgupta
Department: Physics
Adviser: Arshad Kudrolli

Abstract: We discuss an experimental investigation of the buckling dynamics of an elastic filament in a viscous fluid under uniaxial compression in a regime where elastic forces and viscous dissipation are dominant over inertia. The buckling of an elastic filament in a viscous medium is commonly observed in soft matter and biological systems such as unflagellated bacteria during locomotion and microtubules in intracellular media which can exhibit transient buckling modes of short wavelength. The experimental system consists of a soft elastic filament with clamped boundary condition immersed in a Newtonian viscous fluid. One end of the filament is moved over a prescribed distance at a given speed and, then, held stationary. Upon compression, the filament exhibits a buckling pattern characterized by a wavelength decreasing with speed and amplitude decaying from the moving end. Further, over long times, the pattern relaxes towards the fundamental Euler buckling mode with a characteristic time that depends on the viscosity. Focusing on the short time dynamics, we measure the shapes of filament as well as the fluid flow, in response to the compression, using PIV and high-speed imaging. We thus estimate and discuss the relative viscous and elastic stresses experienced by the filament during the growth of the various modes as a function of the compression speed.

6:00 Does Menthol Impact Nicotine Addiction? Effects in an Adolescent Rat Model

Presenter: Matthew Thompson
Department: Biology
Adviser: Neva Meyer; Jean King

Abstract: Contrary to prior reports that menthol serves only as a flavor additive in nicotine products, recent studies on menthol indicate that it may have an effect on nicotinic acetylcholine receptor function in the brain to impact nicotine dependence and metabolism. Furthermore, there is a disparity in menthol cigarette sales in that it disproportionately affects adolescents. We conducted a study in adolescent Sprague Dawley rats to determine the effects of menthol on behavior and brain connectivity during this critical developmental stage. Psychomotor sensitization was tested in an open-field arena with a range of menthol doses and nicotine. Awake animals were imaged in the fMRI scanner before and after drug administration. Results indicate that menthol may have an effect on nicotine dependence, particularly within vulnerable groups. Furthermore, data indicate that menthol administration with nicotine results in negative connectivity between reward circuitry in the brain.

POSTER PRESENTATIONS

3:15 - 4:15 p.m. Tilton Hall, Higgins University Center

Posters will be set up following the lunch and will remain hanging until the reception.

BIOLOGY

1. Electroporation-Mediated Transfection of the Marine Diatom *Thalassiosira pseudonana*

Presenter: Joshua Bugge

Adviser: Deb Robertson

Abstract: This work describes the development of a highly efficient nuclear transformation method for the marine diatom *Thalassiosira pseudonana* using electroporation. Cell mortality was shown to increase as electric field strength increased from 1.25 - 5.0kV/cm. Early experiments demonstrate that *T. pseudonana* can integrate the transgene *Tpfcg/nat*, coding the resistance to the antibiotic nourseothricin, at an efficiency of 342.9 per 10^8 cells when pulsed with 3.75kV/cm and provided with 17 μ g linearized plasmid DNA per 100 μ l. Conditions for electric field strength and plasmid DNA concentration are currently being optimized. The addition of carrier DNA as well as the results of removing excess DNA from flanking regions of the complete *fcg/nat* transgene was also examined as part of this ongoing work.

2. Reevaluation of Segmentation in Sipuncula Through In-Depth Analyses of Neural Development in *Themiste lageniformis*

Presenters: Allan Carrillo-Baltodano, Michael Boyle, Mary Rice, Néva Meyer

Adviser: Néva Meyer

Abstract: Unsegmented sipunculans are recently placed within segmented annelids, providing a unique opportunity to study the evolutionary loss or gain of segmentation. During development of segmented taxa, different tissues and organ systems are subdivided into repeating subunits relative to one another. Within annelids, this can be seen during ventral nerve cord (VNC) formation. VNC development in sipunculans has not been well-studied, and reports range from no evidence to vestigial segmentation based on a few pairs of serially-iterated neurons. We performed a comparative analysis of neural development in the sipunculan *Themiste lageniformis* and the segmented annelid *Capitella teleta* using in situ hybridization and immunohistochemistry. We hypothesize that sipunculans do not show signs of segmentation during development. Homologs of *C. teleta* (*Cte*) and *T. lageniformis* (*Tla*) *synaptotagmin1*, a pan-neuronal marker, are expressed throughout the brain and VNC. *Cte-syt1* expression in the VNC is clearly segmented, while *Tla-syt1* expression is not. Within the VNC of *T. lageniformis*, neuronal sub-type markers (serotonin and FMRF) are expressed in three clusters of neurons, but these do not appear to be strictly spatially restricted relative to other tissues, as is seen in *C. teleta*. In summary, *T. lageniformis* has some serially-iterated neurons within an unsegmented VNC.

