**SESSION 1A**

**POLITICAL TRANSITIONS AND MOBILIZATIONS: CHALLENGES IN DEMOCRATIC RULE**

Session Moderator: Steve Herbert, Geography  
MGH 171  
12:30 PM to 2:15 PM

*Note: Titles in order of presentation.

The Invisible Inequality of the 21st Century: Disenfranchisement of U.S. Citizens Living in U.S. Territories  
Peter (Paul) Camacho, Junior, Political Science  
Mentor: Rebecca Thorpe, Political Science  
Mentor: Hannah Walker

This research project explores disenfranchisement in America. Today, citizens living in unincorporated US territories (Guam, Northern Marianas Islands, US Virgin Islands, Puerto Rico, and American Samoa) are considered “second-class Americans,” having all other fundamental rights as mainland Americans do except federal voting rights. To help understand this phenomenon, this project examines the circumstances under which the political elite had extended suffrage or had established additional protection for minority voters since the early 1900s. Since then, women, African-Americans, 18-year olds, and citizens living in US territories have used different movement techniques and strategies to achieve suffrage, such as establishing conventions, organizing violent and nonviolent protests, and committing to quid pro quo services like serving the country in times of war. This closes in on a theory where political will—defined as the mobilization of mass movements to gain the right to vote—helps explain why Congress votes to extend suffrage to previous disenfranchised groups. This variable is operationalized by counting the number of organized events and the number of people in the group lobbying for suffrage during the year prior to a congressional vote on the floor. I hypothesized that the greater amount of political will present in a year, the more bills will be introduced in Congress. The time frame of data used in this project is from 1910-2015. This presentation can serve as a guide to explain when suffrage extension happens, and what disenfranchised groups did to get what they wanted from big government.

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Taking the Initiative: The Effect of Political Polarization on Direct Democracy  
Tyler Lincoln, Junior, International Studies, Political Science  
Mentor: Rebecca Thorpe, Political Science

Since 1904, when the first voter-sponsored bill appeared on the ballot in Oregon, the frequency of initiatives and referenda has greatly increased, most especially over the last 40 years. While there were only 98 bills voted on nation-wide between 1960 and 1969, over 370 initiatives made it onto state ballots between 2000 and 2009. My research examines several underlying causes of this rising frequency in order to help understand trends in the increasing use of direct democracy. Previous work has focused on the increased participation by moneyed interest groups who use paid petitioners to circulate legislation; however, I am proposing a new, original theory which connects political alienation and dissatisfaction of representative democracy to increased participation in direct democracy. I have built an original dataset which will combine measures of polarization within government, public trust in Congress, and the number of initiatives and referenda throughout the multiple states in which they appear. With this dataset, I ran multivariate regressions to analyze statistical significance in the relationships between these variables. I expect to find that as political polarization in Congress increases, people will lose faith in traditional modes of representative democracy to increased participation in direct democracy. I have built an original dataset which will combine measures of polarization within government, public trust in Congress, and the number of initiatives and referenda throughout the multiple states in which they appear. With this dataset, I ran multivariate regressions to analyze statistical significance in the relationships between these variables. I expect to find that as political polarization in Congress increases, people will lose faith in traditional modes of representative democracy. I further hypothesize that as trust in government decreases, people are more likely to turn to modes of direct democracy to instill change in government, therefore increasing participation in the initiative and referendum process. If my hypothesis is correct, my research would serve as a tool for political scientists to use to predict the rise...
or fall in the political activity of voters, the implications of which could influence timing of legislation, outreach efforts, and a number of other participation-related issues.

**POSTER SESSION 2**

**MGH 241, Easel 122**

1:00 PM to 2:30 PM

**Designing, Constructing, and Launching a Single-Stage Supersonic Rocket**

*Alexa Antalan, Sophomore, Mechanical Engineering, Seattle Central College*

*Tyler Scheffler, Sophomore, Computer Engineering, Seattle Central College*

*David Shay, Sophomore, Engineering, Seattle Central College*

  NASA Space Grant Scholar

*LinJie Fu, Tri Luu, Junior, Computer Engineering, Seattle Central College*

*Mentor: Robert Winglee, Earth And Space Sciences*

*Mentor: Michael Harrell, Earth and Space Sciences*

*Mentor: Rebecca Hartzler, Physics, Mathematics and Astronomy, Seattle Central College*

Our research project was to design, construct, and launch a high powered rocket with the intention of pushing its velocity significantly past the speed of sound while simultaneously collecting data from which to interpret the max achieved acceleration, velocity, and altitude. The rocket’s body has a three inch inner diameter made to fit the 3-inch motor casing without any extra room. This minimum diameter design reduced its weight so that less force was required to achieve higher acceleration, and it provided a smaller cross sectional area than a traditional rocket, thereby reducing the amount of drag force impeding its acceleration. Atypical of most high powered rocket designs, our rocket features a metal tipped nose cone to provide resistance to the heat caused by friction when breaking the sound barrier. At the speeds achieved, unmodified rocket fins will vibrate at extreme rates due to turbulent flow. In order to combat this destructive effect the fins were reinforced with carbon fiber to significantly stiffen them and reduce any resonant effects during flight. The payload consists of a StratoLogger SL100 Altimeter to keep track of the maximum altitude and velocities of our flights as well triggering two separate parachute deployments, achieving a safe landing while also minimizing drift time due to winds at altitude. It is our hope that our research rocket will push the boundaries of velocity and altitude achieved by a junior college rocket team as well as provide insight into ways to optimize our rocket designs to maximize future results.

