PURDUE UNIVERSITY | The Graduate School

InnovatED

Influential. Inspirational. Graduate Research.

More research inside!

A LETTER FROM THE DEAN

Dear Purdue Community,

As Dean of the Graduate School, I have the opportunity to hear about the exciting research projects our graduate students are involved in on almost a daily basis. But one of the things I have realized during my tenure as dean is that many others in our Purdue community don't have that same opportunity. In fact, I get a lot of questions asking, "just what does it mean to go to graduate school and be a graduate student?" One of my favorite responses to this question is describing how our students collaborate with faculty and postdoc researchers to drive the research mission that leads the university to the next giant leap. Our graduate students are on the ground assisting faculty in making research breakthroughs and without them, research programs could not move forward. So, we wanted to provide a vehicle that would highlight graduate students' contributions to the research mission and make their research more visible.

The Graduate School is excited to share with you the inaugural issue of InnovateED magazine. This magazine highlights the research and creativity of our amazing graduate students and their research programs. This unique outlet allows students to present their research to a wide audience who may not have expertise in their research area. What is unique about this magazine is that it is a professional development opportunity for our students. It provides them a vehicle to write a "popular press" piece about their research. Graduate students are excellent at writing scientific papers to present to researchers in their discipline. However, they don't get many opportunities to present their research to the public. InnovateED provides them this opportunity.

We could not be more excited about sharing the research stories of ten of our graduate students. We made a call last spring to solicit submissions and we had many. The articles that appear in this edition were competitively chosen. These stories span colleges from engineering to liberal arts and cover topics from the impact of global warming on coffee farmers to regulating drone usage.

We plan to deliver InnovateEd each semester to your inbox and the archives will be posted on the graduate school webpage. I hope you enjoy learning about what our graduate students study as much as I did. If you have a question, feel free to contact me (lmason@purdue.edu).

Boiler Up,

Linda Mason

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GETTING A NEW LEASH ON LIFE:

Research on psychiatric service dogs for military veterans with PTSD

Posttraumatic stress disorder (PTSD) is an invisible wound often experienced by military veterans. It is estimated that almost 1 in 4 of post-9/11 U.S. military veterans develop PTSD from experiencing a traumatic event during their service. Unfortunately, PTSD is difficult to treat. Not only is there a negative stigma surrounding mental health in military culture, but many veterans who start treatment for their PTSD either drop out or retain their PTSD symptoms after finishing treatment. As a result, many veterans seek out alternative or complementary interventions to help their symptoms.

Kerri Rodriguez, a Ph.D. student at Purdue's Center for the Human-Animal Bond, is studying one potentially promising complementary intervention for PTSD – psychiatric service dogs. These 'PTSD service dogs' are specially trained for tasks that help a veteran's PTSD symptoms. For example, they can be trained to alert and respond to a veteran's anxiety and even wake up the veteran from nightmares.

"PTSD service dogs are becoming increasingly common in the U.S., and stories of veterans benefiting from their service dogs are widespread. However, there is very little empirical research to support their efficacy", says Rodriguez. In fact, the US Department of Veterans Affairs (VA) will not acknowledge or fund psychiatric service dogs as a supported treatment for PTSD simply because there is not enough research.

“WE FOUND THAT THERE WERE, IN FACT, SEVERAL BENEFITS ASSOCIATED WITH HAVING A SERVICE DOG. NOT ONLY DID VETERANS REPORT HAVING LESS SEVERE PTSD SYMPTOMS, BUT THEY ALSO HAD LESS ANXIETY, WERE LESS DEPRESSED, AND WERE MORE SATISFIED WITH THEIR LIVES...”

- KERRI RODRIGUEZ, PH.D.

To address this problem, Rodriguez and her advisor Dr. Maggie O’Haire are conducting a series of innovative studies to determine whether service dogs can indeed help veterans with PTSD, and if so, how they work. To achieve this, they’ve teamed up with an organization called K9s For Warriors, a large non-profit organization providing PTSD service dogs free of cost to veterans with PTSD across the U.S.

The first phase of Rodriguez’s Ph.D. research asked a relatively simple question: How do veterans with service dogs from K9s For Warriors differ from those still waiting on a service dog from this organization? To answer this question, Rodriguez and her advisor, Dr. Maggie O’Haire, surveyed a total of 141 veterans, including 65 veterans that were already placed with a PTSD service dog, and 71 veterans that were on the waitlist to be placed with a service dog. Rodriguez measured a wide range of clinically relevant outcomes, including mental health, quality of life, and psychological well-being.

“We found that there were, in fact, several benefits associated with having a service dog. Not only did veterans report having less severe PTSD symptoms, but they also had less anxiety, were less depressed, and were more satisfied with their lives,” says Rodriguez. "Veterans with a service dog were also able to get out of the house more with their dog’s assistance, making them less socially isolated and better able to participate in social activities than those without a service dog,” she adds.

In addition to asking veterans to fill out a survey regarding their wellbeing, Rodriguez collected saliva samples from the veterans in the study. She wanted to see if veterans with a PTSD service dog had different concentrations of the stress hormone cortisol in their saliva after waking up in the morning compared to those in the control group.

“We found that veterans with a service dog had significantly different cortisol profiles in the morning-closer to what we would expect of a healthy adult without PTSD”, says Rodriguez. “These preliminary findings actually suggest that there may be a physiological mechanism underpinning a service dog’s benefits that affect the brain’s stress response system.” Rodriguez and her mentor, O’Haire, were able to use these preliminary studies as pilot data for an NIH-funded clinical trial on the efficacy of PTSD service dogs. This longitudinal clinical trial will follow 100 veterans over time, assessing them before receiving a service dog and at a follow-up point three months later. Roughly half the veterans in the study will receive a service dog, while the other half will remain on the waitlist.

“Our clinical trial is much more rigorous than our first study. Not only are we getting more saliva samples from veterans over time, but we’re using Fitbit-like wristbands that track veterans’ sleep and activity. We are also looking more closely at the service dog’s temperament and personality to see if that is explaining outcomes”, Rodriguez notes.

Rodriguez's Ph.D. research on the efficacy and mechanisms of PTSD service dogs is incredibly valuable. As this practice continues to surge in popularity, this critically-needed research can not only provide more funding and resources to the nonprofits that need it but has also raised more awareness towards the potential value of PTSD service dogs for military veterans.

"So many veterans have told us that if it weren't for their service dog, they wouldn't be alive today. It's incredibly rewarding to devote my Ph.D. research to a topic that has the potential to help thousands of our military heroes and their families," says Rodriguez.

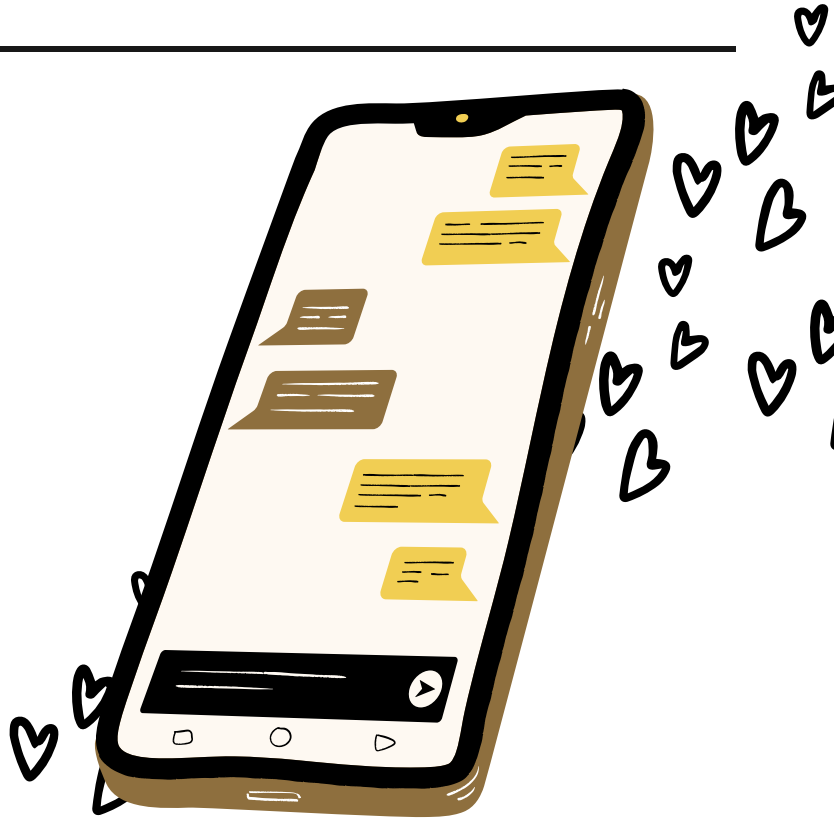
ABOUT THE AUTHOR

KERRI RODRIGUEZ, PH.D.