3. Evolution of the Maternal Stress Response in Stickleback and Implications for Offspring

Presenters: Melissa Graham, Briana Cooney, Ryan Earley, John Baker, Susan Foster

Adviser: Susan Foster

Abstract: The stress response system connects developing young and maternal environment, where protracted maternal stress can positively or negatively influence development of offspring, likely via hormones. Here maternal circulating and egg cortisol concentrations were measured after exposure of females to a stressor in two independently-derived freshwater populations of threespine stickleback. These populations have been exposed to divergent social environments (presence or absence of group cannibalism on offspring guarded by males) for ~12,000 yr. In cannibalistic populations, courtship duration is extended due to disruption by nearby groups, forcing females to retain eggs for protracted periods. In this study, females were assigned to short (<6hr) or prolonged (24hr) post-ovulatory egg retention treatments to mimic the consequences of absence or presence of cannibalistic groups. A significant difference in egg cortisol concentration was seen between populations, while treatment did not have an effect. In order to determine developmental effects of egg cortisol concentration, offspring growth rate, baseline cortisol, and stress responsive cortisol were compared to clutch concentrations. Future work

will evaluate degree of parallelism in additional replicate populations.

4. Coordinated Post-transcriptional Regulation of Nitrogen Assimilation in Marine Diatoms

Presenters: Minoli Perera, Sohini Ghoshroy, Deborah Robertson
Adviser: Deborah Robertson

Abstract: Nitrogen (N) availability in marine ecosystems varies over several spatial and temporal scales. We propose that coordinated post-transcriptional regulation of N assimilatory enzymes in phytoplankton plays an important role in facilitating rapid responses to fluctuations in N source and supply. Previous studies demonstrated that nitrate reductase expression in diatoms was regulated both transcriptionally and post-transcriptionally. However, whether other N assimilating enzymes are regulated by similar mechanisms is unknown. To explore whether additional key N assimilating enzymes are coordinately, post-transcriptionally regulated, relative transcript and protein abundances of key N assimilating enzymes were compared in replicate nitrate-replete (+N) and -deplete (-N) cultures of the model species *Thalassiosira pseudonana*. Enzymes involved in primary nitrate assimilation were down-regulated in the -N treatment, whereas enzymes involved in secondary assimilation remained unchanged or were up-regulated. However, transcript abundances were similar in both +N and -N treatments. These results indicate an uncoupling of transcription and translation during periods of N-stress, suggesting that transcripts of key nitrate assimilating enzymes are co-regulated at the post-transcriptional level, mediating the rapid response to N fluctuations. Investigation is currently underway to elucidate the underlying mechanisms of post-transcriptional regulation in these highly productive photoautotrophs.

COLLEGE OF PROFESSIONAL AND CONTINUING EDUCATION

5. Cybersecurity Risk Management for Public Libraries: Weapons of Mass Instruction

Presenters: Christopher Markman, Alexander Caro
Adviser: Robert Lyons

Abstract: Modern library systems are unique public institutions in terms of their physical information technology infrastructure (databases/servers, computer labs, public wifi), mission statement (intellectual freedom, data privacy) and codes of ethics. This combination of goals, as demonstrated by the 2001 USA PATRIOT Act and more recent information regarding widespread government surveillance of Internet traffic, create a unique set of cybersecurity risks for libraries who attempt to confidentially provide access to information for their patrons. Moreover, the widespread use of single-factor authentication and increasing budget cuts to libraries have all the markers of a “perfect storm” scenario for cyber criminals. Our capstone project aims to address these issues. It is by no means comprehensive, but our research indicates many library systems would benefit from a variety of cybersecurity risk management programs and education initiatives.

