

# **Spatial Structures in the Social Sciences 2014 Winter GIS Institute**

## **Final Presentation Program**

January 17, 2014 Population Studies and Training Center, Seminar Room

<b>9:30–9:45 am</b>	<b>Welcome</b>
<b>9:45–11:15 am</b>	<b>Session I:</b> Health, Ecology, and Environment
<b>11:15 am–12:15 pm</b>	<b>Session II:</b> GIS and Education & Development
<b>12:15–1:15 pm</b>	<b>Lunch</b>
<b>1:15–2:45 pm</b>	<b>Session III:</b> GIS and Spatial Analysis in the Social Sciences
<b>2:45–4:00 pm</b>	<b>Session IV:</b> GIS Applications in Economics
<b>4:00–4:15 pm</b>	Certificate Presentation
<b>4:15 pm</b>	Close of Conference

## PARTICIPANTS

**Jennifer Bouek** (Sociology)

**Greg Boyer** (Center for Gerontology and Healthcare Research)

**Greg Casey** (Economics)

**Meg Caven** (Sociology)

**Diego Focanti** (Economics)

**Raphaël Franck** (Economics)

**Omar Galárraga** (Health Services Policy and Practice)

**Jaein Lee Herrick** (Annenberg Institute for School Reform)

**Stephen Jackson** (Mount Auburn Cemetery)

**Samantha Kingsley** (Epidemiology)

**Marc Klemp** (Economics)

**Joanne Michaud** (Health Services Policy and Practice)

**Sveta Milusheva** (Economics)

**Aaron Niznik** (Sociology)

**Tina M. Park** (Sociology)

**Heitor Pellegrina** (Economics)

**Jorge Eduardo Pérez Pérez** (Economics)

**Gayatri Sahgal** (Public Policy)

**Sarah Hart Shuford** (Public Health)

**Marcus Walton** (Political Science)

**Lawrence Were** (Health Services Policy and Practice)

## **PROGRAM**

### **SESSION I: HEALTH, ECOLOGY, AND ENVIRONMENT**

**Joanne Michaud**, *Spatial Characteristics of Forest Habitat and Lyme Disease Transmission in Rhode Island Towns*

**Greg Boyer**, *An Exploratory Analysis of Community-Based Long-Term Care Resources for Veterans*

**Samantha Kingsley**, *Proximity to Major Roadways and DNA Methylation of Repetitive Elements in Human Placenta*

**Sveta Milusheva**, *The Effect of Distance to Health Care Center on Migration in Rural Bangladesh*

**Sarah Hart Shuford**, *Public Transportation as Potential Barrier to Access to HIV Testing Centers in Rhode Island*

**Lawrence Were**, *Spatial Analysis of Access to Healthcare: The Case of HIV Positive Pregnant Women in Western Kenya*

### **SESSION II: GIS AND EDUCATION & DEVELOPMENT**

**Jaemin Lee Herrick**, *How to Reengage College Dropouts?*

**Meg Caven**, *Neighborhood and Spatial Factors Influencing Philadelphia School Closures*

**Diego Focanti**, *Testing the Heterogeneity-Economies of Scale Trade-Off Using School Desegregation*

**Gayatri Sahgal**, *Mapping Programme Effectiveness in Bangladesh: A Study of BRAC Pilot Programmes*

**LUNCH BREAK, 12:00–1:00**

**SESSION III:  
GIS AND SPATIAL ANALYSIS IN THE SOCIAL SCIENCES**

**Omar Galárraga**, *Mexican Migration to the United States: Historical and Spatial Patterns*

**Aaron Niznik**, *African American Residential Migration in Chicago 2000–2010*

**Marcus Walton**, *Urban Exodus*

**Jennifer Bouek**, *Population Loss and Food Insecurity in America's Rural Regions*

**Tina M. Park**, *Reimagining Ethnic Enclaves: Restaurant Clusters in New York City*

**Stephen Jackson**, *Mapping a Silent City: GIS & Mount Auburn Cemetery*

**SESSION IV:  
GIS APPLICATIONS IN ECONOMICS**

**Marc Klemp**, *Public Attitudes and Geographical Isolation of Ethnic Groups in Africa*

**Greg Casey**, *Geographic Determinants of Ethnolinguistic Diversity*

**Raphaël Franck**, *The Economic Consequences of the 1789 French Revolution*

**Heitor Pellegrina**, *Roads, Trade and Land Use: Theory and Evidence from the Amazon Region*

**Jorge Eduardo Pérez Pérez**, *Local Area Controls and Minimum Wage Studies: What if Markets Differ at State Borders?