Kerri Rodriguez was a Ph.D. Candidate in the Purdue University Center for the Human-Animal Bond at the time of her submission. Her academic advisor was Dr. Marguerite O'Haire. As of summer 2020, she graduated and is now starting as a postdoctoral research fellow with the Human-Animal Bond in Colorado (HABIC) at the School of Social Work at Colorado State University.

Prior to coming to Purdue, Kerri earned her B.S. from Duke University and her M.S. from St Andrews University. Her research focuses on evaluating outcomes and exploring mechanisms of therapeutic applications of the human-animal bond.

MOTIVATIONS AND BEHAVIORS ON MOBILE DATING APPS



When online dating began in 1994, people who met their partners through websites were often stigmatized. Since then, technological advancements and decreases in stigma surrounding online dating have led to the creation of mobile dating apps. These proximity-based apps were designed to meet the needs of Millennial and Gen Z smartphone users who prefer to browse dating profiles while on the go. As of 2018, 40% of American adults reported using either dating websites or apps, however many people are not using them for their intended purpose. Tinder, one of the most popular dating apps, found that 70% of users never meet up with their matches. These findings beg the question – If people aren't using dating apps to find romantic partners, why are they using them?

My research focuses on heterosexual individuals' motivations for using dating apps and how on-app behaviors differ among users. In a study of 425 college students, I found that people have four primary reasons for using dating apps: validation, entertainment, casual sex, and forming romantic and platonic relationships. Women tend to use dating apps for validation and entertainment, while men seek casual sex and relationships. Men are more likely to message matches first, while women generally include more photos in their profile.

Motivation for using a dating app also impacts individuals' behavior. Specifically, users seeking relationships are more likely to meet their matches face-to-face and engage in casual sex. When presented with a profile on a dating app, users have the option to indicate interest in a variety of ways depending on the app. Tinder and Bumble, for example, feature an interface modeled after a deck of cards where users can "swipe left" (to indicate disinterest) or "swipe right" (to indicate interest) on profiles. On other apps, like Hinge or Coffee Meets Bagel, users "heart" profiles they are interested in. I was curious what factors encourage heterosexual men and women to indicate (dis)interest on dating app profiles, so I asked 982 college students what makes them swipe right or left.

Not surprisingly, physical attractiveness was a primary factor in swiping right for both genders. Men specifically emphasized a desire for physically fit partners, while women expressed a preference for tall men. One gender difference is that men mentioned swiping right on women who seem to have "good personalities," while women indicated that they are particularly interested in intelligent men. Regarding factors that encourage users to swipe left, women seem to value the quality of pictures included in profiles, citing blurry pictures, mirror pictures,

group pictures, and shirtless pictures as reasons that they would lose interest in a profile. A lack of physical attractiveness is the primary factor that makes men lose interest in a profile. Specifically, they mention "weird" hair colors and excessive piercings or tattoos as reasons to swipe left. Both men and women cite smoking, drug use, and poor grammar and spelling as reasons to swipe left. Political affiliation also plays a role in both genders' decision to indicate disinterest, with men swiping left on "super liberal" individuals while women swipe left on profiles including confederate flags.

So, as you can see, dating apps serve a variety of functions for people. If you are really interested in meeting someone online through one of these apps, you may want to consider some of the factors mentioned here when creating your profile.

ABOUT THE AUTHOR

JESSICA WELCH, PH.D.

Jessica Welch was a Ph.D. Candidate in the Brian Lamb School of Communication. Her academic advisors were Dr. Melanie Morgan and Dr. Sorin Matei. She graduated in summer 2020 and began a job as an Assistant Professor of Communication at Embry-Riddle Aeronautical University in Daytona Beach, FL where she will primarily be teaching science communication, public speaking, and broadcasting.

COFFEE & CLIMATE CHANGE

Climate change is a real threat to the Colombian coffee supply chain. There are more than 500,000 coffee farmers in Colombia whose livelihoods are being threatened by an increasingly chaotic climate, and the coffee sector in Colombia provides jobs for over 2 million people. However, very little is known about Colombian coffee farmers' experiences with climate change.

In order to respond to climate change, we need to consider two possible approaches: (1) Mitigation: decreasing greenhouse gas emissions to lessen the intensity of climate change and (2) Adaptation: adjusting human behavior to the current and future changes in the climate due to climate change. We hear a lot about mitigation. However, it's becoming more important to pay attention to adaptation, as climate change is already happening in parts of the world, such as Colombia. Additionally, we aren't taking the actions necessary to slow climate change down enough to prevent future impacts. Adaptation will protect communities from food shortages and other climate crises.

Successful adaptation to climate changes depends on the particular impacts of climate change on a region, but also the unique communities within that region and their activities. With the support of Dr. Natalie Lambert, I conducted research with a particular community – coffee farmers in Colombia – to understand how they conceptualize climate change and how they communicate their experiences with it from their perspective and in their own words. The goal of this type of research is to support future adaptation projects in this region, so they can be tailored to the community's particular needs.

We collected our data through interviews of approximately 60–90 minutes with 45 coffee farmers in Risaralda, Colombia. Risaralda is one of Colombia's 32 departments located in the foothills of the Andes. Risaralda is a coffee-producing area officially known as the Coffee Axis, which forms part of the UNESCO World Heritage Site known as the Coffee Cultural Landscape of Colombia. Our participants were from each of Risaralda's 14 municipalities, with two to four interviewees from each municipality.

Along with three team members from UTP, I conducted the interviews in Spanish over a two-week period. Participant ages ranged from 30 to 81, with the mean age being 51 years. We began with basic demographic questions, followed by open-ended questions about common challenges farmers face to have a basis of

comparison for understanding the impacts of climate change on farmers compared with other types of challenges. We analyzed the data using line-by-line coding (jargon: guided by dimensionalization, which is a grounded theory approach).

Through our research we found that Colombian coffee farmers know what climate change is, both as a consequence of human behavior and as a lived experience. They reported experiencing unpredictable seasons and weather, which results in farmers experiencing a lot of uncertainty when making everyday farming decisions. This uncertainty is due to (1) farmers' inability to plan planting and harvesting based on previous seasonal indicators, (2) increased pests, disease, drought, and extreme weather events on their farms, and (3) decreased production exacerbating preexisting financial problems arising from slim profit margins and labor shortages. The farmers shared that they feel that their livelihoods are threatened by climate change, that they must change their farming practices to survive climate change impacts, but that they largely don't know how.

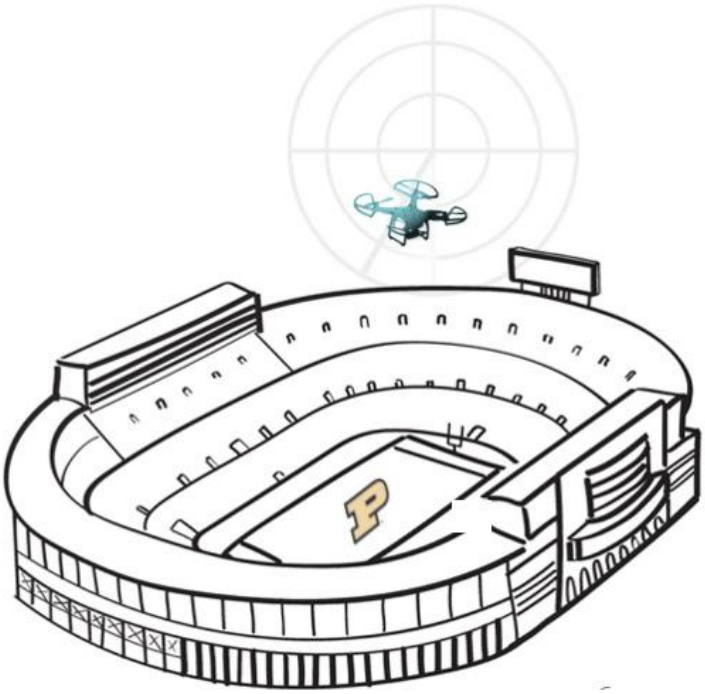
CONCLUSIONS

- Colombian coffee farmers need to be connected with new sources of reliable information in order for them to successfully adapt to climate change.