ECONOMICS

6. City Walls and Path Dependence: Evidence from Chinese Prefecture Cities

Presenter: Rui Du
Adviser: Junfu Zhang

Abstract: This study attempts to examine the persistence of prefecture-level economic activity in China using historical city wall data. Even though the original commercial or military advantages of walled cities have become obsolete, our study documents their continuing importance in modern china. Ancient city walls have been playing a role in sustaining the economic growth and city size, which can be interpreted as path dependence (Bleakley and Lin, 2012). This paper shows that path dependence is empirically relevant for city growth in walled cities.

GEOGRAPHY

7. Mapping Land and Surface Temperature Variability Across the Urban-Forest Gradient in Worcester Mass. using In Situ and Lndstat-8 TIRS Satellite Data

Presenters: Michelle Andrews, John Rogan, Deborah Martin
Adviser: John Rogan

Abstract: Thermal imagery of urban areas is used to observe temperature variability due to land cover heterogeneity\ change, monitor urban heat waves and measure urban heat island intensity. Despite widespread applicability of thermal imagery, many studies lack validation with in situ data. Unlike validation of remote sensing in the visible or infrared portions of the electromagnetic spectrum, land surface temperature validation is difficult due to the dynamic nature of temperature. The objective of this study is to determine how well Landsat-8 TIRS captures fine scale temperature variation by using in situ temperature sensor network in Worcester, Massachusetts. Housing density, number of houses, site ground cover, height of site features and mean elevation and slope within the site area are used to understand the differences in accuracy among sensor locations. Twelve iButton sensors were placed throughout the city of Worcester in locations that represent the three dominant land cover types: dense urban, residential, and woodlot/park. Land surface temperatures were measured at the twelve sites from 13 June 2013 to 28 October 2014. Thirty Landsat- 8 TIRS thermal images (30 m) from the same time period were used to compare the temperature collected at sensor locations with the LST measured by the satellite.

8. GIS Analyses of Health Care Accessibility in Southeastern MA

Presenter: Anastassios Dardas
Adviser: John Rogan

Abstract: This research examines the potential accessibility of health care services, specifically acute care hospital and primary care physician locations, and spatial variations of socioeconomic variables in Southeastern Massachusetts. Health care potential accessibility measures the characteristics of its delivery system and identifies populations at risk in developing chronic conditions. Network analyst and the two step floating catchment area method were used to develop accessibility scores for each census block in Southeastern Massachusetts. Hot-spot cluster analysis was used to identify the spatial variations of socioeconomic variables, such as median household income and disability status of seniors. The results may be used to inform and provide a visual insight for state policy makers and health care providers in making positive and effective health care decisions for the general population.

GRADUATE SCHOOL OF MANAGEMENT/

INTERNATIONAL DEVELOPMENT, COMMUNITY, AND ENVIRONMENT

9. A Business Baking Benevolence: Starting a Mission Driven Commercial Bakery in Worcester, MA

Presenter: Sam Bryson-Brockmann
Advisers: Ramón Borges-Méndez, Donna Gallo

Abstract: This report is dedicated to determining the best possible business and marketing structure for starting a commercial bakery located in central Massachusetts. The bakery will provide a diverse range of high quality breads at competitive prices to restaurants, groceries, and institutions across the Central Massachusetts region. In turn the bakery's social mission is to provide stable employment to at risk young people, ages 16-35, to reduce the crime rate, the rate of recidivism, and promote future workforce development in Worcester, Massachusetts. The research exhibited will demonstrate the need for sustainable low skill job growth in central Massachusetts. This paper explores successful bakery business models which have achieved fiscal fortitude, stability and revenue growth, as well as challenged social ills. Then, using local market research, partnerships with local community networks, and strong financial modeling, this paper seeks to present a satisfyingly marketable business plan.

10. The Business and Environmental Case for Energy Management at Vassar College

Presenter: Ryan Collins

Advisers: Jennie C. Stephens, Donna Gallo

Abstract: The primary cause of anthropogenic climate change is the release of global warming greenhouse gases (GHGs) from the combustion of fossil fuels for energy. Global warming is predicted to have significant detrimental impacts on both the environment and economy, and major sources of GHG emissions are buildings across all sectors - residential, commercial, and industrial. Rising energy costs over time further emphasize the need to better manage building energy consumption. This project presents the role building energy management can play to reduce GHG emissions, while enhancing an organization's financial solvency. Relevant energy consumption trends and energy management considerations offer context for presentation of the state of energy management at Vassar College. Located in Poughkeepsie, New York, Vassar enrolls 2,400 students and utilizes over 70 buildings for its operational needs. Opportunities for Vassar to improve energy management practices, decrease GHG emissions by 715 metric tons and capture energy-cost savings of over \$175,000 annually are presented. Cost-savings analyses were completed on behalf of the Environmental Defense Fund Climate Corps and in collaboration with members of Vassar College's Campus Committee on Sustainability.

