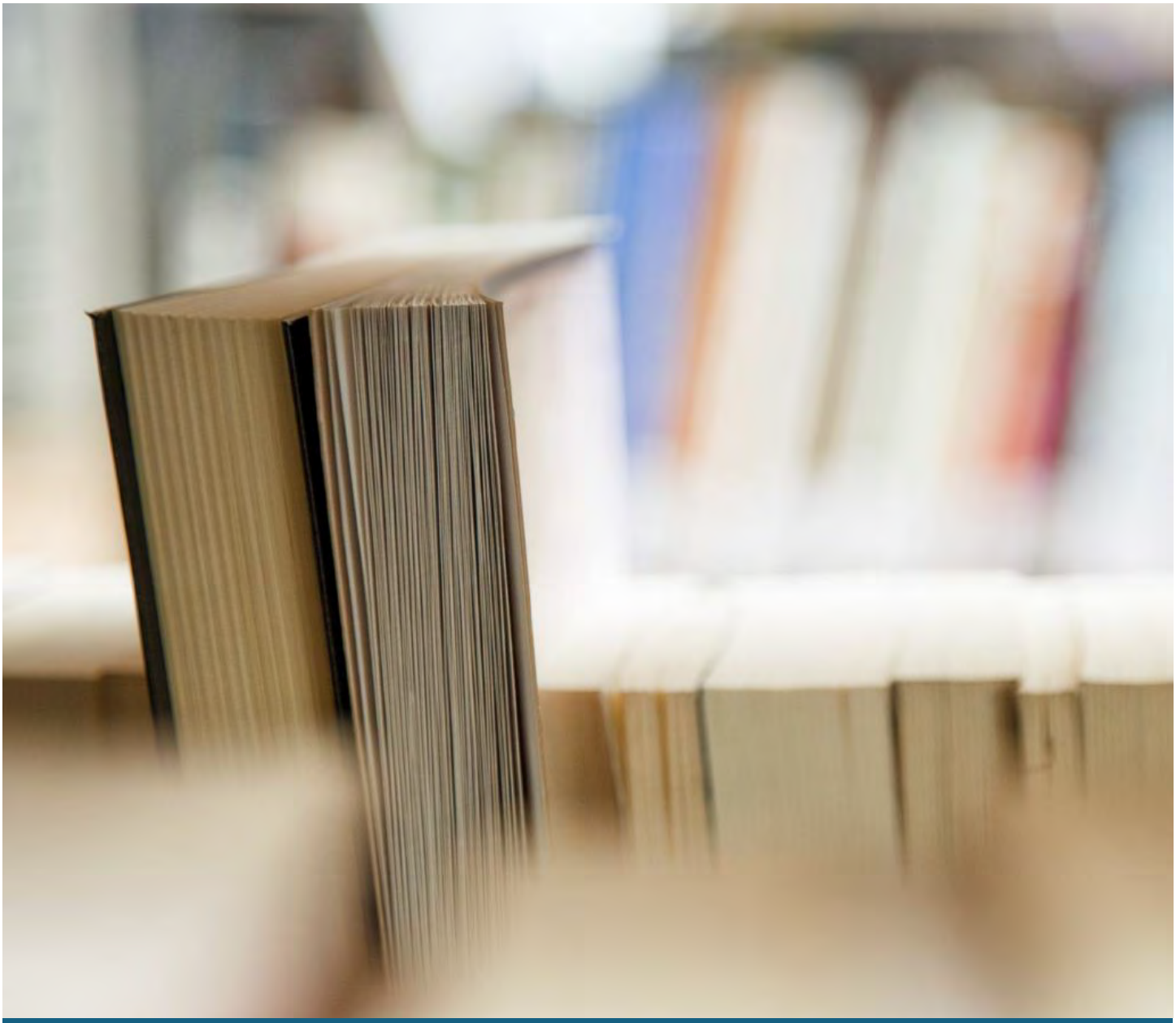

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Letter from the Editors

We are excited to present the 2024 AGEP Science Today Bulletin. The editorial team is proud to complete its tenth year of publication which showcases scientific research conducted by MSU students from the AGEP community. The bulletin strives to contribute to the academic landscape by showcasing the innovative research, work, and leadership accomplishments of our multidisciplinary and multicultural community of researchers and scholars within and outside Michigan State University.

This has been a challenging year at MSU as we faced a horrific tragedy on February 13th, 2023, in which three victims of the MSU community lost their lives. As this incident caused a wide range of emotions across MSU campus, many students including those of the AGEP community continued to contribute to their goals as researchers and students. As the MSU community continues to deal with the tragedy, we will never forget those victims and their families. Therefore, this year's bulletin is dedicated to the victims, MSU, and the AGEP community. Despite the tragedies, we are grateful for the persistence, commitment, and dedication of the MSU community and AGEP Members' for contributing to scientific knowledge through these difficult times.

The 10th edition of the Bulletin features scholarly research that reflects diversity in our identities, culture, conditions, and areas of study. This edition also includes an Alumni Spotlight section featuring conversations with scholars at various stages of their academic careers, and the initiative aim -to broaden the knowledge of career pathways for the next generation of scholars. To our readership and AGEP community, we are grateful for your continued support. Leading the editorial process has been very insightful and rewarding. We are honored for the opportunity to highlight the scholarly pursuits of our members and share this knowledge with the broader academic and non-academic community. We are very confident that the Bulletin will continue to elevate diverse perspectives, backgrounds, and expertise, and inspire future generations of scholars in the humanities and sciences.

Sincerely,

Charles Whitehead-Tillery, Editor-in-Chief
Microbiology, Genetics & Immunology Program

Raymundo Lopez, Assistant Editor
Political Science Program

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Pushing Back Against the Margins: Black Girls Storying their Educational Experiences

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Keywords: Black girls, educational experiences, K-12 education, educational leadership

Introduction

Hines-Datiri and Carter Andrews (2020) exclaimed the need for research that focuses on the experiences of Black girls, not just Black boys because we could create an either-or binary that further devalues the lived experiences of Black girls. Thus, understanding the need for more research that center Black girls' voices, I sought to narrow this gap through the exploration of this study. Specifically, I explored how their positionings as Black girls impact their educational experiences and how their sense of self contributes to their advocacy for an equitable education. Black girls too are generators of knowledge, yet they fail to be a part of decision-making processes in schools that can inform solutions to provide an equitable education for all students. This study sought to illuminate the ways Black girls co-construct knowledge through a conversation about their lived experiences as students at a predominantly white high school. The following research questions emerged from this study: (*a) What are the educational experiences of Black girls at a suburban high school? (b) How do Black girls advocate for themselves in a predominantly white educational space? (c) What can school leaders learn from Black girls' experiences?*

Methodology

The data was collected from a 90-minute sista circle session[1], where we had an in-depth conversation regarding their experiences as Black girls in predominantly, white educational settings. All six participants were Black girls between the ages of 15-17 and were in their sophomore, junior, or senior year of high school during the time of this study (See Table I). The dialogue that took place was open-ended, providing them the space to share stories about their schooling experiences and relationships with their peers. Then, the session was audio recorded and transcribed using a transcription service. I conducted descriptive, line by line coding along with in vivo coding (Esposito & Evans-Winters, 2021). Once I completed coding, I engaged in peer examination as a way to maintain reflexive subjectivity. From the coding process, I juxtaposed the codes with concepts from Black feminist thought and epistemologies (Collins,1990) to help with the emergence of themes. The codes were then grouped into categories, and categories were grouped into theme s (See Appendix I and II).

Results

A riveting conversation occurred in the sista circle that illumined how Black girls are marginalized in schools, yet the ways they push back against it. During our talk, they spoke about their experiences being hypervisible, silenced, and undervalued (Cottom, 2018). I reflect on the participants elucidating their experiences of being Black *and* a girl and its impact on their interactions in school. For example, Ebony talked about an exchange she had with one of her classmates and his attempt to touch her hair. From their conversation, he stated, "I don't think it's offensive to ask to touch Black people's hair because we just don't have hair like theirs, and we just don't know how it feels like, and we just want to know how it feels." This is one of many examples where Black women and girls are exoticized and objectified for their features (Collins, 1990). But, although she had an unpleasant experience with her peer, she still embraces and stands by her decision to wear a fro, which is an act of resistance to beauty standards that perpetuate whiteness (O'Brien-Richardson, 2019). Ebony was startled and uncomfortable in the moment, but her story exemplifies that her existence is resistance and her pride in that.

[1]A sista circle differentiates from a focus group due to the nature of the conversation. Also, a sista circle is intentional in that: 1) Black girls/women gather to discuss their lived experiences 2) There is a spiritual energy that drives the conversation and 3) The researcher is a participant (Lacy, 2018).

Discussion

The results of this brief provide insight into the ways Black girls push back against the margins to reclaim and take up space. In the words of the late bell hooks (1994), "the classroom remains the most radical space of possibility" (p.12). This poignant quote from bell hooks' prolific book, *Teaching to Transgress,* is vital as there is *still* a need to cultivate classroom spaces for Black girls where they have the ability to be vocal without being perceived as assaultive. I further push this notion by asserting the need for educational leaders to acknowledge the necessity of centering the voices of Black girls in schools. Most importantly, this will intentionally place Black girls at the center, rather than the margins, of the discussion (Mauldin, 2020). It is important for educational leaders to acknowledge that when Black women and girls are positioned less than, the social upward progress of society remains stagnant and moribund (Cooper, 1988). Thus, educational leaders must go against the status quo if they truly want to engage students by recognizing the knowledges that Black girls possess. This is not to be exclusive of other students, but to celebrate the brilliance and creativity of Black girls with the purpose of benefitting *all* students.