- The existing financial pressures that compound the impact of climate change on farmers' financial survival must also be addressed. This situation requires an unprecedented change in how farmers are compensated through the coffee supply chain, either at the farmers' end of the supply chain through increased profit at their point of sale, or from the opposite end of the chain with increased profit sharing from intermediaries and consumers.

- Adaptation campaigns should clearly link adaptation recommendations to the specific production problems faced by the farming population, as well as to farmers' grave concerns about profitability.

We need to pay attention to people's experiences with climate change impacts who live in regions vulnerable to climate change, because these experiences are warning signs of what can be expected as climate change impacts unfold globally.



REMOVING ENEMY DRONES & PROTECTING PUBLIC SAFETY

Unmanned Aerial Vehicles (UAVs), more commonly known as drones, keep increasing in number in the United States, particularly multi-rotor UAVs. During 2019, the estimated number of multi-rotor UAVs in the U.S. reached 2 million. This is due to reduced prices, increased availability, improvements in technology and safety, and user-friendly interfaces. This innovation dramatically increased the ways in which this technology can be utilized; however, it also produced some unpredicted situations.

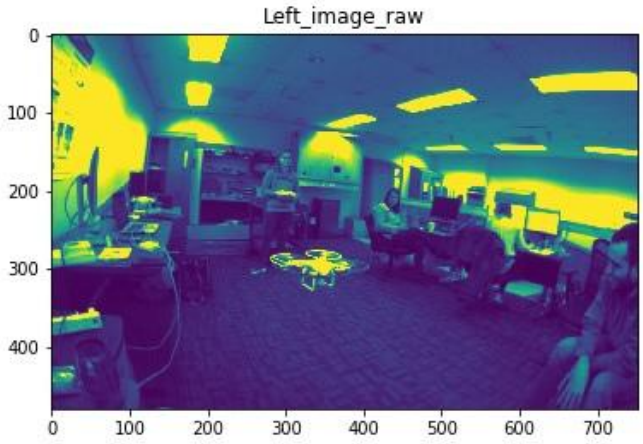
UAVs are used extensively for solving problems in many different fields; however, some fear these devices will become a problem. UAVs can be easily misused or transformed into powerful weapons. For example, a UAV could be used for delivering hazardous material to populated areas, such as sporting events, delivering contraband to prisons, or even recording private data in a neighborhood. Due to these risks, there is an imminent need for systems that can safely mitigate the threat that UAV misuses pose to public safety.

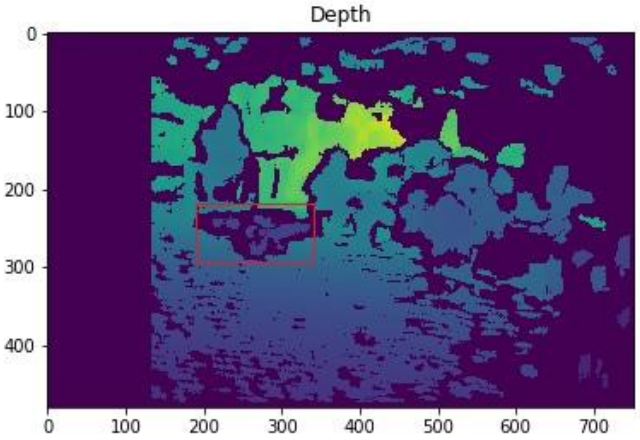
My research is focused on the development of an autonomous Drone Detector, Tracker, and Catcher. This project aims to intercept, capture, and remove intruder UAVs to neutralize potential threats, such as explosives.

Our hunter drone can detect unwanted flying objects in an area and prevent their escape. After capture, these unwanted UAVs are transferred to neutralizing zones, away from populations and other protected locations.

While drones aimed at detecting, tracking, and capturing unwanted UAVs exist, these drones typically force-land or destroy unwanted UAVs. This can be dangerous if a UAV is carrying hazardous materials. Our proposed system has a great advantage over other competitor drones because it moves unwanted UAVs to neutralizing zones, to protect public safety and private property. This requires solving challenging research problems to enable tracking and intercepting an intruder capable of performing evasive maneuvers in 3D space with an autonomous system that has limited computational capability and operational time.

There were three main challenges faced in this research. These challenges included designing a vision system specialized in UAV detection, establishing practical real-time motion control and planning, and designing the capture device. Implicitly, these three research challenges are interconnected, since vision algorithms and motion control affect the hardware specifications and interception strategies. The first challenge is to achieve a precise object detection.





We wanted to find all possible drones in a camera's field of vision. To accomplish this, we developed a detection system comprised of a stereo vision camera, inertial measurement unit, and target motion dynamics modeling. Captures from this stereo camera (MYNT EYE S1030) were used to obtain the depth map. This map holds information about the distance between the camera and the objects in its field of vision. To establish practical real-time motion control and planning, our drone was designed to include a mobile computer. The onboard computer chosen was the NVIDIA Jetson TX1, a very small and lightweight device. Additionally, we used an algorithm designed to continuously search for new intruder UAVs, while also keeping track of the UAVs that it already identified.

The number of Unmanned Aerial Vehicles in the United States is increasing daily. This technology could pose a risk to public safety. Therefore, there is an imminent need for systems, like our hunter drone, that can safely detect, track, and capture unwanted UAVs. My work answers the challenge of tracking and intercepting intruder drones, capable of performing evasive maneuvers in 3D space, while also relocating intruder drones to safe-zones, capable of intercepting hazardous materials.

ABOUT THE AUTHOR

MARIA NIEVES BRUNET

At the time of her submission. Maria Nieves Brunet was a Master of Science student in the Electrical and Computer Engineering Department at Purdue University. She graduated in summer 2020. Maria was awarded the Fulbright Scholarship to pursue her graduate studies. Her research focused on computer vision and tracking algorithms, applicable to the control of autonomous UAVs. Maria's academic advisors were Dr. Mo Rastgaar and Dr. Shreyas Sundaram.

ENGINEERING GUT FUNGI FOR SUSTAINABLE AGRICULTURE AND BIOTECHNOLOGY

The digestive tracts of ruminant and hindgut fermenting animals are extraordinarily complex. A plethora of microbes work together to breakdown the plant material that their hosts ingest each day. Without the work of these microbes, the host organisms would not survive. While bacteria and methane generating archaea receive a majority of the attention, other microbes exist that play a critical role in breaking down crude lignocellulose. Our lab focuses on the often overlooked anaerobic gut fungi (phylum Neocallimastigomycota). These fungi comprise less than ten percent of the microbiome, yet they are responsible for more than fifty percent of the plant biomass hydrolysis within their host organisms. Further, anaerobic fungi are known to encode the largest array of lignocellulose degrading enzymes in the fungal kingdom. Thus gut fungi are poised to advance renewable biochemical technologies that use feedstocks such as corn stover, switchgrass, and poplar as substrates. Unfortunately, there are no genetic tools or techniques to genetically engineer these microorganisms. My work under Dr. Kevin Solomon aims to build a genome engineering toolkit so that anaerobic fungi may be exploited for a diverse range of biotechnological applications.

My work at Purdue University began by isolating these fungi from their host organisms, as there are not any standardized isolates that can be shared between research institutions. In 2017 our lab travelled to the Indianapolis Zoo to collect anaerobic fungi from the fecal material of giraffe, rhinoceros, elephant, and wildebeest. Additionally, our lab isolated a specimen of anaerobic fungi from a horse owned by a faculty member at Purdue University. My earliest studies on this specimen, Piromyces indianae, detail how enzyme expression is tailored in response to changing plant biomass composition. This work has guided many of my current efforts to identify gene expressional strategies in gut fungi, and how we can overcome those limitations to better exploit the diverse potential of these organisms.

To identify gene expression strategies and enable genetic engineering of gut fungi, we are working on obtaining the complete genomic sequences of the three fungal isolates our lab maintains, a task that has been ongoing over the last three years. Anaerobic fungi have some of the most highly biased DNA sequences of any organism reported to date. This DNA sequence bias greatly impedes the assembly of the genetic sequences into chromosomes. Currently, we are collaborating with the Joint Genome Institute and PhaseGenomics to address these challenges. This improved genome resolution will be essential for identifying genes, characterizing genome structure and organization, as well as uncovering

many of the key biological phenomena in these organisms. For example, it is unknown how gut fungi switch to an aerotolerant state that allows transmission between host organisms, a finding that could greatly accelerate genetic engineering. Nonetheless, we have obtained chromosome level genome resolution for one of our 3 fungal specimens, which we hope to analyze and publish next year.