11. Envisioning a Rural Sustainable Community

Presenters: Stefanie Covino, Geory Kurtzhals, Robin Miller, Ruby Woodside

Adviser: Halina Brown

Abstract: While much of the discourse on creating sustainable communities in the United States focuses on the needs of urban and suburban communities, rural areas should not be ignored. Rural areas constitute 72% of the land in the US and are home to over 50 million people. This paper discusses the major components of an ideal rural sustainable community including its educational structure, agricultural base, housing options, waste management systems, transportation, leisure options, tourism, and alternative currency. Each section reviews the current and ideal situations as well as the role of technology, how to reduce the throughput into the production/consumption system, how to change social practice, what steps are required to get to the ideal, and identifies major change agents. Throughout the paper are highlights on how a rural sustainable lifestyle will lead to greater human and environmental wellbeing.

12. Punctuated Equilibrium & the Future of the U.S. Electric Utility Industry

Presenter: Peter Frongillo

Advisers: Donna Gallo, Jennie C. Stephens

Abstract: The phenomenon of punctuated equilibrium accurately describes how whole industries evolve through prolonged periods of stability, punctuated by relatively rapid infusions of fundamental change. The U.S. electric utilities industry is undergoing this precise kind of rapid and fundamental shift. In order to remain competitive in the new business environment, electric utilities of the 21st century must strategically respond to the opportunities and threats posed by climate change, carbon costs, volatile fuel prices, federal power plant regulations, emerging clean technologies, growing energy efficiency programs, expanding customer expectations, and competing third party energy providers, among other forces. This paper identifies and analyses the driving agents of change within the electric utilities industry, and ultimately suggests what utilities can do to be profitable in this new environment and best position themselves strategically to take advantage of emerging business opportunities.

13. Findings from Conversations with Water Systems: How Serious is Drought Risk in the Arid Southwestern United States?

Presenters: Robin Miller, Julie Delongchamp, Nate Cleveland

Adviser: Rob Fernandez

Abstract: Current drought conditions pose a serious environmental risk for a number of local governments across the United States. Breckinridge Capital Advisers, a Boston-based fixed income asset manager, recognizes that utilities and cities proactively engage in projects to maintain resilience in the face of this challenge, many of which use municipal bonds to finance these projects. In order to explore the potential effects of drought on the credit risk of its bond holdings, Breckinridge targeted key holdings in seven states within drought stressed regions of the United States based on the U.S. Drought Monitor Index. Summer research interns engaged in conversations with twenty-five water utilities, wholesale suppliers and policy boards to explore premise that water utilities in drought stressed regions carry greater inherent risk and to learn about the

proactive management of limited water supplies. The findings revealed that utilities constantly work to solidify water rights agreements, adopt appropriate rate structures, and encourage water conservation. The engagement also showed that greater water supply diversity, standardized drought contingency plans, state regulation and subsequent regional collaboration, and proper capital planning can lead to greater resilience in the face of drought, and thus, allow municipalities to carry lower risk of defaulting on bond obligations.

INTERNATIONAL DEVELOPMENT, COMMUNITY, AND ENVIRONMENT

14. A Critical Analysis of Environmental Impact Assessment: Practice, Challenges, and Opportunities for Sustainable Hydropower Development in Nepal

Presenter: Devi Adhikari
Adviser: Timothy Downs

Abstract: Environmental Impact Assessment (EIA) came into force in Nepal with the promulgation of the Environment Protection Act 1996 and Environment Protection Rules 1997. EIA is being practiced extensively in the hydropower sector more than any other development sector in Nepal. However, most EIA work rarely meets the objectives of being a project planning tool to contribute to achieving sustainable hydropower development. Despite a sound legal basis and comprehensive EIA guidelines, evidence suggests that EIA has not yet evolved satisfactorily for sustainable hydropower development in Nepal. The main systemic challenges associated with the current EIA practice for hydropower development projects are: quality EIA report preparation; financial limitations; use of appropriate technology for baseline data collection and impact prediction; engaging public participation; the report approval process; institutional mechanism and coordination; local demand; and good governance. However, EIA process in Nepal has generated some important opportunities: facilitating decision making processes; creating environmental awareness and employment; creating sense of ownership in hydro project; resource benefit and allocation; and watershed management plans. The specific objective of this paper is to review the available EIA related literature on hydropower sectors in Nepal and explore its associated practice, challenges and opportunities. These challenges and opportunities have been identified in this research using a literature review of journals and project reports. Similarly, findings of the research are also based on the professor's feedback and author's own experience in EIA study for hydropower projects in Nepal.