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Tables

Table I. Description of Participants

Name of Participant*	Participant Grade	Participant Age	Participant Race/Ethnicity
Nicole	11th	17	Biracial (Black and White, identifies as Black)
Morgan	10th	15	Black
Briana	11th	17	Black
Ebony	10th	15	Black
Destiny	12th	17	Black

**Each girl was given a pseudonym*

Appendices

Appendix I. Categorizing Codes

Codes	Grouping Codes	Categories
"I'm uncomfortable."	"I'm uncomfortable."	Marginalizing experiences being a Black girl
	Criminalization of Black students	
	Feeling targeted	
	Hypersexualization	
	Hypervisibility of Black students	
	Microaggressions	
	Attempt to control their bodies	
Agency	Attempt to eliminate safe spaces	
"So, if I say, "Can you please give me some space?" (Subcode of agency)		
"We're not heard" (Subcode of agency)	Agency	Resistance through Voice
Realizing that they are becoming adults and should be treated as such (Subcode of agency)	"So, if I say, "Can you please give me some space?"	
Students' beliefs that they deserve respect from adults too (Subcode of agency)	"We're not heard"	
Attempt to control their Bodies	Realizing that they are becoming adults and should be treated as such	
	Students' beliefs that they deserve respect from adults too	Advocacy through Action
Criminalization of Black students		
Desire for more Black teachers	Use of social media	
Feeling targeted	Calling out Racist Interactions (Subcode of Use of social media)	
Hypersexualization		Relational Connectedness to Black Educators
Hypervisibility of Black students	Centering Blackness (Subcode of Use of social media)	
Impact of Black Educators		
"He talks to the kids."	Desire for more Black teachers	
"The Black dad of the school"	Impact of Black Educators	
	"He talks to the kids."	
	"The black dad of the school"	Seeking out Spaces to be their full selves
Microaggressions		
Safe Spaces	Safe Spaces	

"I remember my safe place is being in Jerry's office because he understands me" (subcode of safe spaces) Trying to push students out of their safe spaces (subcode of safe spaces) Use of social media Calling out Racist Interactions (subcode of social media) Centering Blackness (subcode of social media)	"I remember my safe place is being in Jerry's office because he understands me" (subcode of safe spaces)	

Appendix II. Themes from Categories

Categories	Grouping Categories	Themes
Pushed to the Margins	Marginalizing experiences being a Black girl	"U.N.I.T.Y.:" Pushing Back Against the Margins
Resistance through Voice	Resistance through Voice	"R-E-S-P-E-C-T:" An Exclamation for Change
Advocacy through Action	Advocacy through Action	
Relational Connectedness to Black Educators	Relational Connectedness to Black Educators	"We need Black educators:" Significance of Relationships with Black Educators
Seeking out spaces to be their full selves	Seeking out spaces to be their full selves	

Digital Literacy Among System-Involved Populations

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Keywords: community supervision, digital literacy, parole, probation, technology, qualitative methods

Introduction

Within the U.S., about 4 million people are under community supervision (Sawyer & Wagner, 2023), and they often experience collateral consequences (e.g., being denied jobs) post-system involvement (Vallas & Dietrich, 2014), affecting their ability to meet supervision requirements. Another barrier they face involves knowing how to use technology (Ogbonnaya-Ogburu et al., 2019; Reisdorf et al., 2021). The Am. Library Association (n.d.) defines digital literacy as "the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills." Research on system-involved individuals and digital literacy shows that many individuals report having issues using technology. (Ogbonnaya-Ogburu et al., 2019). Thus, it is crucial that we understand the digital literacy skills of system-involved people, their technological needs, and how to better support them.

Methods

Using a convergent mixed-methods design, I collected quantitative and qualitative data from 44 people on probation and parole. Each participant was interviewed over the phone or in-person and shared their experiences using technology. Prior to starting the study, the interview was pilot tested with two individuals on probation and revised based on their feedback. In this brief, I will focus on the qualitative findings. To analyze the qualitative data, I inductively searched for themes present in participants' responses and created a codebook. The study's overarching research question is, "How do system-involved people qualitatively describe their experiences with technology?"

Analysis and Results

The results of the study showed that system-involved people have considerable access to phones (100%) but not computers as only 65% of the sample had access to a computer. The lack of computer access was due to never owning one, financial constraints, and personal choice. Still, system-involved people used the technology they had for a myriad of activities including social media, shopping, banking, etc. They also used technology for to generate income by prompting their own businesses or doing online surveys as well as for transportation needs (e.g., scheduling Ubers). The overall sample had high digital literacy based on the self-reported digital literacy scale scores, but this did not preclude participants from needing help navigating technology. For instance, loved ones often helped participants with simple and more advanced tasks, especially those who had been incarcerated for a substantial amount of time. Additionally, participants struggled to use technology for employment and education-related needs. They often had issues filling out online job applications and submitting resumes online, and even struggled with tasks on the job (e.g., using work-related devices or completing the online employee orientation modules). Another participant struggled to complete school-related tasks because they only had access to a phone, which was not compatible with all the necessary apps they needed. Regarding other needs, some participants mentioned not knowing what websites to use to find information they were looking for, which added difficulty to getting their needs met. Finally, participants also shared that they were interested in learning many different aspects of technology. For some, they only wanted to learn the basic functions that would help them meet their needs and nothing more whilst others wanted to learn how to use advanced programs and tools such as 3D printing or C++.

Future Work

In the future, I plan to build on this pilot study by increasing the sample size and using a more intersectional approach. The intersectional approach will include assessing how factors like race/ethnicity, gender, socioeconomic status, ability status, and primary language impact experiences using technology. Doing so will help us identify any specific groups of people that may need specific types of interventions and assistance. Furthermore, I also want to conduct a longitudinal assessment that explores the digital literacy of incarcerated people prior to leaving prison and then at subsequent intervals upon release.

Broader Implications

The study findings show that system-involved people have a variety of experiences and knowledge with technology and digital literacy. However, struggling to use technology may impact their employment and education, Thus, it is crucial that researchers and practitioners work together to identify ways to better support system-involved individuals with technology and increase their digital literacy. One way to do this is by creating digital literacy programs that are given to people in prison and people on probation. The program can focus on teaching them basic skills needed to navigate technology and the Internet, and if they would like, they can sign up for more classes to learn more advanced skills. Additionally, these programs can provide system-involved people with phones and computers to keep increasing access to technology devices among this population.

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Examining Working-Class State-Level Candidates & Elections

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Keywords: working-class, candidates, representation

Introduction

I define "working-class rhetoric" as any candidate that employs the following: "working-class, blue-collar, unions" and other similar language. Although working-class Americans make up "over half of the labor force," working-class candidates comprise 2% of Congress, 3% of state legislatures, and 9% of city council seats (Carnes, 2013). Thus, working-class candidates are vastly underrepresented in office. Further research suggests underrepresented groups, such as women of color (WOC) and people of color (POC) tend to be working-class (Carnes, 2015). Working-class candidate shortage is more than a descriptive representation issue. Since politicians tend to vote based on their class and economic background, then a shortage of working-class candidates also demonstrates substantive and symbolic representation issues (Barnes, Beall and Holman, 2020; Brown and Gershon, 2017; Carnes, 2013, 2015; Wright and Rigby, 2020). In other words, a lack of working-class politicians results in lower levels of policy advocacy and understanding toward working-class constituents. If such few working-class candidates serve in elected office, it is imperative to learn more about them during the election process.

Research Questions:

- Who are the candidates that use working-class rhetoric, and are they more likely to be WOC and/or POC?

- Does working-class rhetoric used by candidates influence their likelihood of winning general elections?

Hypotheses:

- H1: The proportion of candidates that use working-class rhetoric, such as WOC and/or POC, will be **greater** than the proportion of white men and women.

- H2: The proportion of Democratic general election winners who employ working-class rhetoric, will be **greater** than the Democratic winners of those candidates who do not use working-class rhetoric.

Methods

This study examines the race/ethnicity, gender, occupations, and working-class rhetoric of a subset of state legislative candidates from California, Texas, Georgia, and Oregon for the 2020 primary and general elections. These states were selected because they collected data on the occupations held by candidates, and it can be difficult to find websites for previous elections since they are deleted post-election. Research has not yet investigated class-based rhetoric on candidate websites. This research seeks to address that gap by classifying candidates based on their usage of class-based language on campaign websites.

To investigate these questions, I examine descriptive data and run logistic regressions which is still in progress. For now, any working-class rhetoric used is defined by those candidates who mention "working-class, blue-collar, unions" on their website.

Analysis and Results

Based on **Figure 1**, slightly less candidates of color (46%) use working-class rhetoric as compared to white candidates (54%), an 8% difference. Thus, both POC and white candidates use the rhetoric at similar rates. In **Figure 2** those Democratic candidates that use working-class rhetoric appear more likely to win general elections as opposed to those who do not use the rhetoric. This is noted by the lowest red line situated to the right of zero on the x-axis, which indicates a positive and significant relationship.