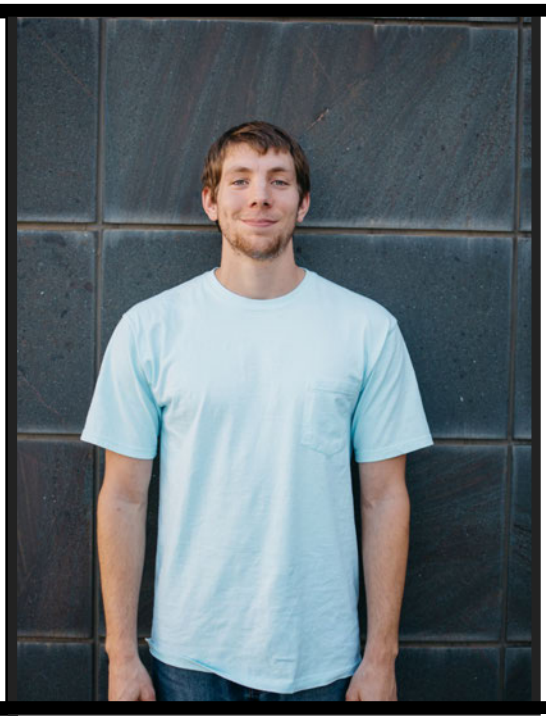
Currently, I am studying how these fungi rapidly adapt gene expression to a range of biological conditions. Gut fungi tailor their enzyme expression to match the complexity of the substrates they grow on. Consequently, I am working on identifying ways to short-circuit this gene regulation such that these enzymes can be hyper secreted regardless of growth conditions. One method to accomplish this is by interfering with epigenetic regulation. Epigenetics describes the effect chromatin structure has on gene expression. Depending upon the region of the genome or stage of the fungal life cycle, the chromatin may be highly condensed, or it may be organized very loosely. By adding chemicals that alter how histone proteins are chemically modified, fungal xylanase (an enzyme responsible for hydrolyzing hemicellulose) expression can be increased by almost 100%. This finding is the first report of epigenetic regulation in anaerobic fungi and establishes the link between chromatin structure and plant biomass degrading enzymes.

To complement these findings, I am working on identifying all of the histone post translational modifications, through a collaboration with the Environmental Molecular Sciences Laboratory at the Pacific Northwest National Lab. This work provides insight into the mechanisms that control anaerobic fungal plant degradation abilities and develops facile tools to enhance activity for efficient plant degradation.

Anaerobic fungi are key in the digestion of plant biomass, and while their enzymes may be used for advancing renewable biochemical technologies, many other opportunities exist. By building a genome engineering toolkit for gut fungi, it is plausible that strains that hyperproduce plant biomass degrading enzymes could be leveraged as a probiotic for large herbivorous animals. Alternatively, as anaerobic fungi release hydrogen gas as a byproduct of fermentation, they are intimately associated with methane generating archaea. By using genetic engineering, it may be possible to manipulate fungal metabolism so the interaction between the fungi and the methane generating archaea is lessened in order to mitigate methane emissions. However, in order to achieve any of these potential biotechnological applications will first require a basic understanding of gene expression, regulation, and genome engineering tools, which is the subject of my research at Purdue University.

ABOUT THE AUTHOR

CASEY HOOKER



Casey is a Ph.D. student in Agricultural and Biological Engineering under Dr. Kevin Solomon, and an NSF GRFP Fellow. His work focuses on genetically engineering anaerobic fungi for biotechnology applications. Casey is originally from Rensselaer, Indiana, and in his free time he enjoys swimming and being outdoors. After graduating from Purdue, Casey hopes to work at a US National Lab such as the National Renewable Energy Laboratory, or at the Oak Ridge National Laboratory.

MULTILINGUAL-MULTILITERACIES MATTER:

The Home and Community Multiliteracies Practices of Multilingual Families

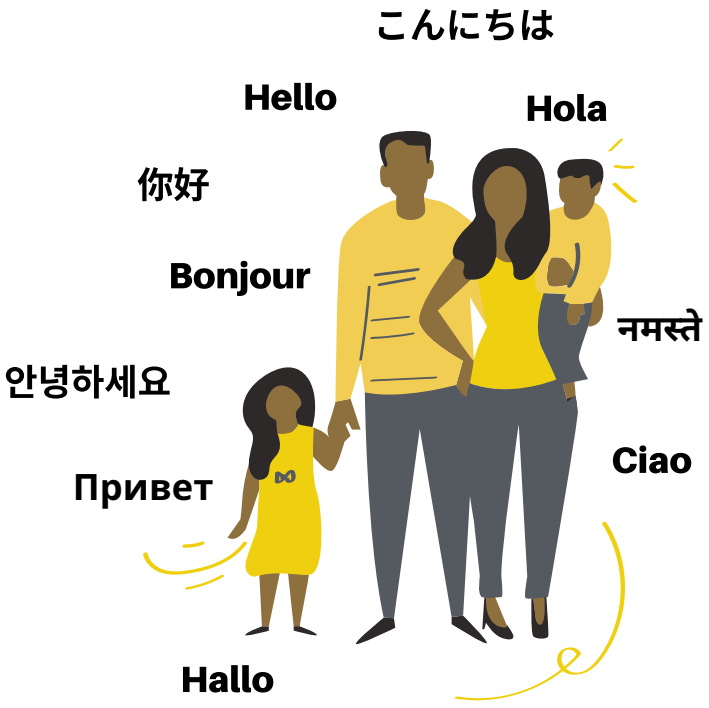
Families from other language backgrounds, or multilingual families, blend languages as they are influenced by their social surroundings, creating the conditions for multilingual multiliteracies (Fishman, 2001; García & Wei, 2014; New London Group, 1996). Multiliteracy is a language and literacy paradigm, in which all languages and literacies are valuable and serve a purpose in meeting the needs of the learners within their new social contexts. Negotiated through different languages, technologies, and modalities, multiliteracies are represented in the homes and communities of multilingual families, shaping their unique identities. Identities are important in establishing one's individuality and sensing a source of contribution to their families and new communities (Compton-Lilly, 2007; Leland, et al., 2017; Morita-Mullaney, Li, & Renn, 2019; New London Group, 1996; Reyes & Halcón, 2001).

Tigert (2018) affirms that to educate their diverse learners in a culturally and linguistically responsive way, teachers must understand that students' rich literacies practiced within their homes and communities may differ from those that teachers understand and instruct in schools. To date, little research has been conducted relating to the literacies that are created when families possess multiple linguistic resources. As part of a larger federally funded project, I conducted this study with two of my professors to address such research gaps. We explored family engagement within the literacy practices of multilingual families in five Indiana communities, identified in-home resources, and examined how parents are raising multilingual and multiliterate children. This study explored two research questions. First, what are the home literacy practices and resources of multilingual families in the five Indiana school districts? Second, how do these family-based literacy practices exhibit multilingual multiliteracies?

A collective case study is used for this inquiry as it examines the same group of individuals (multilingual parents) and how they identify and appropriate multiliteracies in their homes and communities. Within this narrow scope, we can identify how families construct multilingual multiliteracies.

A 32-item questionnaire (Bailey & Osipova, 2015), was completed by parents of elementary-age multilingual students from five Indiana communities, representative of different geographies, including rural, town, urban, and suburban. A total of 1,204 questionnaires were collected.

After the questionnaires were returned, 72 families indicating interest in a follow-up were interviewed in their home, school, or local community center to learn more about their home literacy and language practices.



"THIS INQUIRY PROVIDES IMPORTANT IMPLICATIONS FOR EDUCATORS AS THEY MOVE FROM THINKING OF LITERACY AND LANGUAGES AS STANDARD, FIXED, AND ENGLISH-MONOLINGUAL TOWARD A MORE RESPONSIVE MULTILITERACY APPROACH TO ENHANCE HOME, SCHOOL, AND COMMUNITY CONNECTIONS."

- HAIYAN LI

This semi-structured interview included questions related to print and media sources in the home, how family members interfaced with these resources, practices related to homework and school documents, and other forms of multiliteracies in the home and the greater community.