15. Pollution Profile of a Waste Transfer Station: Are Pollutants from the Facility Contaminating Local Groundwater?

Presenter: Bilin Basu
Adviser: Timothy Downs

16. Changes in the Extent of Baffin Island's Penny Ice Cap in Response to Regional Warming, 1985-2010

Presenters: Heather Cormier, Mary Cox, Alex Gardner
Adviser: Alex Gardner

Abstract: Glaciers are retreating globally in response to warmer atmospheric temperatures, adding large volumes of melt water to the world's oceans. The largest glacierized region and present-day contributor to sea level rise outside of the massive ice sheets is the Canadian Arctic. Recent work has shown that the glaciers of the southern Canadian Arctic (Baffin and Bylot Island) have experienced accelerated rates of ice loss in recent decades, but little is known regarding the spatial and temporal variations in rates of loss. For this study we examine in detail changes in the extent of the Penny Ice Cap (a proxy for ice loss) between 1985 and 2010 to better understand the climatic drivers of the recently observed accelerated rates of ice loss on Baffin Island. To do this, we reconstruct the extent of the ice cap for the years 1985, 1995, and 2010 from Landsat 5 TM imagery. We use 2009 SPOT HRS imagery and a novel extent comparison algorithm to assess the accuracy of glacier extents derived from Landsat imagery. Regional temperature and precipitation records were used to explain the spatial pattern of change. Due to large variation in elevations, hypsometry was also investigated as a contributor to differences in rates of change across the ice cap. Preliminary results show overall retreat throughout the ice cap but with regional differences in area and length change on either side of the Ice Cap divide.

17. Pollution Profiling of an Abandoned Chemical Distribution and Mixing Facility

Presenter: Stefanie Covino
Adviser: Timothy Downs

18. Landscape Assessment of White-Lipped Peccary and King Vulture Habitat in the Calakmul Biosphere Reserve in the Southern Yucatán Peninsula, Mexico

Presenters: Mary Cox, Heather Cormier, Marissa Gallant, Sophie Calmé, John Rogan
Adviser: John Rogan

Abstract: Effective landscape planning for highly mobile endangered species, with vast habitat ranges facing multiple climate-anthropogenic threats, is especially challenging across intra- and inter-national borders. This paper presents a case study of a novel multi-scale approach to assess and monitor habitat viability of threatened/endangered species over large geographic expanses and various political jurisdictions. The approach uses presence-only species data, climate and forest phenology information, and expert counsel to determine the potential distribution of wide-ranging species. By combining Mahalanobis Typicality species distribution modeling with a dynamic patch-corridor model, using Idrisi Land Change Modeler, this study determines the potential optimal landscape structure required to support viable populations. The Calakmul Biosphere Reserve (CBR) is a 7,238 km² expanse of protected tropical forest located within the Southern Yucatán Peninsula, Mexico, serving as vital habitat for many species, including the white-lipped peccary (*Tayassu pecari*) and the king vulture (*Sarcoramphus papa*). The effectiveness of the CBR in conserving suitable habitat for these 'ecosystem engineers' is compromised due to increasing human population density, encroaching agriculture, poaching, and a hotter/drier climate. Results indicate that while the CBR effectively protects significant primary habitat, within twenty years of land change, 30% of primary habitat remains vulnerable to loss inside the CBR, while 35% of unprotected primary habitat falls outside it. Patch-model results indicate the optimal locations of patches of primary habitat and corridor areas in and around the CBR. This approach is applied to the entire potential range of the peccary and vulture within Central America, and preliminary results are provided.