Figure 1:
Candidates of Color
& Working-Class Rhetoric

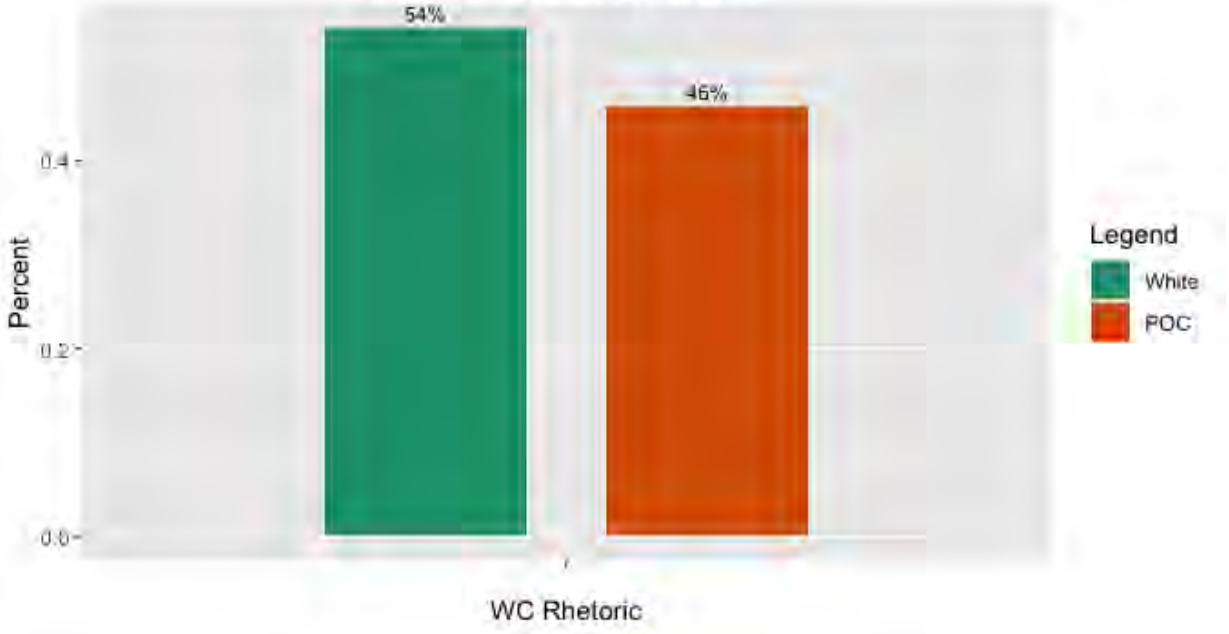
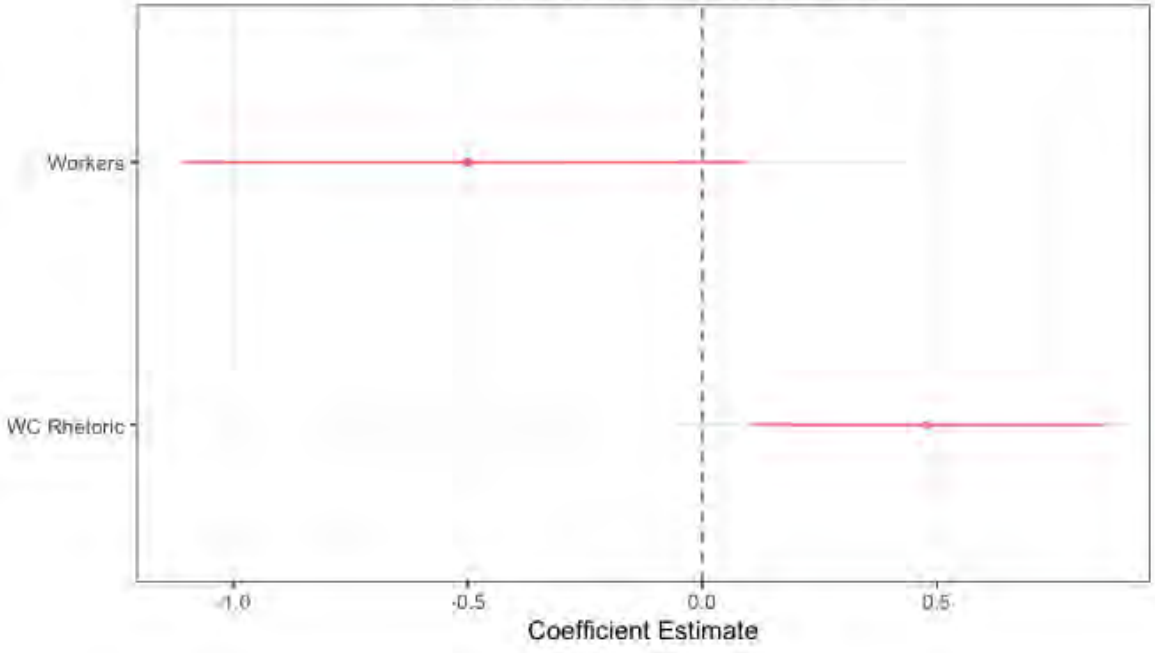


Figure 2:
Democrat General Election Wins



Limitations/Future Work

First, as social scientists, we are limited in access to prior occupation information of current political candidates and officeholders, especially at the state and local level. Second, this study consists of only one election cycle. Given this, my goal is to continue collecting data for future elections. My next steps are to run a content analysis on the types of working-class rhetoric used in my current website data. I also plan to interview working-class candidates on their experiences running for office, since this area is understudied.

Broader Implications

The data I am collecting as part of the C3[2] will be a transparent and accessible resource for scholars both interested in replication and class broadly. Moreover, this data will be helpful for scholars and the public interested in both descriptive and substantive representation and when deciding who to vote for.

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Do Neutron Stars Cool as Fast as We Think?

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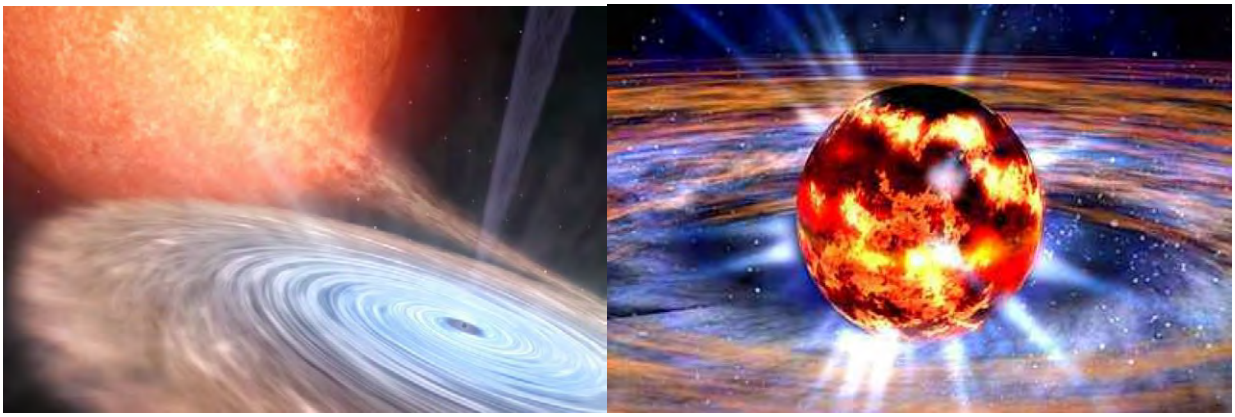
Keywords: neuron stars, cooling, radioactive decay



Left: A neutron star heating up due to an explosion on its surface. The hydrogen-rich fuel for this explosion is provided by a nearby passing star. Right: The same neutron star cooling down when the star providing the fuel has drifted away and the explosion has stopped.

Introduction

Neutron stars are a very special class of stars in our universe which were first discovered in 1967 (Bell Burnell, 2016). They exhibit densities as high as 10^{17} g/cm^3, i.e. as dense as if all the water in all the Great Lake combined was fit into a lunchbox. A typical neutron star weighs even more than our sun but is only as big as the size of a city spanning a few miles. This naturally gives rise to some very interesting physical properties in the interiors of neutron stars.

Due to the strong gravitational pull corresponding to high densities, neutron stars can attract matter from a nearby star passing it. This matter is highly explosive since it contains up to 75% hydrogen. When the matter slams hard on its surface, it undergoes an explosion and heats up the neutron star. The temperature of the surface of a neutron star after an explosion can be measured by X-ray telescopes. This is based on a similar principle as the infrared thermometers used to measure human temperatures. Once the fuel is exhausted, the neutron star is seen to cool down (Wijnands et al., 2016).

The rate of cooling depends on the physical properties of a neutron star, for ex. the thermal conductivity of its layers. There is a discrepancy between the observed rate of cooling of a neutron star and the cooling rate calculated from theoretical models (Brown & Cumming, 2009) based on our current understanding. The goal of this project is to take a step towards resolving this discrepancy.