The interviews were analyzed in two stages using Nvivo 12 qualitative software (QSR International Pty Ltd., 2018). First, codes were developed for the four areas of print, media, school, and created literacies. After categorizing items into these areas, each item was then analyzed for themes and patterns of multiliteracy use. Similarities and nuances were noted across families. In the final stage of analysis, data was triangulated from the questionnaire and the interviews to describe the themes, patterns, and dissimilarities across the families.

Findings from these interviews demonstrate that families acquire and use literacy in a multitude of ways, which are divided into the four categories including print literacies (print materials at home, books or other texts; reading and book storage); media literacies (televisions, videos, movies, music, radio, internet, social media, computers, and smartphones and texting); school literacies (language and translation of school documents and homework); and created literacies (other activities and literacy practices in the home and community).

The findings recognize the activities the parents engaged in with their children and emphasize the importance of the home-based literacy practices on children's emergent literacy, language skills, and identities.

Families use translation tools, such as Google translate to critique the varying qualities of school translations and negotiate their children's homework across their shared languages. Churches also play a central role, furnishing multilingual spaces to negotiate the meanings of sermons, school activities, and to foster affiliation with fellow community members.

Such language and literacy activities accomplish the simultaneous goal of English language development, heritage language maintenance, and transformation of both languages into unique forms of immediate relevance. These multilingual resources demonstrate multilingual families' creative agency. Through interaction, family members are taking on particular roles and identities within their home, school, and communities. This inquiry provides important implications for educators as they move from thinking of literacy and languages as standard, fixed, and English-monolingual toward a more responsive multiliteracy approach to enhance home, school, and community connections.

Classroom educators can examine how their own definitions of language and literacies intersect and differ from the language and literacies of their multilingual students' households. Teacher inquiries into families' multilingual multiliteracies can expand what "counts" as literacy.

This project was funded by the Office of English Language Acquisition's US Department of Education: Grant #: T365Z170072. I would like to thanks Drs. Morita-Mullaney, Renn, and Wright for their support on this important work.

ABOUT THE AUTHOR

HAIYAN LI

Haiyan Li is a doctoral student in Literacy and Language Development in the College of Education at Purdue University. Her academic advisor is Dr. Wayne Wright. Haiyan is also an on-leave associate professor in the College of Foreign Languages at North China Electric Power University, China. She has taught a variety of English language courses for postgraduates, undergraduates and k-12 levels in China for 20 years. She has been working as a research assistant for a USDE Grant, and her current research interests include bilingual and biliteracy development of emergent bilingual students and literacy instructions in linguistically diverse classrooms.

HOW LONG WILL YOUR LAPTOP OR ELECTRIC VEHICLE LAST?

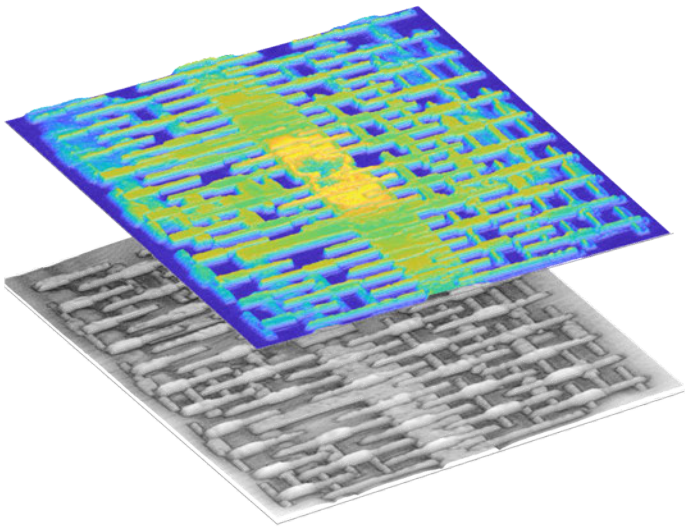
Ever wonder why your laptop becomes so hot after a couple of hours of playing your favorite video game? Or maybe you have heard about Microsoft's Project Natick, and wondered why they would like to develop subsea datacenters? This is because the semiconductor chips in the motherboard of your laptop are processing more than a million tasks per second, making sure you enjoy your high adrenaline video game while dissipating heat in the process. Heat reduces a chip's lifetime. In fact, if the temperature of a chip is 10 degrees higher than the designed temperature, the lifetime reduces 3-fold or more! Therefore, even a slight inaccuracy in temperature modeling can cause significant uncertainty in the predicted lifetime of a chip. Project Natick's objective is to use seawater to cool the data center and keep the transistors functioning so that you don't lose the data you uploaded in the cloud.

Temperature inaccuracies could cause your brand-new technology to fail within months. Interested in purchasing an electric vehicle or a new phone? If the thermal design or lifetime of its core transistors is wrong, your car and phone may stop functioning within a few months. The situation is worse for medical instruments and airbags, where people's lives may be at risk if the lifetime of the transistors is not accurately predicted.

Over the past six decades, the power handling capacity of a transistor increased from a few milliwatts to hundreds of kilowatts, making all the new models of electric vehicles and spaceships possible. To keep up with the demands for high integration density, high power and high reliability, the basic architecture of a transistor has been changed by introducing intrinsically doped layers or tying source-drain terminals, to handle higher voltages, which makes the accurate prediction of lifetime more complicated. Despite half a century of research, the lifetime of high-power transistors, also known as 'power transistors', is still underestimated or overestimated regularly.

My research aims to provide a novel, simple model for understanding the performance of power transistors at high voltages and temperatures. Our model reveals that, in the past, significant errors were made when estimating the lifetime of such transistors, making the performance of these transistors look worse than actuality.

Our results and analysis was possible by rethinking the traditional approach to the modeling of power transistors. Instead of taking the complicated route of modeling the power transistor as complex circuit components, we simply modeled it as two elementary transistors connected in a series, with some approximation about their threshold



voltage. Although it appears quite simple, a copious amount of experiments and simulations are behind these approximations. In the end, the model beautifully reproduced all the experiments and computer-aided device (CAD) simulations.

Since the elementary transistor models were extensively researched and very well known, we were able to examine the device like no one else to understand what is actually going on. By taking a few measurements, we were able to determine that threshold voltage degradation is corrupted by mobility degradation, a very important factor that was previously overlooked. Using the model, we were able to isolate the mobility degradation component, subtract it from the actual threshold voltage degradation, and accurately predict the lifetime of a power transistor. We found that when the transistor operates at just 8 volts, the lifetime would be underestimated by as much as 40% if the mobility degradation is not identified and subtracted. This mischaracterization led semiconductor companies to lower the warranty period on their products, losing out on hundreds of millions of dollars over the decades. Due to these findings, Texas Instruments, a prominent semiconductor company, contacted us and requested that we model a newly minted power transistor and predict its lifetime for their company.

ABOUT THE AUTHOR

BIKRAM KISHORE MAHAJAN

Bikram is currently a PhD Student in the Department of Electrical and Computer Engineering at Purdue University, in Alam CEED Group supervised by Prof. Muhammad Ashraful Alam. His PhD research is about hot carrier degradation and other reliability physics of high and low power electronics devices, wide-bandgap materials and developing packaging solutions for high voltage devices. During his master's degree, he developed a low cost printing technique for manufacturing bio resorbable electronics devices.

FOOD CHOICES OF PEOPLE LIVING WITH HIV IN DAR ES SALAAM, TANZANIA

Human immunodeficiency virus (HIV) is a global public health concern that has claimed 32 million lives *(1)*. People living with HIV (PLHIV) need a nutritious diet to optimize antiretroviral (ARV) treatment. However, food insecurity, poor nutrition, disease progression, and ARVs alter people's food preferences and choices, creating challenges for maintaining health and well-being.

As part of the Diet, Environment, and Choices of positive living (DECIDE) study: Evaluating personal and external food environment influences on diets among PLHIV and families in Dar es Salaam, Tanzania, we examined PLHIV and their families' food environment. With guidance from Turner's food environment framework, we investigated the 'external' (i.e., availability, pricing, vendor and product properties, marketing) and 'personal' (i.e., accessibility, affordability, convenience, desirability) food environment *(2)* using qualitative interviews of PLHIV (n=20) and family members (n=20). Interviews were conducted in December 2018-May 2019 in the local language (i.e., Kiswahili), transcribed, translated, and analyzed using inductive and deductive approaches for theme identification. This study's goal is to describe what drives PLHIV food preferences and choices in peri-urban Dar es Salaam.

Giddens' structuration theory describes how food choice depends on a family's food environment and social practices *(3,4)*.

