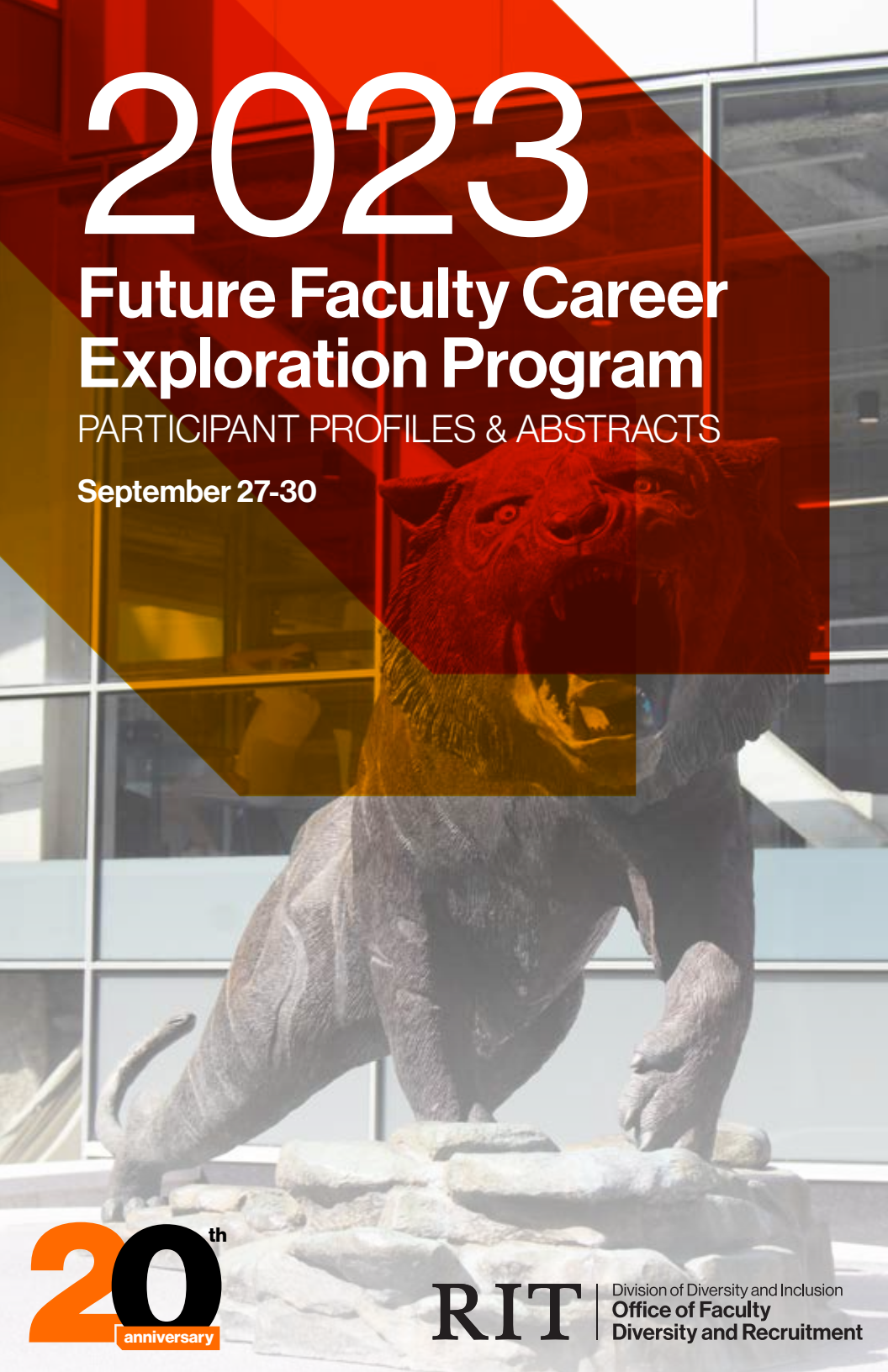

2023

Future Faculty Career Exploration Program

PARTICIPANT PROFILES & ABSTRACTS

September 27-30

20th anniversary

RIT

Division of Diversity and Inclusion
Office of Faculty Diversity and Recruitment

The Rochester Institute of Technology is pleased to welcome you to its 20th Future Faculty Career Exploration Program! The landscape of higher education is ever-evolving with new research opportunities, the widespread adoption of AI, and increased focus on student success and well being. Amidst these exciting developments, we are glad you can join us this year for our annual program.