19. Agricultural Exposures and Risk of Type 2 Diabetes in Nicaragua: A Case-Control Study

Presenter: Nicole Daniels
Advisers: Barbara Goldoftas, Sam Ratick

Abstract: The prevalence of type 2 diabetes is rising worldwide. Laboratory studies show that exposures to agricultural inputs have been associated with type 2 diabetes. This case-control study examines the association between type 2 diabetes and agricultural exposures in rural Nicaragua. This study sample consists of 111 cases and 121 controls in Estelí, Nicaragua. Five different exposures were considered: fertilizers, herbicides, fungicides, insecticides, and pesticides overall. Logistic regressions examined adjusted associations between the exposures and type 2 diabetes. Results of the research indicate exposure to fertilizers showed a statistically significant association with type 2 diabetes (OR=2.388, 95% CI= 1.030, 5.536, p-value=0.042). Associations with pesticide exposures were elevated, but not statistically significant. Conclusions— Building on laboratory findings linking nitrosamine with type 2 diabetes, this study shows associations between agricultural exposures and type 2 diabetes, offering epidemiologic evidence that exposure to fertilizers may increase the risk of type 2 diabetes.

20. Characterizing Ecosystem Services from Department of Conservation and Recreation Replanting Program in Central Massachusetts, USA

Presenters: Matthew Gibb, Tong Jiao
Adviser: John Rogan

Abstract: Trees are an important component of the urban landscape which provide numerous ecosystem services such as surface temperature regulation, surface runoff reduction, air quality maintenance and reduction in carbon dioxide emission from household energy use. In Worcester County, USA as a result of the invasion of Asian Longhorned Beetle (ALB), approximately 32,000 trees have been removed to eradicate the invasive insect. To help reestablish local tree cover, the Massachusetts Department of Conservation and Recreation (DCR) started a tree replanting program in 2009, which has planted over 18,000 trees, to date. While new ecosystem services provided by these planted trees are a major motivation of the DCR program, there has been little research conducted to quantify their present value. This project quantifies ecosystem services of the DCR tree cohort and maps service values across the study area. The ecosystem services that this project investigates include pollution removal effects (ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, and particulate matter), energy effects (heating and cooling effects), and reduced surface runoff. The US Forest Service's iTree-eco application designed to model urban forest structure and function is employed to assess the ecosystem services provided by each tree. These ecosystem services are then aggregated to the study area for pattern and process analysis. Our results will allow policy makers to evaluate tree replanting programs in central Massachusetts using eco-monetary values, which in turn will impact future planning for trees in urban landscapes.

21. Energy Poverty and Justice: Using Renewable Energy in Marginalized Countries to Overcome Climate Change and Support Human Development

Presenter: Drema Khraibani

Adviser: Sam Ratick

Abstract: Energy poverty is limited to no access to affordable, reliable, and efficient form of energy. Currently, there are 1.3 billion people living in energy poverty, being deprived of their basic need. Providing access to a billion people has become a global goal and movement for energy justice. With IPCC warning about global fossil fuel consumption, energy development has moved towards renewable options.

Renewable energy provides those previously without access an ability to meet rudimentary needs. It can uplift communities and families from extreme poverty by easing their labor and extending the time they have to work after dark. Renewable energy can empower women by providing them a chance to work and trade. It powers electricity that provides children opportunities to study at night. Renewable energy powers a movement of development when the source is installed in needed locations and with governmental support.

22. A Comparative Analysis on Infant Deaths and Low Birth Weight

Presenter: Sandra Kiplagat

Advisers: Marianne Sarkis, Timothy Downs

23. 'La Ley del Cerro'—Gender, Mining Cooperatives, and Naturalized Exploitation

Presenter: Tobias Lopez Peralta

Advisers: Denise Bebbington, Paul Posner, Jody Emel

Abstract: Mining cooperatives, once relegated to the margins of mining activity in Bolivia are living a moment of ascension. The MAS (Movement towards Socialism) government at first opposed to the expansion of mining cooperative activity, has given the sector broad support on the basis that mining cooperatives fulfill a socio-economic function which in turn aligns with the promoted discourse of *buen vivir*. Based on the field work conducted of mining cooperatives in Cerro Rico Potosí, the paper explores the gendered division of labor and socio-organizational hierarchies of cooperatives. Mining cooperatives employ significant numbers of women, however labor arrangements are highly exploitative with few safeguards in place. Furthermore, women miners are subject to significant abuse and violence. At the same time mining cooperatives instrumentalize the discourse of fulfilling a socio-economic function in order to gain access to mine areas and preferential treatment by the state. Thus, female miners are invisible to the MAS and to the broader society and they are likely no better off than under previous governments.