"FOOD IS CRUCIAL FOR PLHIV AS IT CAN IMPROVE THE EFFICACY OF HIV TREATMENT..."

The socioecological model can evaluate the impact of HIV. At the policy level, safe food is not always available with Tanzania's rapidly urbanizing population *(5)*. Given substantial economic strain, people's consumption is based on availability, rather than preferences: "We can't afford to choose; you can't make everyone happy." Much food uncertainty for families comes from price fluctuations as "everyday food prices increase." Food security tremendously impacts PLHIV health status. There is a significant link between food insecurity and HIV at the individual, household, and community levels *(6)*. Food insecurity causes malnutrition and risky survival behaviors and ultimately disease progression and poverty *(7–9)*.

Additionally, community factors influence societal norms. In Tanzania, variation in meal structure is based on availability and individual values (e.g., preferences, classifications, and stigma), which depend on culture and ethnicity *(10)*. Prior and anticipated experiences and personal and external influences are among the multifaceted factors influencing food choice *(11)*. For instance, we found when people migrate, they continue eating foods from their places of origin, but interpersonal relationships and social networks also influenced these choices.

Our findings showed this paralleled how PLHIV dealt with financial burdens when seeking an adequate diet. Some indicated they borrow money from social support networks or were gifted food donations; however, many other participants found that "in urban areas, you fight on your own." While preferences were important, they were limited by the family budget. Porridge becomes the typical staple consumed when money was tight, but a caregiver indicated how: "You can see he is eating, but he isn't happy," and thus, food consumption decreased — causing caregivers to attach a perceived significant meaning to food and to ensure adequate PLHIV intake for treatment effectiveness *(12)*. With food shortages, caregivers prioritized PLHIVs' food intake so they could take medications, some even monitoring compliance with medication. We found only when more severely ill did PLHIV eat foods different from the family. During those times, family members sacrificed the quality and quantity of their own meals by providing PLHIV special consideration. The caregiver's knowledge of healthy foods for PLHIV impacted home availability and, thus, individual consumption.

We described the core motivations and perceptions of PLHIVs' food environments and how they can affect household food choices, intrahousehold food allocation, and dietary intake. PLHIV had diverse food preferences and could not always articulate them. Many prefer the smell of

cooked food while avoiding roasted foods. Dislike of food texture or appearance reduced appetite. Generally, a sugary taste was preferred while sour avoided: "...when I eat lime, it makes the blood in my ears to run cold." Some reported sharp taste preferences, and occasionally preferences were complemented with knowledge: "the bitterness also cures blood pressure, diabetes." Knowledge of higher nutritional value (e.g., meat), satiety (e.g., stiff porridge), and doctor instructions (e.g., sweet potato or cassava leaves) drove food choices. PLHIV preferences and avoidances based on organoleptic characteristics of food differed by medication usage and current disease state. The food environment lacked availability and access. Meals would be skipped, particularly dinner, as economic constraints and lack of appetite due to ARV-induced changes in preferences worsened comorbidities and sometimes changed body image. Food is crucial for PLHIV as it can improve the efficacy of HIV treatment *(12)*;food insecurity diminishes ARVs' ability to work effectively *(8)*. ARV usage intensifies foods' organoleptic characteristics, and preferences are exaggerated with the severity of illness.

Overall, this study provides an understanding of food choice influencers for PLHIV and their families from all ecological levels. Food choice comes with social values, so it is vital to know the food choice dynamics of the family when faced with HIV. Using the family perspective will be useful for tailoring future interventions for these vulnerable populations.

ABOUT THE AUTHOR

MORGAN BONCYK

Morgan Boncyk is a Master's student in Public Health at Purdue University. Her Academic Advisor is Shauna Stapleton, MPH. With a love of culture and travel, she plans to apply her skills and knowledge on a global scale. In doing so, she has worked on various research projects that have taken place around the world. Her most extensive research has been in Dr. Nilupa S. Gunaratna's lab for over two-years. Morgan wishes to make a difference and stand for those who lack a voice.

HOW UNDERACHIEVEMENT DEVELOPS IN GIFTED GIRLS

The academic underachievement of gifted students has been a persistent concern for decades. Much of the research regarding gifted underachievers has focused on identifying causes of this phenomenon (e.g., Lupart & Pyryt, 1996; Matthews & Mcbee, 2007; Reis & McCoach, 2002) and characteristics of gifted students who underachieve (e.g., Baslanti & McCoach, 2006 McCoach & Siegle, 2003; Obergriesser & Stoeger, 2015). However, research on how underachievement develops in gifted students (e.g., Snyder & Linnenbrink-Garcia, 2013) and the role school and home-life factors play in the development of underachievement is scarce. The purpose of my research is to fill these research gaps by conducting an exploratory multiple case study (Yin, 2018) to examine the experiences of middle and high school gifted students who identify as underachievers. There are two research questions that guided my inquiry. First, how do gifted girls experience underachievement and what do they identify as contributing aspects? Second, what are the commonalities and contrasts among the cases?

To answer these questions, we sampled four girls, formally identified as gifted prior to entering high school, who self-identified as underachievers. All of them mentioned a sustained lack of motivation to achieve well in school. Table 1 illustrates the case profiles of each participant.

Three semi-structured interviews were conducted with each participant. The questions in the interview protocol were designed to provoke thought about experiences with underachievement. Narratives were constructed following the guidelines offered by Seidman (2013). I began by reading the transcripts, writing initial reflections (i.e., writing memos), and bracketing (i.e., engaging in the self-reflective process of recognizing and setting aside—although not abandoning—any prior knowledge and assumptions; Tufford & Newman, 2012) my thoughts and responses. Next, I crafted a narrative using the participants' own words, identified salient issues within each narrative and explored connections and differences among the narratives through initial coding. Specifically, I thematically analyzed the narratives with the intent to identify aspects appearing to contribute to the onset, development, and resolution of underachievement. Finally, I interpreted each story, determining broader meanings by using a combination of focused and axial coding (Saldaña, 2013). I constantly compared the patterns, themes, and topics identified against the data to test the emerging hypotheses for plausibility, according to the constant comparative method (Thomas, 2016). Finally, to increase the trustworthiness of the findings, a copy of the final manuscript was sent to each participant for member

Table 1
Case Profiles

Carolina*	Jessica*	Rachel*	Vicky*
Age: 15 **Grade:** 10 **Gender:** female **Race:** White	**Age:** 16 **Grade:** 10 **Gender:** female **Race:** Native American: Southwestern tribe**	**Age:** 16 **Grade:** 11 **Gender:** female **Race:** White Hispanic	**Age:** 15 **Grade:** 10 **Gender:** female **Race:** White
Formally identified as gifted: Yes	**Formally identified as gifted:** Yes (no longer qualifies)	**Formally identified as gifted:** Yes	**Formally identified as gifted:** Yes
Current GPA: 3.2 **Highest GPA:** 3.7 **Lowest GPA:** <3.0	**Current GPA:** 2.8 **Highest GPA:** 3.0 **Lowest GPA:** 1.5	**Current GPA:** 2.3 **Highest GPA:** 3.0 **Lowest GPA:** 2.0	**Current GPA:** 3.7 **Highest GPA:** 3.7 **Lowest GPA:** 3.7
Birth Order: Oldest; one half-sibling lives with mother. Carolina lives with father.	**Birth Order:** Youngest of four girls	**Birth Order:** The only child	**Birth Order:** Youngest of two
Family Income: $50,000-$74,999 **Languages spoken at home:** English **Parent's highest level of education:** Ph.D.	**Family Income:** $50,000-$74,999 **Languages spoken at home:** English and Southwestern tribe language **Parent's highest level of education:** Graduate degree	**Family Income:** $75,000-$99,999 **Languages spoken at home:** English and Spanish **Parent's highest level of education:** M.S.	**Family Income:** $75,000-$99,999 **Languages spoken at home:** English and Spanish **Parent's highest level of education:** Ph.D.
Other important information: Carolina was diagnosed with Dyslexia in third grade.	**Other important information:** Jessica moved from a Native American reservation to a predominantly White school at age 11	**Other important information:** Rachel was diagnosed with ADHD, general anxiety disorder, and depression.	**Other important information:** Vicky was diagnosed with ADHD, general anxiety disorder, and depression.

Note. *These are pseudonyms. ** In consultation with the participant we decided not to name the specific Native American tribe to which she belongs to protect her identity.

checking to identify any evidence of researcher bias. None of the participants indicated disagreement with the interpretations and statements in this article.