RIT is welcoming its most diverse and academically qualified freshmen class ever. These students are passionate about RIT's focus on the intersection of technology, the arts, and design. Our campus is undergoing transformation with the addition of new and expanded facilities, including the SHED—Student Hall for Exploration and Development. The SHED is quickly becoming the epicenter of RIT, containing an enormous three-story makerspace, performing arts facilities, and active-learning classrooms, all integrated into a single complex that connects our student center and newly reimagined library. We're also doubling the size of the Saunders College of Business and are dramatically upgrading our athletic facilities. We are just now breaking ground on a new performing arts center. On the programmatic side, RIT has been setting records in sponsored research while adding new Ph.D. programs—the newest being Business Administration and Cognitive Science.

As a leader in higher education, RIT is committed to the understanding and acknowledgment of history, causing us to renew and refocus our existing commitments to help create a more diverse, equitable, and inclusive society. With input from RIT students, faculty, staff, and alumni, we developed an Action Plan for Race and Ethnicity that is guiding RIT's efforts as we launch new programs, services, and policies to help create equal opportunity and respect for all.

Consistent with this plan, we have placed special emphasis on the recruitment and retention of a diverse and excellent faculty. It is RIT's strong commitment to the Future Faculty Career Exploration Program that has been key to the success of these efforts.

We sincerely welcome you for a productive and exciting visit!

David C. Munson, Jr.
RIT President

Future Faculty Colleagues,

I am delighted to welcome you as part of the 20th cohort of the Future Faculty Career Exploration Program at Rochester Institute of Technology. This program plays a crucial role in recruiting exceptional faculty to RIT, and creates opportunities for you to build a network among peers as you prepare for your university career. Congratulations on being selected to participate in our annual program!

At RIT, we place a high value on having a diverse community of scientists, artists and intellectuals which allows us to be a strong and vibrant university—one that attracts creative and innovative students.Our program plays an integral part in making RIT a more diverse, equitable, and inclusive university.

This nationally recognized program is designed to help us learn more about you, your research and career interests. It also allows you to get a first-hand look at RIT. Through our future faculty program, you'll connect with our faculty and have the opportunity to share your research, scholarship, and artistic work.

The Office of Faculty Diversity and Recruitment has put forth tremendous effort to recruit and welcome prospective faculty. This year's cohort includes individuals at all stages of their careers—from Ph.D. candidates to recent graduates to postdoctoral fellows. This program allows participants at the earliest stages of their academic careers to explore career opportunities at the university, and experience RIT as a prospective workplace.

Thank you for participating in this engaging and exciting professional development opportunity, and welcome to RIT.

Sincerely,

Prabu David, Ph.D.

Provost and Senior
Vice President for
Academic Affairs

Congratulations on being selected to participate in the 20th class of Rochester Institute of Technology's Future Faculty Career Exploration Program! I applaud your many achievements to date and take great honor in formally welcoming your participation in this exciting four-day RIT event.

RIT embraces inclusive excellence as we advance the exceptional! Diversity and inclusion are fundamental aspects of RIT's identity as an institution and are intrinsically tied to its historic strength as one of America's most innovative and forward-looking universities. RIT enjoys national recognition among leaders in diversity in higher education. The article, "Growing Diversity", not only captures the innovative approaches the Office of Faculty Diversity and Recruitment utilizes in recruiting an excellent and diverse faculty, but it also highlights the Future Faculty Career Exploration Program and three former participants who joined the RIT faculty. *INSIGHT Into Diversity* magazine has recognized Rochester Institute of Technology as a 2022 Higher Education in Diversity (HEED) Award recipient and a 2022 Diversity Champion. This marks the ninth year in a row RIT has been named a HEED Award recipient and eighth consecutive year as a Diversity Champion. *Winds of Change* magazine, for the 12th year, listed RIT as one of the "Top 200 Colleges for Native Americans." Further, RIT was named by *STEM Workforce Diversity* magazine among its top 20 universities in 2021 for RIT's work to help diversify the STEM workforce.