Analysis Methods

One of the modes of cooling in neutron stars is Urca cooling (Schatz et al., 2014), which is based on the radioactive decay of exotic neutron-rich nuclei in the neutron star. The rate of radioactive decay influences the rate cooling in neutron stars. The strongest cooling isotope in a typical model of neutron star after explosion is ^{33}Mg. This is very exotic with a half-life of only 89 ms on earth. The decay rate for this isotope has been previously measured (Tripathi et al., 2008), but the measurement is questioned in the literature (Yordanov et al., 2010) because of systematic errors in the previous experiment. The cooling rate of neutrons stars is constrained with a new measurement of the decay rate of ^{33}Mg using a completely different technique called 'Total Absorption Spectroscopy' that is free of systematic errors encountered in the previous measurement (Rykaczewski K., 2010).

^{33}Mg was produced in the laboratory with the help of particle accelerators called cyclotrons, at the National Superconducting Cyclotron Laboratory (NSCL) at Michigan State University. The produced ^{33}Mg was immediately transported to an experimental end-station where an array of radiation detectors were set-up. Since ^{33}Mg is highly radioactive, the decay radiation was monitored with the detector set-up and the decay rate was measured.

Results

The analysis of the decay experiment of ^{33}Mg using Total Absorption Spectroscopy revealed a slower rate of decay than initially measured in (Tripathi et al., 2008). This puts new constraints on the cooling rate of neutron stars.

Broader Implications

The new results have important implications on two fronts - Not only is our understanding of the cooling of neutron stars improved, but we also learn about the nuclear properties of exotic radioactive isotopes. Neutron stars, in a way, act as a test ground for our understanding of the properties of the atomic nucleus. And a better understanding of the nuclear properties of materials has wide implications on fields ranging from nuclear energy to nuclear medicine and even nuclear weapons and stockpile stewardship.

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Latino Partisanship: A Computational Approach

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Keywords: latino politics, random forests, partisanship, prediction

Introduction

Why do Latinos vote Republican? It is a widely held belief that racial and ethnic minorities represent some of the most reliable Democratic voters. However, even despite President Trump's racist and anti-immigrant comments, he saw modest gains in certain sections of the Latino population (Sommer and Franco 2024). Scholars have attempted to provide explanations that reconcile Latino idenity and support for Donald Trump, but these explanations largely rely on causal frameworks to determine the effect of any given trait or attitude on vote choice. Latino identity, however, is a constructed identity, correctly specifying the interactions between many of its constituent parts may prove a difficult task (Sen and Wasow 2016). Furthermore, the heterogeneity amongst Latinos on a variety of traits may further complicate attempts at model specification. I argue that the use of a predictive framework alongside computational methods allows for a modeling strategy that seriously considers the constructed nature of Latino identity. This study seeks to answer the following question: *What heterogeneities in the Latino community are most predictive of Republican vote choice?*

Methods

To answer my research question, I turn to random forests, an extension of Classification and Regression Trees (CART) (Breiman, 2001). In each tree a subsample is taken out of the larger sample, this sample of observations starts off in a parent node, and at each node the tree takes a random sample of the variables and selects a variable that splits the parent node into two child nodes, each split attempts to maximize homogeneity within nodes and maximize heterogeneity between nodes. The model will continue to split the nodes until each node contains a terminal amount of observations. Predictions are then made by averaging the predictions of the individual trees or the majority votes of the trees if outcome is categorical. Features in the random forests are ranked by a variable importance measure, this measure is calculating the average decrease in accuracy for prediction when an individual feature is out of sample. Random forests models are a non-parametric form of prediction as the model itself allows for complex arrangements of variables and latent interactions. Considering these random forests are not a panacea, random forests in general do not deal well with the collinearity of items and tends to select between highly co-linear variables at random.

Data and Results

Below I present the results of my random forest model, alongside a logistic regression with a lasso penalty for comparison. I leveraged the Latino sample of the 2020 Collaborative Multiracial Post-Election Survey (n = 4085). Within the model, I included a variety of demographic measures; as well as measures of group consciousness, issue importance, and identity salience which are all thought to be important predictors of vote choice (Kim and Zilinsky 2024). I excluded party affiliation and candidate evaluations, as they are heavily correlated and predictive of vote choice. Additionally, I performed k-fold cross validation to assess the performance of my models. Overall, these results demonstrate that random forests, are marginally better, at predicting vote choice for the respondents. Interestingly, though the models return racial resentment as the most the most predictive variable and the coefficient with the largest magnitude. However, the random forest model seems to return measures of identity salience as the most predictive variables, while the logistic regression selects various measures of issue importance as particularly significant.

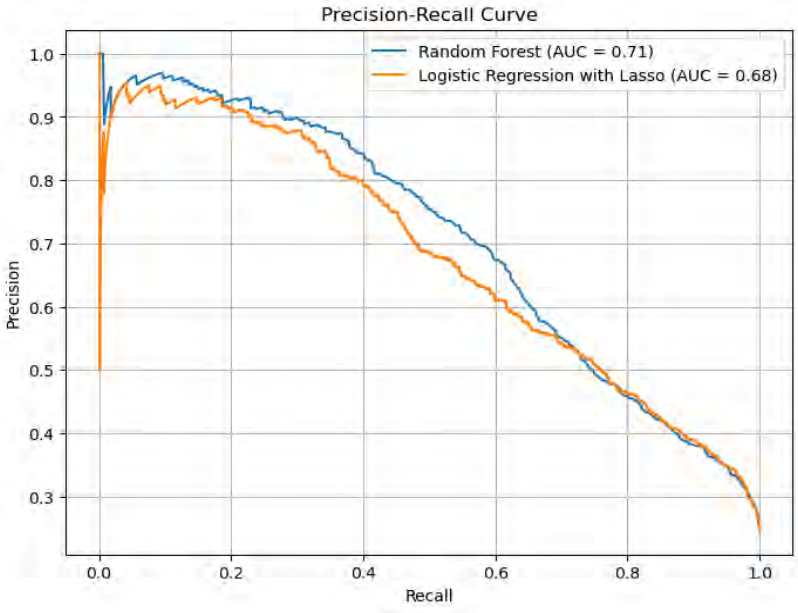

Figure 1: Precision Recall

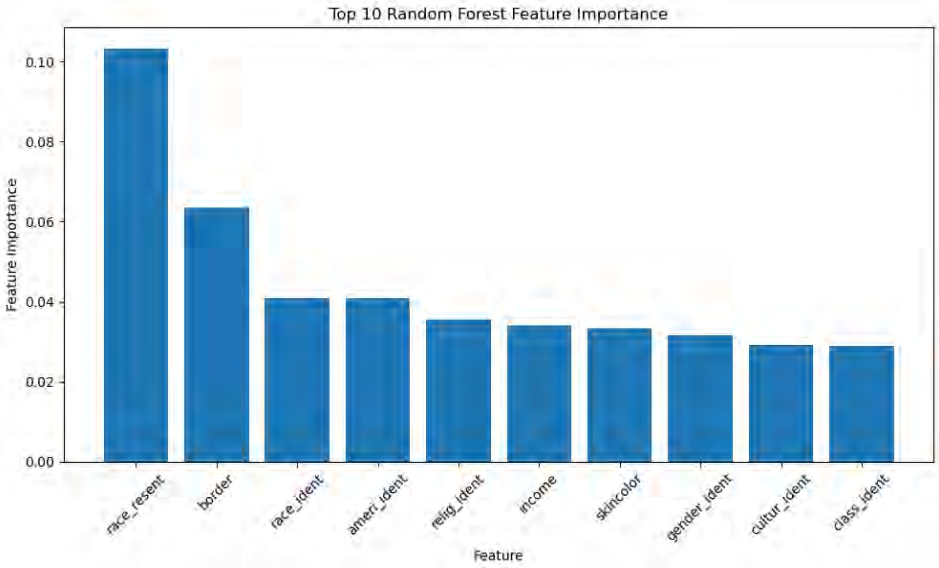

Figure 2: *Variable Importance*

Discussion

The implications of my results are two-fold. First, both higher levels of racial resentment and a perception of the border as an important issue seem to be indicative of a higher probability of voting republican. Thus, it may be important to further investigate the causes of these attitudes. Second, since my models select different variables as important further consideration must be given as to which modeling strategy is most appropriate. In the future I would like to extend my research by utilizing additional computational models that may improve the performance of my predictions such as fuzzy forests or support vector machines (Conn and Ramirez 2016).

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A Methods Review: What are People Saying about GMOs on Twitter (Now Formally Known as "X")?

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Keywords: data scraping, GMOs, attitudes, perceptions

Introduction

The landscape of attitudes toward genetically modified foods (GMOs) has become convoluted in recent years, despite their well-documented role and importance in human history (Edwards, 2015). This shift in narrative is due to contrasting news sources, conflicting conclusions of empirical scientific study, and social discourse across cultures (Twardowski, 2015). This study seeks to complete an empirical analysis of these complex attitudes, based on methods adopted from validated measures used in previous similar studies. This will be accomplished by answering the research question: How are semantic characteristics related to the popularity of tweets? Popularity is defined by the number of retweets, likes, and replies each tweet receives. We hypothesize that people are more likely to align/engage with negative semantics.

Methods

Firstly, we conducted a sentiment analysis which is a natural language processing (NLP) technique used to automatically identify whether a given text expresses a positive, negative, or neutral sentiment, as well as to quantify the intensity of that sentiment (Wu, 2011). Next, we aimed to conduct a Pearson Bivariate correlation, that analyzed the correlation between retweets/likes to the sentiment of Tweets (Wang, 2019). All functions were conducted in R Studio and the raw Twitter (Now known as "X") data was graphed in Python.