From this analysis, I concluded that a pattern of similar onset and development of underachievement is evident across the four narratives. For all four girls, academic achievement was disrupted when they experienced a sudden increase in curricular demands. Participants' negative self-perceptions, lack of learning skills, and negative relationships with teachers commonly contributed to the maintenance of underachievement. Finally, the underachievement began to resolve for three of the girls when they began to focus on their goal of college admission. For the fourth girl, Vicky, underachievement had not yet been resolved at the end of the study, but she was achieving according to her potential in out-of-school activities, such as her research work with a university professor.

This exploratory study was focused on the subjective experience of underachievement. In general, the study illuminated complex social and emotional aspects of school and other developmental transitions, many of which might not be recognized and acknowledged at home or in school.

Many studies have discussed lack of motivation as a possible explanation for underachievement. However, my results indicate that motivation was only one of several aspects identified by these girls as a reason for underachievement. Motivation is a complex construct that encompasses self-concept, self-efficacy, and goal valuation (Siegle et al., 2017; Wigfield & Eccles, 2000). My results indicated that each of these underlying constructs affected the participants' motivation and, in turn, affects achievement differently. Moreover, motivation and underlying constructs were influenced by participants'

psychosocial development, student-teacher relationships, and students' learning skills.

These findings offer direction for further examination of the elements that impact academic achievement and offer suggestions for intervention research aimed at resolving or preventing academic underachievement.

This research was funded by the American Psychological Foundation's Esther Katz Rosen fund grant.

ABOUT THE AUTHOR

OPHÉLIE DESMET, PH.D.

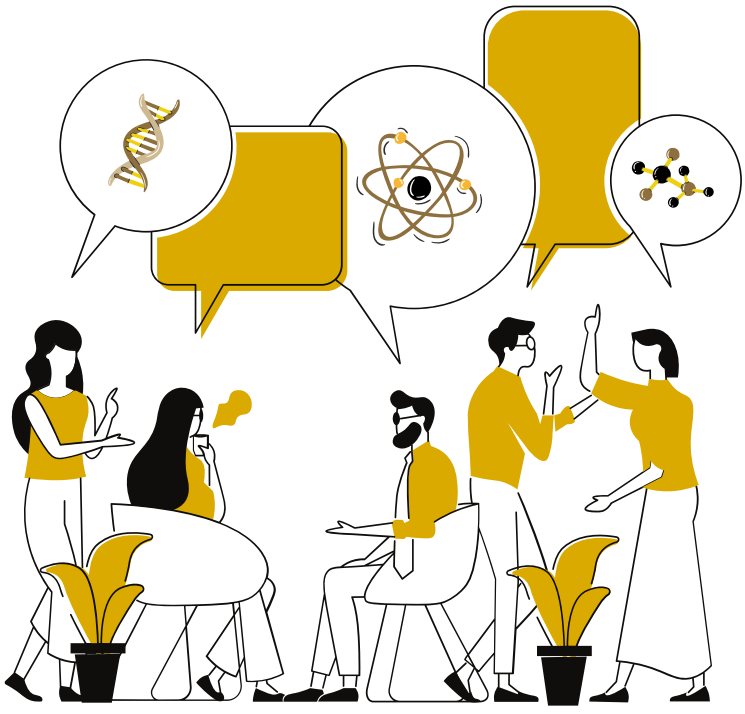
At the time of her submission, Ophélie Allyssa Desmet was a doctoral candidate in the College of Education at Purdue University. Her research focused on academic underachievement, achievement motivation, talent development, and issues of underrepresentation and equity in gifted education. Ophélie's academic advisors were Dr. Nielsen Pereira and Dr. Marcia Gentry. As of summer 2020, Ophélie graduated and is now a Postdoctoral Research Assistant in the Department of Educational Studies at Purdue University.

INVESTIGATING CHEMISTRY OUTREACH FACILITATORS' EXPERIENCES WITHIN A COMMUNITY OF PRACTICE

Informal science learning occurs outside a school setting, or via activities and events that are not part of an ongoing school curriculum (Ryu et al., 2019; Stocklmayer et al., 2010). Chemistry outreach events are considered informal learning environments, with student organizations at the forefront of planning and implementing said events (Pratt & Yezierski, 2018). Although there is an extensive collection of activities and demonstrations for outreach events, there is little research that focuses on understanding other aspects of chemistry outreach. To broaden our knowledge on this topic, we studied leaders of student organizations participating in chemistry outreach. To do so, we conceptualized student organizations participating in outreach events as a community of practice.

Communities of Practice (CoP) are "...groups of people who share a common passion or concern and deepen their understanding of the topic by interacting on an ongoing basis" (Wenger et al., 2002). Leadership is one of the design elements of a CoP; and, Brokering, Boundary Objects, and Interactions are boundary processes through which members of a CoP engage with people outside of the CoP (Wenger, 2000). As a framework, CoP is highly abstract (Storberg-Walker, 2008) and does not describe how the design elements and boundary processes interact with each other. The main goal of this study is to investigate what factors contribute to the facilitators' experiences in chemistry outreach events in terms of Leadership and Boundary Processes. By exploring the experiences of chemistry outreach facilitators who are leaders of student organizations, we are building on the CoP framework.

A case study methodology was adopted for this study. This methodology is suggested when researchers want to understand a real-world case and assumes understanding will involve important contextual conditions pertinent to the case (Baxter & Jack, 2008; Yin, 2014). Nine (9) participants of a chemistry graduate student organization agreed to participate in the study. All participants were graduate students. For Case #1, the participants attended Girl Scout Day, an event in which the student organization hosts middle-school girl scouts and carry out hands-on activities with them. For Case #2, the participants were part of National Chemistry Week (NCW). For NCW, the student organization recruits volunteers within and outside of the organization to visit classrooms in local schools and perform hands-on activities and demonstrations with the children. Out of nine participants, seven (7) self-identified as underrepresented minorities (URMs). To protect their identity, experiences shared by



"BY BEING MORE MINDFUL ABOUT THE FACILITATORS' NEEDS, LIKE LANGUAGE BARRIERS OR DIFFICULTIES ENGAGING THE AUDIENCE AT EVENTS, THESE NEEDS CAN BE BETTER ADDRESSED. "

- STEPHANIE SANTOS-DIAZ, PH.D

URM participants will be presented as Gael, and experiences shared by non-URM participants will be presented as Sophia. Creating composite characters based on shared experiences is a common practice in qualitative studies, especially when it is necessary to conceal the identity of easily identifiable populations (Allen, 2018; Dwyer et al., 2016; Eisenbach, 2015).

This study is part of a larger study implemented to identify leadership styles in chemistry outreach. Only a portion of the larger data set (i.e. interviews with participants) informs this study. The interviews were transcribed and then analyzed through open-coding (Merriam & Tisdell, 2016), where similar statements or responses were grouped into different themes pertaining to facilitators' experiences. Four broad factors contributing to facilitators' experiences were identified: experiences with outreach initiatives, gender, race/ethnicity, and educational background.

Gael has extensive chemistry outreach experiences that influence how she thinks about outreach, its structure, and its goals. She uses outreach events to engage in Brokering (i.e. share knowledge) because she believes the events can serve as a learning experience. Her experience with outreach events can influence Boundary Objects (i.e. how the organization prepares for the events). However, due to challenges related to race/ethnicity, she was not able to portray herself as the leader that she is. She was not comfortable speaking English in public, so language was a barrier for her to participate in conversations during planning meetings.

For Gael, inquiring about the science behind the demonstrations was a goal of the event. It was important that attendees of the outreach event felt comfortable asking questions. She expressed that cultural differences and not being familiar with the local culture influenced how she engaged with attendees (i.e. Interactions). In terms of gender, Sophia used outreach events to portray herself as a role model in her community, impacting Interactions. As for educational background, Gael and Sophia acknowledged that having graduate students facilitate the outreach events presents difficulties to make learning a goal of the event (i.e. Brokering), given that each graduate student has a different understanding of the experiments. They also are unaware of the level of knowledge of their young audience, impacting Boundary Objects and Interactions.

The results of this study can be used by student organizations to adopt new outreach practices. For example, leaders can plan pre-event meetings to get to know other leaders/facilitators. By being more mindful about the facilitators' needs, like language barriers or

difficulties engaging the audience at events, these needs can be better addressed. Being aware and understanding differences amongst the organization can positively influence the organization's performance in chemistry outreach events. For more information about suggestions and other results, refer to the journal *Chemistry Education Research and Practice* (Santos-Díaz & Towns, 2020).