**The Increase in Interdisciplinarity of Life Science Faculty Positions during Economic Instability**

*Sabrina R. Sadler, Senior, Science, Technology, and Society (Bthll)*

*Mentor: Rebecca Price, Interdisciplinary Arts & Sciences*

Speculation for the increasing trend in interdisciplinarity in the life sciences spans from financial incentives to social relevance with little focus on the possibility of economic instability as a key contributor. To understand how economic instability impacts interdisciplinarity in faculty positions in the life sciences, I extracted and analyzed data from job ads in the journal Science from 2002 and 2008 and compared the amount of interdisciplinary research and experience required by assistant professors before and during the recession. I concluded that more faculty members are required to have an interdisciplinary background across fields to satisfy the requirements of a single job position in 2008 compared to 2002, and that interdisciplinary skills are especially relevant in times of economic down-turn. To fill the demand for interdisciplinary knowledge in life science faculty positions, I propose that the university incorporate interdisciplinary approaches in their graduate training programs to better equip doctoral students for future academic professorship positions.

**SESSION 2Q**

**HIV AND STIs: FROM THE BENCH TO THE BEDSIDE AND BEYOND**

*Session Moderator: Geoffrey Gottlieb, School of Medicine*

**JHN 175**

3:30 PM to 5:15 PM

*Note: Titles in order of presentation.*

**Impact of Medical Plurality on Care Engagement and Treatment Outcomes among People Living with HIV in Limpopo, South Africa**

*Taylor Lee (Tay) Boyd, Senior, Neurobiology UW Honors Program*

*Mentor: Maya Wright*

*Mentor: Rebecca Dillingham, Infectious Disease and International Health, University of Virginia*

Medical plurality, the concurrent existence of multiple medical systems, is particularly important in the South African context. Our research during the summer of 2015 utilized an in-depth survey to document the engagement of individuals living with HIV, with alternative health sectors: traditional
medicine, herbal medicine, and faith healers. The participants in the study were both male and female patients living with HIV between the ages of 18 and 65, who had been on antiretroviral therapy (ARTs) for at least one year. Every participant was a patient at either the Fhulufelo HIV Clinic or the Thohoyandou Health Center in Limpopo, South Africa. After listening to a brief explanation of the study and its purpose, patients had the option of volunteering to take a survey, which inquired about their adherence to ARTs, engagement with traditional health sectors and their understanding of HIV. Verbal and written consent were obtained from every participant and the survey data from every participant was included in the statistical and thematic analysis. We found that 34% of the participants had an unsuppressed viral load (n=35). Of the patients that were unsuppressed, 46.3% of them were among the participants who had ever engaged in any of the alternative sectors, while 22.2% of those unsuppressed had never engaged in these alternative sectors. This research suggests engagement with alternative health care sectors is associated with unsuppressed viral loads. This study is important as it may encourage the development of interventions to support better individual and population health outcomes and collaboration between biomedical providers and traditional healers. One limitation was the relatively small sample size (n=102), in comparison to the total population of people living with HIV in the Vhembe District of South Africa.

**POSTER SESSION 3**  
Commons West, Easel 11  
2:30 PM to 4:00 PM

**The Undocumented Immigration Exodus**  
*Lane Covington, Junior, Political Science*  
*Mentor: Rebecca Thorpe, Political Science*  
*Mentor: Hannah Walker*

Over the last 10 years, the number of undocumented immigrants in the United States has gradually begun to decline for the first time in decades. While previous research has looked at this change in the rate of undocumented immigrants across the country as a whole, there is very little information on how or why these trends have changed within and across states. Yet, some states are losing more undocumented immigrants than the nation as a whole, and some states still have a growing undocumented immigrant population. Why has the rate of undocumented immigration dropped so much more in particular states since the mid 2000s, when compared to the national rates since the same year? To answer this question, I employ statistical methods and examine the relationship between the number of undocumented immigrants within a state, as well as state immigration legislation. I expect that the number and severity of state laws regulating or deterring undocumented immigrants corresponds with a more significant drop in the number of undocumented immigrants.