*

## **PRESENTATION ABSTRACTS**

### **Jennifer Bouek – Population Loss and Food Insecurity in America’s Rural Regions**

America’s rural regions have experienced population loss due to out migration for the past several decades (McGranahan, Cromartie, and Wojan 2010). For many rural counties, out migration is the result of persistent poverty, high rates of unemployment or geographic isolation. Historically, concentrated and persistent poverty has been highest in America’s most isolated rural areas (Weinberg 1987). Despite a decline in rural poverty in the 1990s, the rural population continues to experience disproportionately high poverty rates and food insecurity rates (Weber, Duncan, and Whitener 2002; Lichter and Johnson 2007). The rural poor are additionally burdened by their isolation, often lacking access to public transportation, adequate schools, medical facilities and basic social services such as clean drinking water and modern sewage systems (Jensen, McLaughlin, and Slack 2003). Such isolation often exacerbates problems associated with poverty and intensifies experiences of food insecurity (Pheley, Holben, Graham, and Simpson 2008).

While there is considerable documentation on the demographic characteristics and motivations of emigrants from rural counties, less is known about the consequences of out migration for those who remain. This project aims to contribute to our knowledge of those who remain by examining food insecurity rates of high population loss counties. High population loss is likely to disrupt social networks. Social networks have been shown to play a significant mediating role in experiences of food insecurity (Tarasuk 2001; Quandt, Arcury, McDonald, Bell, and Vitolins 2001). Therefore, those who remain might be faced with additional barriers in maintaining their nutritional health. Being able to access alternative sources of support, such as food banks or other welfare programs, then becomes even more important in providing rural residents’ the ability to feed themselves and their families, particularly because of their geographic isolation.

Seeking to understand if and how population loss affects the food security of those who remain in these rural areas, this project poses two questions:

1. Is there a spatial relationship between high population loss and food insecurity rates at the county level?
2. Are food aid programs located in the counties with the greatest need?

To answer these questions, I will use GIS to map counties with both high-population loss and high food insecurity rates across the US to determine spatial patterning. I will then narrow my field of scope to the state of Arkansas to determine whether food aid programs are located in regions of highest need by geocoding sources of emergency food.

### **Greg Boyer – An Exploratory Analysis of Community-Based Long-Term Care Resources for Veterans**

The aging American population is driving the need for long-term care. Over the last two decades, institutional (nursing home) long-term care has declined in the United States. Similar to this general long-term care trend, care in The Department of Veterans Affairs (VA) delivery has also changed. Since 2005, the VA has proactively moved to transition Veterans in nursing homes, called Community Living Centers, to less-restrictive, community-based settings (CBS). However, the understanding of available community-based resources remains unclear. This study examines

two types of community-based resources in relation to the placement of CLCs: Adult Day Care Centers and Assisted Living Facilities. First, the relationship of CLCs and available CBS will be mapped with varying radii (2, 5, and 10 miles). Next, the availability of such resources will be examined in relation to county population density. Finally, I will examine the capacity of ALFs (bed size) in relation to CLC location, first by county and then by the above radii. This study serves as a first step in understanding community-based long-term care resources as the VA moves to serve Veterans in the least-restrictive setting possible.

### **Greg Casey – Geographic Determinants of Ethnolinguistic Diversity**

Research into the long-run determinants of economic growth has identified ethnolinguistic diversity as a robust correlate of income per capita and growth (e.g. Easterly and Levine, 1997). To better understand this relationship and potentially overcome issues of endogeneity, the economics literature has recently begun to investigate the geographic causes of ethnolinguistic diversity (e.g. Ahlerup and Olsson, 2012; Ashraf and Galor, 2013).