Results

The hashtag analysis denoted: #gmo, #gmos, and #monsanto as being the most commonly used hashtags during 2018 (Figure 1). The sentiment analysis conducted was insignificant as it related to our variables of interest, as sentiments were overwhelmingly coded as neutral (Figure 2).

A Spearman's correlation was additionally conducted on the connection of followers to popularity, and we obtained the value Rs=0.00592, which was insignificant.

```
hashtag_word
          gmo          gmos       monsanto            ad
         7052          2515           922           716
       health       organic     glyphosate leftfieldfarms
          702           599           427           416
      crispr     pesticides       nongmo        iartg
          374           325           318           312
       food      mustread kindleunlimited          free
          308           303           277           274
    thriller       biotech       roundup        cancer
          270           264           250           243
> |
```

Figure 1. Total hashtag analysis output, of a random sample of 50,000 Tweets in 2018

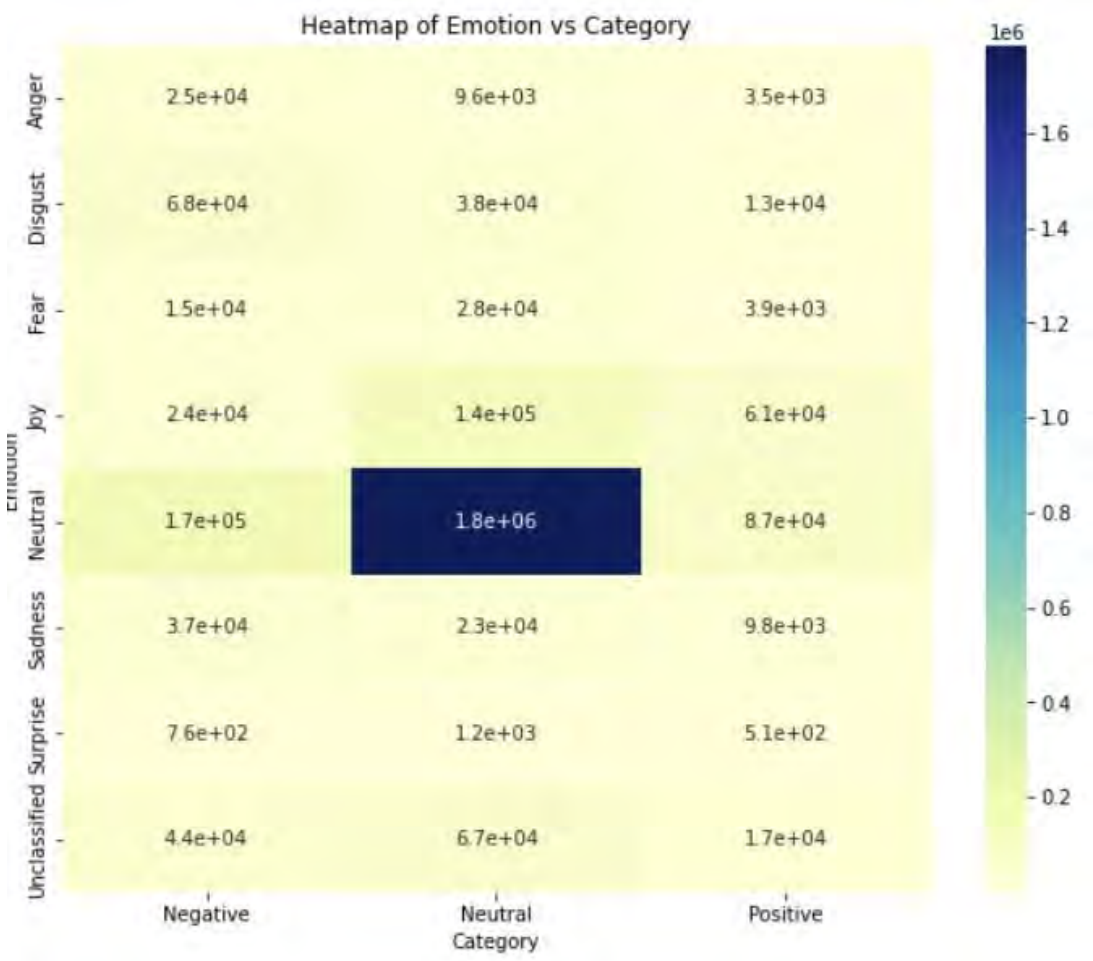

Figure 2 Heatmap of sentiment analysis, depicting overwhelming prominence of "neutral" coded tweets.

Analysis

Firstly, the hashtag analysis was successful in that the landscape/network of tweets was clearly displayed. In the process of conducting the sentiment analysis, we noticed an oversaturation of neutral tweets. This was a glaring issue, as the oversaturation of neutrality was not conducive to the social environment, we are aware of in the year (Evanega et al., 2022). It was clear that our sentiment analysis was too sensitive, and when cross-validated with manual sentiment analysis of 50 randomly selected Tweets, the measure was deemed invalid for our sample population. We were thus unable to conduct the bivariate correlation on likes, retweets, and sentiments as it would have been a case of "garbage in garbage out". When expanded to the entire population, it became clear that this was a flawed measure for our population as well, as there were far more neutral-coded tweets than all the other emotions combined (Figure 3). Lastly, to see if any correlation existed within the variables of interest, a Spearman's Correlation was conducted on followers and popularity of tweets and the covariance Rs=0.00592 was achieved. This result was insignificant, and thus we were unable to fully address our research hypothesis.

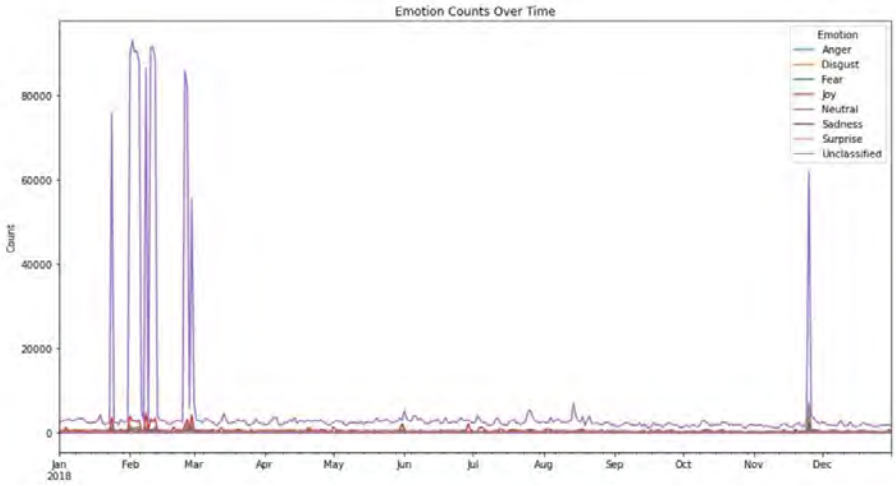

Figure 3. Emotion score counts over the span of the 2018 calendar year of all Tweets related to GMOs.

Future Directions

Although we were unable to address the research hypothesis completely, we were able to establish an important principle of what not to do. If future researchers are interested in conducting a sentiment analysis of GMOs on Twitter in the year 2018, using these methods would be an ineffective way to derive sentiments from the data. Thus, the future direction of this project would be to improve the sensitivity of the sentiment analysis, to revisit the original variables and conduct a proper bivariate correlation. Additionally, there are clear limitations in the transferability of this project as Twitter ("X") is now withholding data from researchers, and there is no way to acquire similar data in current and upcoming years. However, these methods may be useful for Sina Weibo (as other researchers have done this), but the issue of transferability remains.

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The Role of Extended-Spectrum Beta-Lactamase producing Plasmids in community-acquired ESBL infections.

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Keywords: antibiotic resistance, ESBL, humans, dogs, plasmid, horizontal gene transfer

Introduction

The spread of antibiotic resistance (AR) is caused by the overuse of antibiotic treatment, which has led to increased selection for resistant bacterial pathogens. This has become a major challenge for the healthcare system as it leads to increased mortality. One of the main causes of increased AR infections is extended-spectrum beta-lactamase (ESBL) producing bacteria. ESBL-producing bacteria cause an estimated 198,000 cases per year, accounting for approximately 9,000 deaths[1]. ESBLs are enzymes produced by bacteria to hydrolyze beta-lactam antibiotics such as penicillin and first through third generations of cephalosporins. *Escherichia coli* (*E.coli*) and *Klebsiella pneumoniae* (*K. pneumoniae*) are common bacterial hosts that cause majority of ESBL diseases, including urinary tract infections (UTIs) and pneumonia.[2] Horizontal gene transfer (HGT) has been identified as a major contributor to this increase in ESBL transmission through either transformation, transduction, or conjugation.[3] However, conjugation is the main mechanism responsible for the transfer of ESBLs, allowing ESBL-producing bacteria to transfer ESBL genes to other bacteria through conjugative plasmids [2-3]. Plasmid mediated ESBL transfer often occurs within some plasmid incompatibility (*inc)* groups, which are classified by replicon type or *inc* genes.[2] ESBL-producing bacterial infections are acquired mainly in hospital settings, however there is not a clear understanding of how these infections occur in community acquired settings.[4] It is suspected that "spillover" results in community spread of ESBL-producing bacteria due to interactions between humans and livestock, companion animals, wild animals, and soil.[5-7] ESBL-producing bacteria have been isolated from different community reservoirs, it is unclear what is promoting the dissemination of ESBL enzymes in these different communities.