**POSTER SESSION 4**  
Commons East, Easel 44  
4:00 PM to 6:00 PM

**Metropolitan Fragmentation: A Barrier to Reducing Racial Residential Segregation in the 21st Century**  
*Lauren Mittman, Senior, Political Science*  
*UW Honors Program*  
*Mentor: Rebecca Thorpe, Political Science*

This project examines local government effort to combat persistent racial residential segregation. Although U.S. cities today are more diverse than ever, many continue to be characterized by black-white segregation. Because many local governments today do not implement a sufficient variety of policy solutions to address segregation, an important question arises: What might deter local government implementation of these policies? I hypothesize that fragmentation, a result of the fracturing of metropolitan statistical areas (MSA) into many smaller local governments, can explain this inaction. Because metropolitan areas vary regarding their level of fragmentation and therefore the political and economic competitiveness local governments face, local governments in more fragmented MSA's will prioritize policy issues that will allow them to compete. In order to test my hypothesis, I use statistical methods to analyze local government effort to combat segregation for three U.S. cities, Baltimore, St. Louis, and Atlanta between 2011-2014. I draw on original research identifying key legislation and newspaper articles addressing residential segregation and examine the role of institutional fragmentation in each context, controlling for other factors. This project will offer a new understanding of local governments' role in addressing a crucial aspect of racial inequality by revealing one reason many local governments do not treat racial residential segregation as an immediate issue to be addressed through public policy.
The Flight Patterns of a Supersonic Square Multi-Cluster Two-Stage Rocket
Shannon Gatta, Sophomore, Informatics, Seattle Central College
Shanika Davis, Sophomore, Astronautical Engineering, Seattle Central College
NASA Space Grant Scholar
Gabriel Finertie, Freshman, Engineering, University of Washington
ADONAY LEBENEH, Freshman, ELECTRICAL ENGINEERING, Seattle Central College
Nguyen Trung Nam
An Hoang, Sophomore, Computer Science, Seattle Central College
Darius Williams
Mentor: Rebecca Hartzler, Physics, Mathematics and Astronomy, Seattle Central College

Clusters of rocket motors are classically arranged cylindrically for the purpose of maximizing the effective aerodynamics of the overall cross-sectional design. Alternatively, our team’s rocket booster engine configuration was arranged in a unique square formation around the main engine for the first stage of our launch. This not only simplified construction and reduced the need for extra material to support the engines, but also lent itself to increased stability by making use of the corners of the square as part of the fin design. This first stage consisted of nine identical motors ignited simultaneously. Once the second stage ignited, this nine-engine cluster detached from the rocket and propulsion continued via a single motor. Speeds reached approximately 550 m/s, which is to say approximately Mach 1.6. The mainframe was constructed of carbon fiber with Kevlar reinforcement to prevent the fins from self-destructing upon breaking the sound barrier and/or ground impact. Our payload consisted of electronics for measuring and transmitting acceleration, speed, and altitude, along with a GPS unit for tracking purposes. The rocket’s objective was to reach 60K feet, the maximum altitude allowed by FAA regulations, with a supersonic square cluster design modeled after SpaceX’s Falcon9. The research conducted was to study the takeoff, flight stability, and landing of our rocket’s more efficient square orientation in comparison to a typical cylinder design.

Arsenic in Shallow Polymictic and Seasonally Stratified Urban Lakes: Mobility, Bioaccumulation and Ecological Toxicity
Erin Hull, Senior, Environmental Science, UW Tacoma
Mentor: Jim Gawel, Environmental Science
Mentor: Rebecca Neumann, Civil and Environmental Engineering
Mentor: Pamela Barrett, Civil and Environmental Engineering
Mentor: Corey King

Elevated levels of arsenic have been reported in surface waters of many urban lakes around the Puget Sound as a result of the widespread heavy metal contamination from the late ASARCO smelter in Ruston, Washington. Arsenic is a neurotoxin and carcinogen and a priority Superfund contaminant. However, the mobility and toxicity of arsenic is not fully understood. Physical and biogeochemical processes that lead to elevated arsenic concentrations in the water column and aquatic organisms have been studied well in thermally stratified lakes, but not in periodically mixed (polymictic) oxygenated lakes. This project examines the mobility, bioaccumulation and toxicity of arsenic in four urban lakes in south King County that range from seasonally stratified and oxygen depleted (anoxic) to polymictic and oxygenated (oxic). Specifically, we aim to discover why one of the lakes has elevated levels of arsenic (up to 40 ppb) in surface waters, yet regularly mixes and thus remains oxygenated. Typically, arsenic is only mobilized from sediments when a lake becomes anoxic during stratification. Monthly water quality parameters (temperature, pH, dissolved oxygen, and specific conductivity) were measured and water samples (alkalinity, chlorophyll, sulfide, iron, arsenic, and nutrients) were collected at multiple depths throughout the water column. Plankton samples were also collected using vertical net tows. Water and plankton samples were analyzed for dissolved and total arsenic (after digestion) by ICP-MS. Phytoplankton and zooplankton in polymictic oxic lakes accumulated more arsenic than plankton in thermally stratified lakes, even though aqueous arsenic concentrations were similar between the lakes. This data suggests that arsenic in polymictic urban lakes is not only bioavailable, but has the potential to travel up the food chain. This project aims to create a model for predicting arsenic bioavailability based on physical lake characteristics to better predict possible toxicity and, therefore, has important implications for lake management.