An influential hypothesis proposed by Michalopoulos (2012) is that groups develop human capital specific to their local ecology, which reduces incentives to move and interact with groups based in different areas. Thus, regions with a more diverse ecology should support a greater number of distinct ethnolinguistic groups. His paper also mentions several other theories which predict the same relationship between geography and group formation. To bring this theory to data, Michalopoulos (2012) shows that higher variation in land quality and elevation predicts higher levels of diversity.

In addition to variation, however, the size of homogenous ecologies should influence the number of distinct groups by altering how large an area a single group might cover. To investigate this hypothesis, I plan to combine data on geographic conditions from Ramankutty *et al.* (2002) with data on the spatial location of ethnic/linguistic groups. I will use regression analysis to test whether concentration of land quality and elevation can predict ethnic diversity after controlling for variation in these variables and other proposed determinants of ethnolinguistic diversity.

#### Works Cited

- Ahlerup, P., & Olsson, O. (2012). The roots of ethnic diversity. *Journal of Economic Growth*, 17, 71–102.
- Ashraf, Q., & Galor, O. (2013). Genetic Diversity and the Origins of Cultural Fragmentation. *American Economic Review*, 103, 528–533.
- Easterly, W., & Levine, R. (1997). Africa's growth tragedy: policies and ethnic divisions. *Quarterly Journal of Economics*, 112, 1203–1250.
- Michalopoulos, S. (2012). [The origins of ethnolinguistic diversity: Theory and evidence](#). *American Economic Review*, 102, 1508–1539.
- Ramankutty, N., Foley, J. A., Norman, J., & McSweeney, K. (2002). The Global Distribution of Cultivable Lands: Current Patterns and Sensitivity to Possible Climate Change. *Global Ecology and Biogeography*, 11, 377–92.

### **Meg Caven – Neighborhood and Spatial Factors Influencing Philadelphia School Closures**

At the end of the 2012-13 school year, the School District of Philadelphia closed 23 of its public schools, citing underperformance, under-enrollment, and a budget deficit that made keeping these schools open untenable. The 23 schools closed were a subset of 37 that were initially recommended for closure. This project investigates three research questions related to the influence of spatial factors on school closure in Philadelphia. First, I interrogate whether closed public schools are comparably closer to charter schools than those that remain open. With under-enrollment named as a reason for school closure, it stands to reason that expanding numbers of local charter schools would compete for finite numbers of pupils. Second, I explore relationships between school and neighborhood demographics, and specifically investigate whether a discrepancy between school and neighborhood racial and socioeconomic demographics predicts school closure. Lastly, I compare the 23 shuttered schools to the 14 that were initially recommended for closure, but remained open. Did the schools spared from closure have different school or neighborhood characteristics than those that were ultimately shut down?

Philadelphia's 2013 school closures were met with considerable resistance from the community; activists filed civil rights complaints with the US Department of Education, citing the disproportionate impact of the closures on African American students. This study, conducted using 2010 census tract data, as well as data from the Public Elementary/Secondary School Universe Survey, will contribute an academic analysis of spatial and demographic factors to current understandings of this complex and highly politicized issue.

### **Diego Focanti – Testing the Heterogeneity-Economies of Scale Trade-Off Using School Desegregation**

Alesina, Baqir and Hoxby (2004) posit that one of the main forces that determines the size of political jurisdictions is a trade-off between the costs of a heterogeneous population and the benefits from economies of scale. The main test for their model uses shocks to racial heterogeneity created by the Great Black Migrations after both world wars. We propose two alternative tests for the model based on the desegregation of schools after *Brown v. Board of Education*. The first one compares the number of school districts in neighboring counties across borders between states that mandated and states that forbid desegregation before the ruling. The second one compares the number of districts in counties where court rulings posterior to *Brown v Board of Education* forced the segregation of schools with its neighbors. According to the model, we expect that counties that are forced to choose a higher level of heterogeneity in schools will respond by also taking advantage of economies of scale, i.e. consolidate school districts.