24. An Oasis of Humanitarian Aid in the Southern Arizona Desert: A Critical Analysis of Actors Working to Mitigate the Deadly Factors of the Undocumented Migration over Arizona's Mexican Border

Presenter: Erika Marchant

Adviser: Ken MacLean

Abstract: Through an analysis of literature, case studies, and GIS tools, I introduce, describe, and analyze what I argue is strong contention in southern Arizona between the US federal government and non-governmental actors over efforts to mitigate the deadly factors of the undocumented migration across the US/Mexico border. One major finding from the GIS spatial and statistical analysis of the 2001-2013 period demonstrated that the percent of deaths related to the environment is going down while the number of people dying each year remains in the same range. Four interpretations of why this is happening have emerged. First, the steady increase in undetermined deaths in the category of "undetermined" is not clearly defined and therefore, many of these deaths may be due to environmental causes. Secondly, the decline in environmental deaths could be because of the higher likelihood of migrants being apprehended due to the increase in Border Patrol agents, and not because of an increased utilization on rescue beacons or other humanitarian resources. Third and most likely, the change in the number of migrant deaths and causes could be a combination of the last two conclusions. The final interpretation of my research shows that no matter why, the deaths caused explicitly by hypothermia, dehydration, and other environmental factors are consistently decreasing. The method of preventing these deaths is inherently irrelevant. It is important to recognize that no matter how it is being done, the Border Patrol is successfully making progress in curbing environmental deaths of migrants crossing through southern Arizona.

25. Tell Your Story: Creating Participatory Culture to Cultivate Personal Narratives and Social Messages for the Local and Global Agora

Presenter: Toma Mengebier

Adviser: Anita Fábos

Abstract: Diane Stone (2008) employs the concept of the Greek marketplace or public square known as the “agora” to embody the new public spaces where global policies occur. Today’s ‘global agora’ embodies “the heart of intellectual life and public discourse” through “a social and political space – generated by globalization – rather than a physical space [...] an electronic or virtual global commons.” (20-21) This public space; where politics, markets, culture and society intermingle; is transnational, highly influenced by its “actors,” the public and their institutions, and as such requires their orderly participation. The global policy agora is where citizens may actively contribute to global policy processes, if they have access and rights to expression within these domains. Consequently, “universities are adapting to their changing environment to provide education and training for young professionals who need the skills and knowledge to traverse global policy processes. [...] Universities, their scholars, and their students are drawn into, and structure, the global agora.” (25) Henry Jenkins et al. (2009) define a ‘participatory culture’ as one that enables artistic expression and civic engagement with a “strong support for creating and sharing creations,” as well as some form of knowledge transaction between more experienced participants and beginners. Furthermore, members of a participatory culture “believe their contributions matter and feel some degree of social connection with one another.” (xi)

26. Resident Advisers React: Autoethnographic Reflections on High-Intensity Situations

Presenter: Brenna Merrill

Adviser: Laurie Ross

Abstract: Resident Advisers (RAs) are paraprofessional peer leaders who are trained to respond to high-intensity incidents. Within this role, I found it difficult to reflect and maintain my own personal wellness after witnessing a particular crisis situation. Thus, the intent of this research has been to learn of and to give voice to the multiple ways in which various RAs respond to sensitive scenarios. Utilizing autoethnography, I incorporate my experience with the perspectives of my coworkers and multidisciplinary literature. Seven current RAs, who had self-identified experiencing such an incident, volunteered to be interviewed. These narratives are embodied in the text in order to establish a dialogue between researcher, participants, and readers. The data reflected here synthesizes the reactions of eight different RAs. Given the qualitative methodology, broad generalizations cannot be made. However, it is evident that we exhibit helpful and inhibiting behaviors as a means to be personally well after professionally engaging in highly emotional experiences.