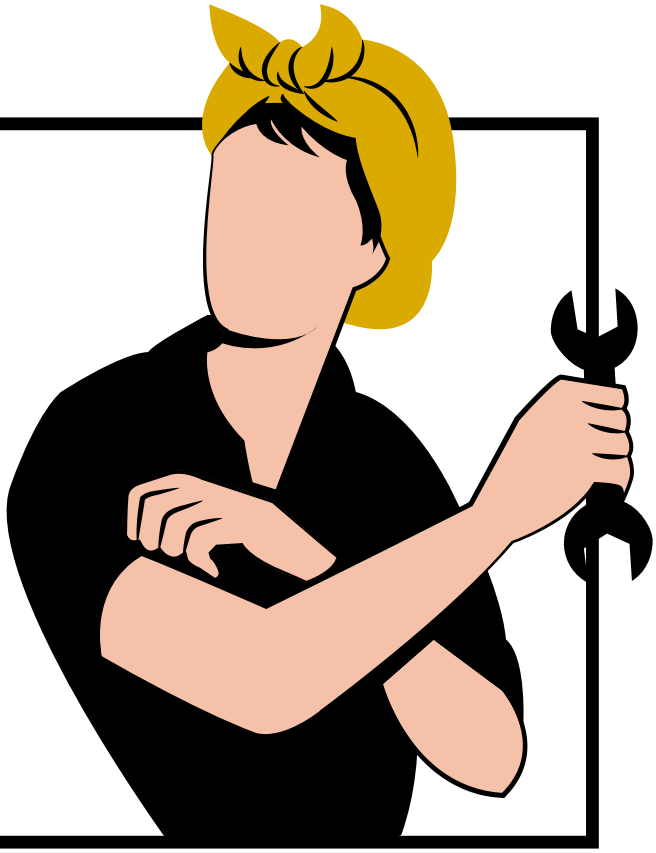
ABOUT THE AUTHOR

STEPHANIE SANTOS-DÍAZ, PH.D

Stephanie Santos-Díaz earned a B.S. in Chemistry from Universidad de Puerto Rico at Cayey in 2016. She was a Ph.D. Candidate in the Division of Chemistry Education at Purdue University and an NSF GRFP Fellow. Stephanie graduated in summer 2020. Her academic advisor was Dr. Marcy Towns. Early in her career, Stephanie demonstrated a strong commitment with science outreach. Inspired by her prior experiences, she decided to design her dissertation work around chemistry outreach and leadership.

BOILERS WORK

Internship Program



The Boilers Work internship program provides ten graduate students per year with a $4,000 stipend to pursue a summer internship. This program is intended to help our students garner real-world work experience, refine soft-skills, and establish career connections prior to graduation. Upon return, program participants are required to facilitate one professional development workshop to share their experiences and insights.

This year's recipients of the Boilers Work award included Master's and Ph.D. students from across the university in programs such as Public Health, Curriculum Studies, Anthropology, Communication, and Linguistics.

Internships were conducted at the Tippecanoe County Health Department, the Immigrant Resource Center of Miami, People for Community Recovery, The Center for Closing the Health Gap, and more! The following are some of the stories shared by our Boilers Work award recipients about their internship experience this summer.

AMANDA WALLER

Master's Student: Anthropology

I spent the summer of 2020 working as an intern with People for Community Recovery (PCR), a non-profit in Chicago, IL. PCR was started in 1979 by Hazel Johnson, a woman now widely considered to be "the mother of the environmental justice (EJ) movement". PCR's focus has consistently been on the intersecting issues of housing, transportation, food access, education and injustices based on race and class.

As an intern at PCR during a global pandemic, there were significant changes that happened, including going completely virtual. While these changes were unexpected, I was able to support PCR's work in several ways while not being in-person. As a part of a larger campaign focused on a potential solar farm coming to the area, I researched community benefit agreements, focusing on possible benefits from this project. I was also able to help PCR in writing grants, facilitating virtual community meetings, and distributing much needed PPE to the community. This internship experience not only taught me about the invaluable work PCR is doing and the existing inequalities in Chicago, but truly tested my ability to be flexible, self-reflective, and humble.

HANNAH GALLION

Master's Student: Public Health

Throughout the summer, I conducted my practicum experience at the Tippecanoe County Health Department. Getting to work at the health department during a global pandemic provided me the opportunity to gain skills needed as an epidemiologist. Throughout the summer, I worked on three main projects and participated in various trainings. For the first project, I updated and completed the Infectious Disease Binder, which contains information about each reportable disease. The information includes the case definitions, Indiana Administrative Code, Quick Facts, and a case definition flow chart for each disease. The Quick Facts sheet includes information about symptoms, the spread

and contagiousness of the disease, as well as prevention strategies. The second project consisted of running the Second Quarter Board Report for Communicable Diseases. The purpose of the Board Report is to track how many cases of each communicable disease are reported in the county. In addition to completing the Second Quarter Report, I compared the Second Quarter Report to the First Quarter Report providing a way to show if the change was significant. A significant increase in cases could represent an outbreak in the county. The last project consisted of contact tracing for COVID-19 and Hepatitis. For COVID-19, I assisted in the Call Center and conducted interviews about place of employment in order to prevent outbreaks in the community. I also completed Hepatitis investigations for newly diagnosed cases. During my time at the Health Department, I gained skills in tracking and preventing the spread of disease in a community.

JANELLE GRANT

Ph.D. Student: Curriculum Studies

During my internship with The Center for International Programs (CIP) at Kalamazoo College, I didn't expect to work during a pandemic. Since the department works in study abroad programs, the pandemic posed real challenges to the CIP team. I assisted in researching and learning about how to best implement orientations and seminars in an online format that still facilitated learning and engagement.

Utilizing the opportunity to read research regarding online learning was valuable to me as a PhD student in Curriculum Studies. From a literature review, I understood that learning online can be engaging when educators change their pedagogy to better fit an online format. Learning online is also a way to reach a wider pool of students that might work full-time jobs, need childcare, or have a lack of reliable transportation.

While online learning might not be our first option (understandably so!), there are pedagogical changes that educators can implement to build classroom community that facilitates rich discourse online as well as engaging content. For example, educators may post videos of them giving announcements and updates via video, so that the content isn't just text. While whole lectures can be recorded online, computer-screen-fatigue is real and it's best to incorporate different curriculum materials to keep students engaged. Use of recorded audio accompanying PowerPoint presentations is also another suggestion. What works in online classrooms varies; however, during the time of COVID-19, it's still possible to move forward with our education in an effective way.

BOILERS WORK

Internship Program

ANAMARIA MOLINA

Master's Student: Linguistics

This summer I had the privilege of doing an internship with the Immigrant Resource Center of Miami (IRCOM) whose main focus is to help immigrants in their process of becoming legal residents and citizens of the USA. IRCOM provides legal services, preparation of documents, education opportunities among others. My involvement was with the program that prepares future citizens for the citizenship exam and interview. Anybody who wants to become an American citizen must demonstrate knowledge of civics, geography, and history as well as command of English. The process is long and difficult as there are 100 questions to learn, an extensive application and finally the interview.

In this, an election year, it is more crucial than ever for applicants to pass their interview, become citizens and cast their vote. My students were all adults residing in Miami. They come to IRCOM nervous about the interview and it is our job to prepare them with group citizenship classes, English classes, and private coaching. I was asked to lead the English curriculum this summer and it was fantastic! I loved teaching them small talk, how to understand and answer questions, how to keep a conversation going, and most importantly how to answer truthfully and completely all the questions in the hour-long interview. It was a pleasure to see their progress from week to week, to see their eyes light-up when finally understanding a concept they'd been struggling with and to celebrate (through zoom) those who passed.

DESTINIE GREEN

Master's Student: Public Health

My internship at the Indiana Rural Health Association was great and allowed me to get experience in meaningful work and get experience working at a public health organization in a virtual setting. This practicum experience allowed me to focus on my main public health interest by developing health promotion-related projects using evidence-based information.

My final projects consisted of developing a health equity toolkit for serving minority populations in rural Indiana, such as Hispanic, Amish, and Haitian; a physical activity and nutrition toolkit for pregnant and postpartum women; and a telehealth tobacco cessation toolkit for increasing access to care for tobacco dependent patients.

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