### **Raphaël Franck – The Economic Consequences of the 1789 French Revolution**

The economic and political consequences of the 1789 French Revolution, and specifically of the Terror, have long been debated. Using Greer (1935)'s data, we can provide a spatial analysis of the repression carried out by the French revolutionaries who used the judicial branch of government to execute all those who were said to oppose (rightly or wrongly) the Revolution. To identify local variation in the intensity of the Terror, we rely on exogenous variations in local weather conditions in the 1780s and 1790s. We will assess the robustness of our identification strategy by carrying our falsification tests which show that the local weather conditions before and after the 1780s and 1790s cannot explain revolutionary violence. Finally we plan to use

modern data on local GDP and public amenities such as the road network to assess the long-term consequences of the 1789 French Revolution.

### **Omar Galárraga – Mexican Migration to the United States: Historical and Spatial Patterns**

We analyze the contemporary patterns of Mexican migration to the United States. Using recent state and municipality data (2005-2010), we explore the spatial autocorrelation of the migration variables with standard spatial econometrics procedures such as the Moran's I. We also analyze the *historical* migration rates as of 1924, as reported by Foerster (1925), and test for historical spatial autocorrelation patterns. Then we construct a cubic matrix (location, migration, and time period) to analyze the predictors of current migration. The first hypothesis is that historical migration rates predict contemporary migration patterns. The rationale is that variations in historical migration rates reflect the creation of social networks that promote migration; locations with higher *historical* migration rates may also have higher migration rates *nowadays*. This theory implies that spatial autocorrelation may be reinforced overtime as migration networks reduce the costs of migration as candidates to migrate have access to more information (Woodruff and Zenteno 2007). We hypothesize also that rainfall measures are another predictor of current migration. Using rainfall patterns measured as normal deviations (z-scores) from historic means, we generate indicators equal to unity when the level of rainfall was one standard deviation below the mean historic mean annual rainfall (1971-2001) and zero otherwise. The notion behind this predictor is that economic returns are adversely affected in locations with low rainfalls, generating greater incentives to migrate, particularly among those households that rely on activities that are rain-dependent such as agriculture (Munshi 2003).

#### References

- Foerster RF (1925). The racial problems involved in immigration from Latin America and the West Indies to the United States: A Report Submitted to the Secretary of Labor. Washington, DC.
- Munshi K (2003). Networks in the modern economy: Mexican migrants in the US labor market. *The Quarterly Journal of Economics* 118:549–599.
- Woodruff C, Zenteno R (2007) Migration networks and microenterprises in Mexico. *Journal of Development Economics* 82:509–528.

### **Jaen Lee Herrick – How to Reengage College Dropouts?**

In today's economy, an increasing number of jobs require education beyond a high school diploma, and postsecondary degrees are critical for job prospects. More than 80 percent of high school seniors aspire to four-year degrees (Roderick, Nagaoka & Coca 2009). Yet only a fraction enroll in a degree-bearing program within a year of high school graduation, and among those who do enter degree-bearing programs, approximately 36 percent are unprepared for college-level coursework and require remediation (Foley, Mishook & Lee 2013). Unfortunately, many of those, especially in remediation, end up dropping out without any postsecondary degrees. For my project, I would like to locate where the young adults with some college education but no degrees are residing in the Providence area and identify where the support services could be located to better assist and reengage this population, encouraging them to complete their postsecondary education. By mapping out this population and potential service locations, I hope to better understand the distinct needs of this population, and mapping will allow us to better match the supports while utilizing their neighborhood's existing resources.

### **Stephen Jackson – Mapping a Silent City: GIS & Mount Auburn Cemetery**

Mount Auburn Cemetery, located in Cambridge, Massachusetts, was founded in 1831 and is recognized as America's first garden cemetery, the beginning of the public parks movement, and an Historic National Landmark. The cemetery is essentially a small town at 173 acres, over 93,000 occupants, monuments, tombs, its own road, path system, and utilities networks as well as being an accredited arboretum containing a collection of over 5,500 trees consisting of 700 species and varieties. This project begins the exploration of the type of data that is possible to generate from records stretching back over the 182 year old history of the institution. 3 different mapping systems, along with numerous electronic and hand-written notes and a plant-specific database need to be combined in order to create a map Mount Auburn has never seen: one containing burial lots, roads, and trees together. From there, it should be possible to examine and share data that currently resides only with individuals, such as available space for lot expansion, tree collection health, and monument preservation issues.