27. Trilogy of Violence: Religion, Culture and Identity: The Abused Muslim Woman in the Age of Secular Modernity

Presenter: Hasnaa Mokhtar

Adviser: Denise Bebbington

Abstract: The purpose of this research is to explore a new dimension of cultural violence against women in the name of Islam phenomenon by examining the intersection of religion, culture, identity and gender in light of developmental studies. Individuals, communities and even the state use religion, Islam, to justify, legitimize and reinforce cultural practices of patriarchy, including gender-based violence such as child marriage, bride burning, acid attacks, honor killings, marital rape, male guardianship, and unjust divorce and custody laws, to subjugate and discriminate against Muslim women. Development interventions trying to address such problems treat religion as an obstacle to Muslim women’s empowerment, often ignoring the multiple-layers of women’s oppression that state and non-state actors cause whether locally, globally or both combined. Thus, this study outlines several key themes that illustrate the blurred lines between religion, culture and identity, and that although Muslims recognize the severity of violence against Muslim women, they do not associate with secular theories and approaches to addressing the problem. Through the collection and analysis of primary and secondary data, this study hopes to provide a broader understanding of cultural violence against Muslim women within patriarchal systems that use Islam to justify violence against women.

28. Pollution Profiling of an Illegal Landfill

Presenter: Kelsey Shields

Adviser: Timothy Downs

29. Cyanobacteria Monitoring: Water Quality Assessment and Implications for Future Practice 2006-2014

Presenter: Anjana Tamrakar
Adviser: Timothy Downs

30. Species Distribution Modeling of Endemic Bird Species in Hispaniola

Presenters: Alison Thieme, Sean McCartney
Adviser: John Rogan

Abstract: Given the high rate of biodiversity loss across the planet and the limited resources with which to mitigate these losses, the ability to prioritize and allocate funding to concentrations of species richness is very important. Focusing conservation efforts on areas with the greatest concentrations of biodiversity will achieve the maximum impact on conservation efforts (Mittermeier et al, 1998). For our research we will apply methods using Maxent, IDRISI and ArcGIS software to identify hotspots of endemic diversity on the island of Hispaniola. Presence locations of endemic bird species were acquired from the Global Biodiversity Information Facility (GBIF). Species distribution models will be created based on presence locations using Maxent software and IDRISI Selva software. Maxent software is based on the maximum-entropy approach for species habitat modeling and produces a model of the range of the given species (Phillips, 2007). Hotspot analysis will be conducted within ArcGIS software based on the results of our species distribution models.

PSYCHOLOGY

31. Adoptive Parents' Management of their Child's Relationship with their Birth Family Members via Social Media

Presenters: Kaitlin Black, April Moyer, Abbie Goldberg
Adviser: Abbie Goldberg

Abstract: In recent years, advances in technology (e.g. the Internet, social media) have drastically shifted interpersonal communication, changing the face of adoption processes. Given the increased presence of the Internet, adoptive families must prepare for the possibility of birth family contact through technology (Siegel, 2012) in developmentally sensitive ways for their child. The current study explores the following questions: 1) To what extent are adoptive parents sharing information about the birth family obtained via technology (e.g. blogs, social networking sites, Google searches) with their child? 2) To what extent are adoptive parents willing to help their child connect with their birth family via technology in the future? Our analysis was grounded in Erik Erikson's Stages of Psychosocial Development. This qualitative study of 89 individuals within 42 couples (19 lesbian, 11 gay, and 12 heterosexual), who had adopted a child five years earlier (21.3% international, 75.3% public, and 3.4% private domestic adoptions), examined parents' ways of managing their child's relationship with their birth family via technology in developmentally-considered ways. Our findings suggest that parents are actively considering developmentally sensitive ways of managing their child's relationships with birth family members.

32. Adoptive Families' Contact with Birth Families: The Role of Social Media

Presenters: April Moyer, Kaitlin Black
Adviser: Abbie Goldberg

Abstract: Advances in technology have dramatically shifted interpersonal communication and have changed the face of adoption. Indeed, it is possible adoptive families perceive both advantages and challenges associated with increased ability to access information about birth family members. Using thematic analysis, data from semi-structured interviews with 39 couples (15 lesbian, 11 gay male, and 13 heterosexual) were analyzed. Technology had played a key role in contact between birth family members and adoptive family members, particularly through social networking sites such as Facebook, with mixed results. Some families considered using technology to contact birth families and others expressed hesitation. For example, a mother shared, "So I'm not too worried about that [contact via Facebook]...we would love to hear from her [birth mom]." On the other hand, the notion of "boundaries" was commonly discussed by many families and it was clear that technology was a stressor. Furthermore, some parents disagreed with their partners regarding the possibility to use technology for outreach to birth families. One parent stated, "If it weren't for him [my partner], I probably would have lunged forward by now." Our findings suggest many adoptive families acknowledge advantages of connecting to birth families via technology.