Today, RIT positions itself to increase the number and percent of African American, Latinx and Native American (AALANA) and female faculty, especially in STEM fields. We understand well the importance of diverse, talented faculty in moving RIT forward in greatness through difference. So, we are honored to welcome you to our campus as we learn more about each other.

An outstanding three-day program has been prepared for you. During this time, I hope your many questions regarding RIT/NTID—our students, staff, faculty, programs, departments, colleges, campus and community—are addressed and answered. Most important, I hope you get a better idea of your potential space in the RIT family as we both explore the many opportunities for a wonderful relationship.

Keith Jenkins, Ph.D.
Vice President and Associate Provost for Diversity & Inclusion

Dear Colleagues,

Congratulations on being selected to participate in the 20th class of Rochester Institute of Technology's Future Faculty Career Exploration program! I commend your accomplishments to date and take pleasure in welcoming your participation in the program. This program is an exemplar of our longstanding commitment to inclusive excellence at RIT. We place high value on a diverse and excellent faculty, recognizing that different perspectives support creativity and innovation in the classroom, in research and scholarship, and across the campus.

The Office of Faculty Affairs is focused, in part, on providing faculty career development opportunities through best practices, policies, programs, and professional development that help our faculty build successful careers at RIT. I am looking forward to sharing with you more about the support our office provides to faculty at all stages of their career.

I am pleased that you have chosen to be part of our future faculty program and look forward to working with you to identify opportunities to launch your career forward at RIT. Thank you for helping with RIT's mission to "shape the future and improve the world through creativity and innovation!"

LaVerne McQuiller Williams, Ph.D., J.D.
Associate Provost for Faculty Affairs

Dear Future Colleagues,

Welcome and congratulations on your acceptance into the 20th cohort of RIT's Future Faculty Career Exploration program.

For most of you, this will be your first opportunity to experience the culture of Rochester and its premiere technology university. We trust that your experience here will be a transformational one. For others of you who have already participated in our Pathways to RIT events, thank you for your continued engagement with RIT. Whether this is your first experience or not you should be as proud of your accomplishments as we are.

After a rigorous national search, you were selected from among the brightest minds in the nation. Your cohort reflects the highest level of research, art, skill and expertise that we could find. Your presence honors RIT's enduring commitment to inclusive excellence. I hope that you will discover the charm of innovation, and the professional quality which sets RIT apart from other universities.

Over the next few days, I encourage you to enjoy the great workshops, panels, and networking events. I also invite you to shine as brightly as you can through your presentations, and the opportunities you will have to collaborate and cultivate relationships with RIT faculty and other cohort members.

I look forward to personally meeting each of you.

Congratulations again,

Torrence E. Sparkman, Ph.D.

Assistant Provost and Assistant Vice President for Faculty Diversity & Recruitment

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David Alekhuogie, M.F.A.

Visiting Faculty
California Institute of the Arts

Profile

David Alekhuogie received his MFA from Yale University (2015) and a post-bac BFA from School of the Art Institute of Chicago (2013). Alekhuogie has held solo exhibitions at Assembly, Houston (2023); Commonwealth and Council, Los Angeles (2022, 2019); Yancey Richardson, New York (2021); Los Angeles Municipal Art Gallery (2019); Company Gallery, New York (2019); Skibum MacArthur, Los Angeles (2017); and Chicago Artist Coalition (2016). Selected group exhibitions have been held at MoMA, New York (2020); High Museum of Art, Atlanta (2017); Fraenkel Gallery, San Francisco (2015); and Regen Projects, Los Angeles (2015). His work has been published in The New Yorker, The New York Times, Time Magazine, Timeout, Chicago, Vice, and The Los Angeles Times. He is a recipient of a Rema Hort Mann Foundation Emerging Artist Grant (2019). His work was included in Companion Pieces, the 2020 iteration of MoMA's biannual New Photography exhibition, and is currently on view in Men of Change: Power. Triumph.