### **Samantha Kingsley – Proximity to Major Roadways and DNA Methylation of Repetitive Elements in Human Placenta**

Environmental exposures experienced by mother and baby during fetal development have short-term and long-term impacts on the health of the child. The placenta regulates the fetal environment as well as the growth and development of the fetus making it a critical organ to study. Epigenetic mechanisms, such as DNA methylation, play an important role in placental development and fetal programming by affecting gene expression. DNA methylation silences genes which are passed down through cell division, allowing the fetus to adapt to its environment. The extent of global DNA methylation is commonly measured when studying environmental exposures, often by the methylation of repetitive elements which make up at least half of the human genome. Interspersed repeats, a type of repetitive element, are derived from transposable elements such as long interspersed nuclear elements (LINEs) and short interspersed nuclear elements (SINEs). The only active LINEs and SINEs in humans are the LINE-1 and Alu families. Previous studies have examined the association between global DNA methylation in cord blood and in the placenta and prenatal exposures to specific traffic-related air pollutants but did not consider the effects on LINE-1 and Alu. LINE-1 and AluYb8, a subfamily of Alu, methylation levels are associated with certain environmental exposures in utero but associations with traffic-related air pollution have not been studied. This study examines proximity to major roadways as a marker of long-term exposure to traffic pollution and levels of placental LINE-1 and AluYb8 methylation.

### **Marc Klemp – Public Attitudes and Geographical Isolation of Ethnic Groups in Africa**

This project visualizes the locations of hundreds of ethnic groups in Africa based upon the "Tribal Map of Africa" found in "Africa: Its Peoples and Their Culture History" by Murdock (1959). Furthermore, for 35 African countries, the project makes use of measures of public attitudes towards a series of issues, on the ethnic group level, found in the Afrobarometer survey data. The measures of the public attitudes are visualized, and analyzed with a focus on spatial correlation. In addition, the project aims to calculate an index of historical geographical isolation for coordinates in Africa, on the pixel level. This index will be calculated as follows. First, the slope of the surface of Africa is calculated based on a map of the elevation of locations in Africa. It is then assumed that pixels with an average slope above a certain level can not be traveled by foot. Second, assumptions are made about the cost of travel through certain types of landscape,

such as desert, relative to plains. Based on these assumptions, the number of pixels reachable for a certain cost at a given location, are calculated. Finally, the index of historical geographical isolation is correlated with the measures of public attitudes.

### **Joanne Michaud – Spatial Characteristics of Forest Habitat and Lyme Disease Transmission in Rhode Island Towns**

Lyme disease (Lyme borreliosis) is the most commonly reported vector borne illness in the United States; the U.S. Centers for Disease Control and Prevention estimate that 300,000 new cases are contracted each year. In the northeastern U.S., Lyme disease is caused by the spirochete bacterium *Borrelia burgdorferi* and is transmitted to humans by infected black-legged ticks (*Ixodes scapularis*). The complicated two-year life cycle of *I. scapularis* involves both reservoir-competent small mammalian hosts, primarily the white-footed mouse (*Peromyscus leucopus*), and reservoir-incompetent reproductive hosts, predominantly white-tailed deer (*Odocoileus virginianus*).

Populations of mammalian hosts for *I. scapularis* are regulated at least in part by the characteristics of their natural habitats. In large unbroken areas of forest habitat, host populations may be limited by healthy predator populations. As large forest patches are fragmented and the extent of forest edge increases, biodiversity and species dynamics are altered, potentially affecting the disease burden on wildlife and the risk of Lyme disease transmission to humans.

In this study, I will examine the relationship between forest habitat spatial pattern and Lyme disease incidence in Rhode Island. Analyses will be performed on the town level using land use/land cover RIGIS data, and physician-reported Lyme disease data for the period 1991 to 2012.