Methods

We collected 20 ESBL-producing *E.coli* plasmid sequences derived from humans (n=10) and dogs (n=10) from the National Center for Biotechnology Information (NCBI) database. Genome annotations were performed on collected plasmid sequences using the Bacterial and Viral Bioinformatic Resource Center (BV-BRC). Antibiotic resistant genes (ARGs) were identified on plasmid sequences using the Comparative Antibiotic Resistance Database Resistant Gene Identifier (CARD RGI) program. Plasmid Multi Locus Sequence Typing (pMLST) was used to categorize human and dog-derived plasmid sequences by replicon type.

Analysis & Results

In the bioinformatic analysis (see Table 1), 17 out of the 20 plasmid sequences collected (85%) were derived from *E. coli* and 3 (15%) from *Salmonella enterica* (*S. enterica*). CTX-M's (CTX-M-14, CTX-M-1, CTX-M-15) were identified in human-derived plasmid sequences. TEM's (TEM-1), and CMY's (CMY-2) were also observed in human-derived plasmid sequences. In dog-derived ESBL-producing plasmid sequences, CTX-M's (CTX-M-1, CTX-M-55, CTX-M-15) were observed. OXA's, TEM's (TEM-1, TEM-190) ESBLs were also observed in dog-derived plasmid sequences. Aminoglycoside, chloramphenicol, and quinolone resistance was also present in collected plasmid sequences based on CARD RGI results. Of the 20 plasmid sequences, 15 (75%) belong under the group F replicon type while 5 (25%) were classified under group N, I1 and A/C. In observing the results of bioinformatic analysis ESBL resistant genes identified in human plasmids were similar in dog plasmids indicating that ARGs were disseminated between these hosts. IncF replicon type was prevalent amongst the collection which could mean that plasmids classified under this group are transferring ESBLs between humans and dogs. Lastly, human and dog derived ESBL-producing plasmids that transfer other ARGs can potentially increase the spectrum of antibiotics the host is resistant to limiting effectiveness of antibiotics under different classes. Some limitations

for this analysis are that the prevalence we see could be due to the plasmids being derived from a specific geographical area. Furthermore, this data is not representative of the entire population.

Table 1. Bioinformatic Analysis of ESBL-producing bacteria from humans and dogs.

Bacterial Strain	Source	Dogs	ESBL	Other ARGs	Replicon Type (PMLST)	NCBI Accession
E. coli	Dog	pCARB35_02	TEM-190	Mrx, mphA	F2:A-:B-	CP031655.1
E. coli	Dog	pV289	CTX-M-1	-	F2:A-:B-	HG739084.1
E.coli	Dog	pHB42-F5	CTX-M-55, TEM-1	aadA2, APH(3")-Ib, APH(3')-IIa, APH(6)-Id, dfrA12, mphA, Mrx, qacEdelta1, rmtB, sul2, tet(A)	F2:A-:B-	CP110817.1
S. enterica	Dog	pCFSAN000934_02	CMY-2	sul2, floR, APH(3")-Ib, APH(6)-Id, tet(A)	A/C	CP009567.1
S. enterica	Dog	pCVM22462	CMY-2	-	I1	CP009566.1
E. coli	Dog	pHB42-F3	CTX-M-55, TEM-1	aadA2, APH(3")-Ib, APH(3')-IIa, APH(6)-Id, dfrA12, mphA, Mrx, qacEdelta1, rmtB, sul2, tet(A)	F2:A-:B-	CP104331.1
E. coli	Dog	pHB42-2	CTX-M-55, TEM-1	dfrA12, aadA2, qacEdelta1, mphA, rmtB	F2:A-:B-	CP104079.1
E. coli	Dog	pDog168	CTX-M-15, OXA-1	aadA5, qacEdelta1, sul1, Mrx, mphA, tet(A), AAC(6')-Ib-cr6, dfrA17	F-:A6:B-	MZ634324.1
E. coli	Dog	p615cip	-	QnrB10	FY2-:A-:B-	MT859325.1
E. coli	Dog	p2305	CTX-M-1	dfrA17, aadA5, sul2	I1	MG948334.1
E. coli	Human	pBH-100-1	TEM-1	sul1, qacEdelta1, aadA, catI, APH(3')-Ia, tet(B), tetR	F2:A-:B-	CP024652(.2)
E. coli	Human	pE17EC0401-1	CTX-M-14, CTX-M-27	dfrA5, qacEdelta1, sul1, Mrx, mphA, AAC(3)-IIe	F24:A-:B1	CP088467(.1)
E. coli	Human	pDETEC38	NDM-5	aadA22, Mrx, NDM-5, mphA	F2:A6:B1	CP116154(.1)
E. coli	Human	p100_NDM5_IncN	CTX-M-1, NDM-5,	dfrA12, aadA2, qacEdelta1, sul1, BRP(MBL), NDM-5, Mrx, mphA, tet(A),AAC(3)-IIe, Mrx	F36:A20:B1, N	MT199177(.1)
E. coli	Human	p94-1	CTX-M-15, OXA-1	-	N	CP041579(.1)
E. coli	Human	pEc-050-T5-ESBL_4	CMY-2	ErmB	F2:A-:B-	CP086494(.1)
E. coli	Human	p41-2	CTX-M-15, OXA-1	-	N	CP041583.1
E. coli	Human	pMPCMY-2	CMY-2	CMY-2, ErmB	F2:A-:B-	CP043945(.1)
S. enterica	Human	p81741	NDM-5, TEM-1	NDM-5, BRP(MBL), Mrx, mphA	F2:A-:B-	CP019444(.1)
E. coli	Human	p3_115106	TEM-1	QnrS1, Mrx, mphA, ErmB	F2:A-:B-	CP043338(.1)

Future Directions

- Collect more samples from the database to increase the sample size to get a better representation of the population.
- Perform phylogenetic analysis on collection to examine how the human and dog sequences cluster together.
- Obtain chromosome sequences to determine sequence type for each sample to identify clones that harbor specific ESBLs.

Qualitative and quantitative findings will provide insight into how HGT in ESBL-producing plasmids from dogs contribute to the transfer of ESBL genes in a community setting. Our work will allow us to discover strategies and therapeutic methods with the potential to block ARG transfer to prevent and mitigate community-acquired infections (CAI).

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The Adsorption Kinetics of *Salmonella* Serotypes on Glycan-coated Magnetic Nanoparticles

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Keywords: *Salmonella*, serotypes, adsorption, biosensors, nanoparticles

Introduction

The United States Centers for Disease Control and Prevention (CDC) estimates that *Salmonella* causes about millions of infections and thousands of hospitalizations in the United States annually [CDC, 2024]. Detecting it in different food products is pivotal in mitigating the impacts of these infections, especially in reducing the number of foodborne-related illnesses and hospitalizations. *Salmonella* and other foodborne pathogens must be detected before ingestion to protect the public. However, conventional detection methods are expensive and time-consuming, requiring lengthy preparation and extended analysis times [Dester, 2022]. For example, culture-based methods require the growth of the bacterium, and polymerase chain reaction (PCR) tests for DNA amplification. An alternative preparation method, using magnetic nanoparticles (MNPs), has been shown to speed up sample preparation by forming conjugates with bacteria quickly recovered using a magnet [Dester, 2022].

Methods

This project aims to study the interaction between different *Salmonella* serotypes and glycan-coated MNPs to understand how differences in surface antigen expression may affect the adsorption profiles of bacteria. These experiments were repeated for all 4 measured serotypes of *Salmonella*: Hadar, Enteritidis, St. Paul, and Agona. The methodology is similar for both kinetics and isotherm experiments. *Salmonella* suspension and MNPs are added to a microcentrifuge tube, then incubated and allowed to interact before being separated by an external magnet. The MNP-cell conjugates are separated from the unbound cells in the supernatant. The supernatant is plated, and the cell count is quantified using a colony counter to get the equilibrium cell concentration. Meanwhile, the MNP-cell conjugates are resuspended in phosphate-buffered saline (PBS) and plated to obtain the adsorption capacity.

The kinetics experiment displays the adsorption capacity of the *Salmonella* serotype binding to the MNPs over time. The two most common practical models are the pseudo-first-order (PFO) and the pseudo-second-order (PSO) [Saleh, 2022]. For the kinetics experiment, it is essential to note the time increments being measured, with the minimum point of interaction being limited to 5 minutes while the maximum is up to 60 minutes. The intervals are 5, 10, 15, 30 and 60 minutes. The time is arbitrary if the interaction is contained within an hour, as that is the point at which equilibrium is reached, noting that there are minimal changes in interaction potential between MNPs and *Salmonella* cells.

The isotherm experiment highlights the relative relationship between the adsorption capacity of the *Salmonella* serotypes binding to MNPs along with the number of cells in the supernatant. Using the Langmuir and Freundlich models for isotherm modeling [Saleh, 2022]; these being the most well-investigated models provides a more holistic view of the captured quantity of cells relative to the whole cell count. The five trials for isotherms are the five distinct cell dilutions: 100, 80, 60, 40, and 20%.