### **Sveta Milusheva – The Effect of Distance to Health Care Center on Migration in Rural Bangladesh**

In this project I will be measuring the effect of distance to health care center in rural Bangladesh on the probability of migrating. I will use the fact that as part of a health intervention in 1977 in Matlab, Bangladesh, 4 different health centers were randomly placed in the treatment region. I will then be able to do a difference in difference analysis comparing out-migration by distance to the health clinic before and after the health clinics were built. This analysis is important on two levels. First, it will shed light on how building a new facility, especially a healthcare one, might impact migration patterns. In addition, if being closer to a health care facility signifies better health, then this study could help shed light on the issue of whether healthier people self select to become migrants.

### **Aaron Niznik – African American Residential Migration in Chicago 2000–2010**

The city of Chicago's south side contain a number of "black belts" that have a long history of highly concentrated African American populations during the 20<sup>th</sup> century. These highly homogenous neighborhoods are often marked by high levels of violent crime and poverty. Taken together, since the 1950s these formerly dense neighborhoods have lost around 75% of their population. This study utilizes 2000 and 2010 census data tract data to investigate where African Americans are moving in the greater Chicago metropolitan area. Using Moran's I analysis I find that as Chicago's traditional central city black belts depopulated between 2000

and 2010, certain areas of the metro's southern and western suburbs saw increased clustering of African Americans. This indicates that many African Americans in Chicago are opting to move out of the traditional black belt in favor of more diverse neighborhoods further from the city's center.

### **Tina M. Park – Reimagining Ethnic Enclaves: Restaurant Clusters in New York City**

Ethnic enclaves in the United States are most frequently identified through analysis of residential locations of individuals, using sources like the Census and the American Community Survey, or through qualitative observations. However, studies regarding the assimilation of recent immigrants have shown that immigrants may follow different patterns of residential settlement, indicating that use of resident location may not always capture the spatial agglomeration of immigrants. I propose using alternative data, in this case health inspection data from the Department of Health of the City of New York, to identify ethnic enclaves. The City of New York provides information about every registered food establishment in the city, including specific classification of the type of cuisine which may be used as a proxy for ethnic group. I will match the newly identified clusters against the population clusters identified through the latest American Community Survey and Decennial Census to see whether residential ethnic clusters match business ethnic clusters. Additionally, preliminary research on boundaries of ethnic enclaves identified by the mass media, in public policy, and other scholarly works regarding ethnic enclaves in New York City will be used to determine whether the business ethnic clusters identified have any validity.

### **Heitor Pellegrina – Roads, Trade and Land Use: Theory and Evidence from the Amazon Region**

In the proposed project, I intend to study the Brazilian Amazon case to better understand the factors determining urbanization processes driven by international trade. In particular, I propose to study how the distance to highway networks determines who is able to take advantage of the recent increase in commodity prices, what are the patterns of land use and what are the costs and benefits of this process in both environmental and economic terms. During this week, I will set up a dataset with georeferenced information on income from the Brazilian census data (at the municipality and census tract levels), night lights, and geographic characteristics such as pluviometric levels, slope, altitude, distance to rivers and others. My goal is to present at the GIS institute the dataset I will use with preliminary results from the study (such as the main correlations and figures showing some stylized facts about the region) and also to use the opportunity to discuss choices I will have to make in order to organize the dataset (such as the unit of observation, the appropriate distance and neighborhood definitions and others).

### **Jorge Eduardo Pérez Pérez – Local Area Controls and Minimum Wage Studies: What if Markets Differ at State Borders?**

Recent studies on the effects of minimum wages on employment and earnings in the United States, debate whether local area controls are better than countrywide controls to assess the impact of increases in the minimum wage. While traditional studies using nationwide state level data generally find a negative elasticity of employment to increases in the minimum wage, local area controls studies using contiguous counties across state borders tend to find no negative effect on employment and a positive effect on earnings. Although local area controls are appealing, since spatially close labor markets may be more comparable than markets that are far

away, they may not be appropriate if there are covariates that have large differences across state borders, or if border county markets behave differently. We reexamine the quality of local area controls by examining the effect of a state minimum wage increase in wages and employment of restaurant workers, using a spatial regression discontinuity design. We first calculate the distance of county centroids in neighboring states to the state border. Using this distance measure and data from the Quarterly Census of Employment and Wages, we analyze the behavior of wages, employment and covariates near and away state borders.

### **Gayatri Sahgal – Mapping Programme Effectiveness in Bangladesh: A Study of BRAC Pilot Programmes**

Established in Bangladesh, BRAC is currently the world's largest developmental organization that seeks to empower people and communities in situations of poverty, illiteracy, disease and social injustice. Microfinance is BRAC's largest and most extensive programme which provides small and medium sized credit to individuals who lack access to formal financial institutions. In recent years, BRAC's Microfinance Programme has begun piloting a series of new products/services which complement the demand for credit. The pilots are monitored by Microfinance's Research and Development Unit (RDU) which is interested in developing indicators that extend beyond standard financial metrics innovative indicators to track the 'success' of their Pilots. In addition to assisting the RDU with developing metrics for evaluating and monitoring Pilot project, as part of their Capstone study a team public policy students, are also helping the Unit understand the spatial location of its Pilots. The provision of such a perspective is considered to be important as it would allow the RDU to a) understand the spatial concentration of its pilots, b) monitor project indicators such as loan take-up and repayment rates, and c) identify spatial correlations between pilot areas and neighborhood areas which can help address questions of scalability. Given certain data constraints, the following presentation shall focus on providing insight into spatial concentration of Pilot and the performance of certain key indicators across pilot areas, as well as provide a research framework for addressing issues of scalability.

### **Sarah Hart Shuford – Public Transportation as Potential Barrier to Access to HIV Testing Centers in Rhode Island**

In this project, we explore the relationship between income-level, race and ethnicity, and access to HIV testing centers by public transportation (buses) in Rhode Island. According to RIPTA's 2012 *Rhode Island Transit Market Review*, "More than any other demographic, low-income status is the strongest indicator of higher than average transit demand. This is because, as income falls, the cost of owning and using a private vehicle becomes more burdensome, while transit is affordable" (p. 20.) Furthermore, minority individuals tend to have lower incomes and, therefore, use the transit system more often than non-minorities (p. 30.) Low-income minority individuals are also at higher risk for HIV (CDC, *Today's HIV/AIDS Epidemic*, 2013.) If individuals are unable to access HIV testing sites readily by public buses, public transportation may be considered a barrier to access of HIV testing centers. We propose that limited access to HIV testing centers by public transportation has implications for the development and spread of undiagnosed or untreated HIV among certain populations in RI. We analyze data from the Rhode Island Department of Transportation, the Rhode Island Department of Health, and the United States Census Bureau 2010 to explore this problem.

### **Marcus Walton – Urban Exodus**

Recent gentrification of some major cities across America has had wide spread effects on the demographics of not only the city's population, but its surrounding areas as well. In some cases, scholars addressing this phenomena have labeled it as the reverse of white flight, and the "suburbanization of poverty". In Prince George's County, Maryland, gentrification of neighboring Washington D.C. has not only been linked to such demographic shifts but has also coincided with the introduction and growth of "megachurches", some of which have membership exceeding 10,000 people. Might the apparent connection between these two trends be spurious or has the demographic shift from urban gentrification precipitated the movement? Is there an observable spatial relation between these newly constructed megachurches and migration patterns into the county? Moreover, what kind of net effects on the county and local communities can be linked to these changes?

### **Lawrence Were – Spatial Analysis of Access to Healthcare: The Case of HIV Positive Pregnant Women in Western Kenya**

Access to healthcare varies across space and is critical for the wellbeing of HIV+ individuals who need regular and uninterrupted access to life-saving medications and hospitalizations in case of adverse events. The need for access to care is even greater for HIV+ women who continue to desire children, become pregnant and give birth even after knowing their HIV+ status thus requiring institutional delivery to prevent mother-to-child transmission of HIV. Using data from the Academic Model Providing Access to Healthcare (AMPATH) – a HIV AIDS program in Western Kenya with over 150,000 HIV+ persons we evaluate the effects of spatial factors such as distance and the distribution of healthcare providers and consumers on access to healthcare for HIV+ pregnant women. Specifically, we calculate the distance to healthcare facilities at different neighborhood scales (locations and sub-locations), estimate the distribution of patients around healthcare facilities including institutional delivery facilities, undertake a network analysis of attendance patterns around health facilities, as well as spatial correlations.