Analysis & Results

Adsorption experiments were performed using different *Salmonella* serotypes, and the data was fitted into known kinetic and isotherm models. Analyzing the generated kinetic and isotherm parameters provided more profound insight into the interaction between *Salmonella* and the MNPs. The measurement values for *Salmonella* detection using MNPs are informational as they set a baseline standard for how specific *Salmonella* serovars react to MNPs and how society can benefit from the knowledge and understanding of the reaction profiles of lesser-known Salmonella serovars. This research sets the foundation for understanding how specific *Salmonella* serotypes react to glycan-coated MNPs. This marks the beginning of understanding the *Salmonella* serovar group differences with respect to MNP binding abilities. The results suggest minimal differences amongst the observed serotypes of *Salmonella*. Their adsorption profiles are similar observationally and display adherence to models PSO and

Freundlich. The PSO kinetic model implies that chemisorption is the rate-limiting step, with electrostatic interaction being a factor in MNP-cell conjugate binding, and there are abundant active sites on the MNP. The Freundlich isotherm model implies there are adsorbate-adsorbate interactions and heterogenous surface structures on both the MNPs and *Salmonella* cells.

Future Work and Implications

This study will improve the understanding of MNPs as a rapid aid in sample preparation for *Salmonella* detection and gain insight into the interaction between these serotypes of *Salmonella* and MNPs. Future implementations of this work can set a precedent for the early detection and extraction of MNP-bound *Salmonella* samples from a contaminated liquid solution using a chitosan, a shellfish derived carbohydrate, coating on the MNPs. Improvements can be made to better implement MNPs for detection, building from the research committed, to allow for rapid and more reliable detection. Improvements in the work could investigate if O-antigens or H-antigens affect interaction with MNPs. In the larger scope of the project investigating MNP-cell conjugate interactions lays the foundation of understanding for future implementations of MNPs in improved detection of food borne pathogens in a solid matrix if the idea translates. The experiment and its results are worthwhile because MNPs are a faster and cheaper alternative to the conventional method of detecting food-borne pathogens, with culturing and PCR evaluating the sample [Bhandari, 2022].

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AGEP Alumni Spotlight
A Conversation with Dr. Jamell Dacon

By Charles Whitehead-Tillery
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Dr. Jamell Dacon is an Assistant Professor at Morgan State University in the Department of Computer Science. He completed his Ph.D. in Computer Science at MSU and is a former SROP student and member of AGEP from 2013 to 2018. His research interests specialize in advancing data science and machine learning algorithms to develop theoretically grounded reliable, safe, explainable and interpretable AI tools. Focus areas include Fairness & Bias in AI (particularly in ML and NLP), Human-Computer Interaction, and Data Science for Social Good, with applications in areas such as Criminal Recidivism, Cyberbullying, Marginalization, Health Equity, Social Welfare Policy, and Educational Equity.

Note: this piece is an abbreviated version of the interview.

Question 1: Please think back to when you were a doctoral student at MSU. Tell us about your time with SROP and AGEP and how they influenced your transition from MSU to other experiences at Morgan State University.

JD: Thinking back to when I was a doctoral student, my first time arriving at MSU felt like being handed the keys to a candy store—there were so many opportunities available to me. I had the privilege of being surrounded by a network of scholars from both the computer science and computational mathematics, science and engineering (CMSE) departments. Even scholars from outside those areas, like plant biology, microbiology, and political science, were incredibly supportive. The AGEP program served as an academic GPS, guiding me through the twists and turns of graduate life, with Steven Thomas playing a key role in bringing us all together. The program supported us through small presentations, student chalk talks, and, of course, by providing food, which made the experience much easier to engage with. Graduate life differs significantly from undergraduate life—it's slower, denser, and more complex—but programs like SROP and AGEP helped ease that transition for me. These experiences and spaces ultimately prepared me for my transition to Morgan State University. The tools and confidence I gained through those programs have helped me navigate new challenges. Now that I'm on the other side of the desk, welcoming new scholars, I guide my classroom and my students to reach where I am today—and beyond.

Question 2: What has it been like to navigate as a professor as a man of color, particularly during this time?

JD: At Morgan State University, it's incredibly fulfilling because I came from an HBCU background, and moving to MSU—a PWI—was very different. It was also challenging because I was the only Black student in the Computer Science program for my entire five years, which left me feeling isolated. As a man of color at MSU, it felt like trying to find the rhythm to a dance you didn't know, or like being at a party where you couldn't quite catch the beat. There were always moments where I was trying to fit in, leading to some awkward experiences, but by the end, I had found my rhythm—both in research and in my personal interests. Now, coming to Morgan

State University and being a professor of color, I realize that while it's not as rare here, it's still closer to being an anomaly. Many people look up to me because they understand the challenges I've faced, and now I have the opportunity to create meaningful change by advocating for inclusivity and diversity. Being a guide for students through what feels like a maze, rather than feeling lost in that maze myself as I did during my doctoral journey, allows me to offer the guidance I wish I had. In addition, I've realized that HBCUs aren't always seen as target schools compared to Ivy Leagues, but being here has shown me that there are countless hidden gems along the way. Now, as a professor, I've become a role model for students who look like me and come from similar backgrounds. More importantly, they can see themselves in me and envision where they can go. That's what it means to be a professor as a man of color today.

Question 3: Now that you are a professor, in a different position of power, how are you creating space for others to succeed?

JD: I like to think of my role as a professor as that of an architect, building a supportive academic ecosystem. During my Ph.D., I had many opportunities to collaborate with various departments and scholars, as I previously mentioned. Now that I am a professor in the Computer Science department, I've noticed that students often have diverse interests—ranging from medicine to software, engineering, and health. As a result, I'm constantly making connections across these fields. My philosophy is all about building bridges, not walls. Even though I'm in the same department as my students, they sometimes think they're limited to one path. I encourage them to explore multiple avenues. During office hours, students tend to stay in my office for long periods, and I usually have music playing to create a relaxed atmosphere where they feel they belong. Sometimes, they even bring food, and we work on assignments together. These conversations often include discussions about internships or personal challenges. Whether it's through open office hours or mentorship programs, I aim to be accessible and create a sense of community. As the advisor for student groups and the chair of student activities in the department, I also make it a point to provide a listening ear. My goal is to create a space where everyone can thrive. I try to avoid being passive-aggressive because I remember what it was like to be a student. Having spent nearly a decade in school, I understand that freshmen, sophomores, and juniors are still learning and growing. I also like to inject humor into my interactions—who doesn't love a good pun or two, right? Ultimately, office hours and mentorship programs help foster a sense of belonging. When students feel comfortable enough to trust you, they're more likely to come to you for help. I often remind them that if they feel the need to cheat, it means they don't fully understand the material. It's my job to teach the subject thoroughly because I'm here for them. Over time, I've built strong relationships with my students because we've established a mutual understanding and respect.

Question 4: How are you balancing expectations to have high-quality research alongside teaching, service and other tasks that are required of you?

JD: Mentoring students can be tough because I work with many of them, and I make it a point to meet one-on-one to offer guidance on their projects. I also try to share my own, not-so-glamorous experiences, like navigating institutions with drastic cultural differences. In my role, I make an effort to host workshops and engage in collaborative learning, but balancing the expectations of research, teaching, and service requires a lot of practice and discipline. I prioritize tasks by setting realistic goals and writing down everything I need to do. When I was in grad school, I used to want to check off everything in the exact order I wrote it down. But by the end of grad school, I realized that this approach can quickly lead to feeling overwhelmed. That overwhelmed feeling often comes when you're trying to go through tasks in order, which can increase stress. So now, I focus on doing what I can control. I start with smaller tasks and celebrate small wins—finding joy in the chaos. If I have 20 things to do, I'll cross off 3, then maybe cross off another one 30 minutes later. Sometimes, late at night—at 2 a.m., for example I get new research ideas and end up checking off 6 more things. Above all, I try to hold myself accountable because time management is truly a trusty sidekick.

Question 5: Finally, what did you take away from SROP and AGEP? Did SROP and AGEP inspire you to create similar communities at your institution?

JD: I participated in SROP back in 2017, about seven years ago when I was a junior. It was probably one of the greatest experiences I've had. We had a large cohort of about 75 to 80 students, and what made it even more special was that everyone was having fun while also being extremely smart. People came from all over the world, and we taught each other dances, ate together, and just connected on a deeper level. That experience showed me that community is everything. Even though the program eventually ended, and we went our separate ways, we always had opportunities to reconnect. Steven Thomas facilitated these outings, allowing us to maintain those bonds. SROP inspired me to build similar communities at Morgan State University—places where collaboration and support are the norm. I think programs like SROP and AGEP foster these kinds of communities, where we lift each other up rather than engage in self-deprecation. When we support one another, we can achieve incredible things. Community is the biggest lesson I took away from both AGEP and SROP, and it continues to shape how I approach my work today.

AGEP Faculty Alumni Spotlight
A Conversation with Dr. Christina A. Campbell

By Charles Whitehead-Tillery
Department of Microbiology, Genetics & Immunology, Michigan State University

Dr. Christina Alicia Campbell is a tenured Associate Professor in the School of Criminal Justice at the University of Cincinnati. Dr. Campbell earned a B.A. from San Diego State University in 2006 and a M.A. and Ph.D. in Psychology from Michigan State University in 2012. She completed a postdoctoral fellowship in the Department of Psychiatry, Division of Prevention and Community Research at Yale University in 2014. Her passion for research was cultivated as a Ronald E. McNair Scholar and National Institutes of Health, Minority Biomedical Research Support (MBRS) Scholar.

Note: this piece is an abbreviated version of the interview.

Question 1: Tell us about your time with AGEP and how AGEP influenced your transition from MSU to other experiences at University of Cincinnati and in your role at your current institution.

CC: I was in the Ph.D. program for Psychology at Michigan State University when a first-year Ph.D. student told me about AGEP. What initially attracted me to AGEP was the mention of funding opportunities and research stipends. After joining, I immediately knew it was the right fit because of the strong sense of community and family. I've maintained relationships with many people I met through AGEP, even to this day. Being the only Black person in the psychology department was incredibly isolating, so attending AGEP meetings and connecting with people who shared similar experiences was crucial for me. During my Postdoc at Yale University, I remained involved in AGEP, and scholars would frequently visit. Even though I am currently at the University of Cincinnati, I now live in Georgia because of the strong community I built. Three of the AGEP scholars from MSU, even though we are in different disciplines, have remained in close contact with me.

Question 2: What has it been like to navigate academia as a minoritized identity, particularly during this time?

CC: Being an African American woman with parents who are descendants of slaves adds a unique dimension to my experience, as I am deeply aware of the history of marginalization and limited opportunities. Therefore, it doesn't surprise me when I see the underrepresentation of African Americans across various disciplines and graduate programs. As a first-generation college student, my journey has been different from many of my peers and cohort. Coming from a background where access to resources was often limited, I learned to seek out programs like AGEP, the Ronald E. McNair Scholars Program, and Summer Research Opportunity Programs. These initiatives played a significant role in shaping my path, and I consider myself a product of these opportunities. I am committed to ensuring that first-generation college students like myself have access to similar opportunities. Where I am today is a testament to the impact of those programs and the mentorship I received. It’s essential that other students, particularly first-generation students, have the same access, especially when many of them come from families who are unfamiliar with the specific pathways to success in academia. My

family, for example, could support me emotionally, but they didn't have the tools or knowledge to help me navigate the microaggressions or other challenges I faced. They didn't know how to engage with faculty who weren't always comfortable interacting with Black students or how to advocate for what I needed. That's why programs that offered additional resources and mentorship were crucial to my success. Navigating academia—whether in the classroom or in research—can be a daunting task, and these programs provided the support I needed to overcome those challenges.

Question 3: As your role as an associate professor, how are you creating space for others to succeed?

CC: I strive to create supportive spaces at various levels, whether with students or faculty members. Mentorship is invaluable to me because I am a product of it, so I am very intentional about sharing experiences with undergraduate students to help them pursue opportunities—especially if they are interested in obtaining a Ph.D. I even had a first-generation college student who completed his undergraduate degree and came with me to the University of Cincinnati when I joined the faculty. This past summer, he completed his Ph.D. and was hooded. Being able to mentor someone throughout their academic journey for so many years has been incredibly rewarding. I also focus on helping undergraduates prepare strong resumes and CVs that will stand out to graduate programs. At the graduate level, I believe it's not enough to simply pass classes and complete a dissertation. Students need the skills to market themselves effectively and secure their desired jobs. It's common for students to finish graduate school with some level of debt, so I try to help by not only guiding them in building strong research portfolios but also ensuring they understand how to negotiate for their desired salaries. I even have a book called The ABC's of Negotiating, which is a children's book that I find applicable to students, early-career professionals, and graduate students alike. At the faculty level, when you look at criminal justice programs across the country, there are only about 50 African American professors, which is not a large number. At the University of Cincinnati, I've been able to recruit two Black professors, bringing the total to four, including myself. This makes us the program with the most Black professors in criminal justice in the United States. Additionally, I have mentored the faculty members I've recruited, helping them navigate academia within the criminal justice department.

Question 4: How are you balancing the expectations to have high quality research alongside with teaching and service?

CC: Much of what I've been able to accomplish comes from thinking strategically, which is a mindset I developed as a graduate student. Whenever I worked on a paper, I always considered whether I could present it at a conference. During my graduate teaching experiences, a fellow AGEP scholar and I would document our experiences and present them at conferences as well. In fact, we even co-authored a peer-reviewed publication on teaching race in the classroom. I've always believed in being smart and strategic because there are only so many hours in a day. I also strongly value collaboration, but not just with anyone—it's important to work with people who truly believe in your work and respect you as a person. Many people assume that simply helping others is collaboration, but real collaboration is about not working in isolation, which can be risky. To this day, I continue to collaborate with AGEP scholars from different universities because we recognize the value of working together and know we can achieve more as a team.

Question 5: Finally, what did you take away from AGEP? Did AGEP inspire you to create similar communities at your institution?

CC: I firmly believe that I needed to be part of AGEP because it was such a reinforcing space. As racial and ethnic minorities and first-generation college students, we form a positive and supportive group. No matter what challenges I faced on campus, I knew I could always turn to AGEP for inspiration, encouragement, and empowerment. Through AGEP, I learned about a variety of topics and research that extended beyond my own academic background, which was fascinating. I also gained a deeper understanding of different disciplines and was reminded of the rich histories we all come from. Being in a space surrounded by such brilliance and

excellence was a constant source of joy for me. While I've always believed in the importance of diversity, it frustrates me when people miss out on the greatness in front of them by overlooking individuals based on their background. Since graduating, I've sought out similar communities because I can't imagine navigating my academic journey without the support of my community or village.

What is MSU SROP?

The Summer Research Opportunities Program (SROP) is a gateway to graduate education at Big Ten Academic Alliance universities.

The goal of the program is to increase the number of underrepresented students who pursue graduate study and research careers. SROP helps prepare undergraduates for graduate study through intensive research experiences with faculty mentors and enrichment activities.

The MSU SROP Program provides an opportunity to combine professional development with applied work experience in your career field. This is also an opportunity for Michigan State University faculty to evaluate you as a potential graduate student. MSU SROP typically convenes the third weekend of May and ends in the last weekend of July.

Program Benefits

- An opportunity to conduct research at one of the country's largest and most scenic academic research universities
- A generous stipend for the summer
- Free room and board on MSU's campus
- Paid travel to/from East Lansing
- Opportunities to present research locally and regionally
- An opportunity to interact with successful role models who have earned advanced degrees

In the scenario that the program cannot occur in person, all research and professional development activities are adapted to a virtual environment.

Eligibility and How to Apply

- U.S. citizen or permanent resident
- Enrolled in a degree-granting program at a college/university in the U.S.
- Cumulative GPA of 3.0 or higher
- Have completed at least 2 semesters of undergraduate education
- Have at least 1 semester of undergraduate education remaining after completing MSU SROP
- Demonstrate a strong interest in graduate study (Master's or Ph.D.)

For more information

Please write to us at: msusrop@grd.msu.edu

Visit us online at: http://www.grad.msu.edu/SROP

Discussion Notes:

Discussion Notes:

MSU AGEP: MSU's premier graduate education learning community for diversity, equity and inclusion

Are you a student or faculty member at MSU and want to join the AGEP Learning Community?

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Visit **grad.msu.edu/agep** for more information

What is AGEP?

The Alliances for Graduate Education and the Professoriate **(AGEP)** is a National Science Foundation program that supports recruitment, retention, and graduation of underrepresented U. S. minorities in doctoral programs of the natural and social sciences, mathematics, and engineering. Undergraduates, graduate students, post-docs, and faculty who participate in building the AGEP Community at MSU rise to meet the challenge of Diversity, Equity & Inclusion (DEI) at U. S. colleges and universities, by nurturing and developing world-class STEM and Social, Behavioral and Economic (SBE) sciences faculty members who fully reflect the diversity in race, gender, culture and intellectual talent of the U. S. population.

National Need

The United States faces a growing demand for a highly educated science and engineering workforce. The annual number of Black, Hispanic, and American Indian citizens earning a PhD must quadruple in order to contribute the science and engineering talent necessary for the U.S. to become self-reliant.

AGEP at Michigan State University – Impact

The MSU AGEP Community represents 75% of doctoral students at MSU who are Black, Hispanic or American Indian citizens that in NSF sponsored departments. Ninety percent of the AGEP Community graduate student participants complete an advanced degree. Over the past 10 years, the AGEP Community has grown from six graduate students in 2006 and faculty to over **250** participants annually with over **400** alumni nation-wide.

The MSU AGEP Learning Community began with support from NSF, and AGEP has become a self-sustaining component of the matrix of graduate student support provided by the MSU Graduate School. A cross-disciplinary AGEP Learning Community of graduate students and faculty meets monthly; discusses active research by participants using everyday language; and considers current topics of regional and national importance for public policy. AGEP is a proven strategy for diverse recruitment, retention, and persistence in graduate education.

For more information, visit us at:
MSU AGEP website: https://grad.msu.edu/agep
MSU AGEP Program Director: Steven Thomas, deshawn@grd.msu.edu

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the individual presenters and do not necessarily reflect the views of the National Science Foundation.

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