Alekhuogie's work is in the collections of Hirshhorn Museum in Washington D.C., The Getty in Los Angeles, LACMA, The Museum of Modern Art NYC, The Museum of Fine Art in Houston, Fitchburg Art Museum, Minneapolis Museum of Art, and the High Museum of Art, among others.

Abstract

New Topo-Politics

The term *New Topographic* refers to an influential landmark exhibition of photography that first took place at what is now the George Eastman Museum in Rochester, New York. The term was coined by the curator of the exhibition, William Jenkins, and has come to refer to a genre of landscape photography that examined the post-industrial relationship of the built environment with the natural landscape.

The photographs in the exhibition depicted the commonplace banal buildings, strip malls, suburban developments, parking structures, freeways, and other man-made interventions into the landscape. These photographs together start to tell the story of the post-industrial American dream. The story of American modernity. This is in stark contrast to more romanticized depictions of the American landscape that existed prior. This new reframing of the landscape re-centered the role of the photographic image in the history of pictorial representations of the American landscape in Art history.

In this lecture, Alekhuogie is seeking to reexamine and broaden the view of American Modernism depicted in new topographics through a lens that considers the social and political implications of race and class. These implications are often rendered invisible in the existing art history.

Kofi Bazzell-Smith

Graduate Student
University of Illinois

Profile

Kofi Bazzell-Smith is an artist, educator, and professional boxer, currently pursuing an MFA in New Media at the University of Illinois Urbana-Champaign. As a Mellon Foundation Interdisciplinary Program Fellow, he specializes in Japanese manga and creates works in English and Japanese.

Driven by his passion for manga and the lack of studio courses on the subject in the United States, Bazzell-Smith is dedicated to effecting change. He actively travels to teach about manga, the Japanese language, and cultural exchange. He aims to broaden the horizons of art education, challenging its current parochial focus on predominantly Western-European art forms, and fostering a more diverse and inclusive artistic landscape.

In 2023, Bazzell-Smith lectured in both English and Japanese at universities such as UCLA, UT Austin, Aoyama Gakuin, Musashi University, Middlebury College, and Auburn University. He also exhibited work in Tokyo, Chicago, Austin, and Auburn.

In March of 2023, with sponsorship from the University of Illinois Center for Advanced Study and the Japan Arts Foundation, Bazzell-Smith organized an artist residency, inviting Japanese mangaka Kazuo Maekawa to teach manga techniques to American students. Bazzell-Smith acted as the grant writer, budget manager, host, event organizer, and Japanese-to-English interpreter throughout the two-week residency, hosting workshops, lectures, dinners, tours, and a cosplay party at various venues including the University of Illinois, Northwestern University, C2E2 in Chicago, and Franklin STEAM Academy middle school.

Through his original manga productions, Bazzell-Smith explores the generation of new knowledge through the pursuit of art from another culture. His work lies at the crossroads of Japan's efforts to globalize through popular culture and the growing academic recognition of comic studies as a lens for examining socio-cultural phenomena.

As an artist-scholar, Bazzell-Smith strives to champion these movements, to publish manga in Japan, and to pioneer the teaching of manga production in the United States, challenging the Eurocentric dominance in art education.

Abstract

Bridging Boundaries: Exploring Cultural Fusion through Manga, Language, Aesthetics, and Narrative

Manga, the Japanese form of comics, has garnered global appeal and prompted initiatives like the International Manga Award by the Japanese Ministry of Foreign Affairs to foster international exchange. Though manga represents a versatile form of expression, Western iterations often convey a narrow understanding of the form.

In this presentation, Bazzell-Smith shares his personal journey as a practitioner who has delved into the intricacies of Japanese language and culture, discussing how this has influenced his creative process and led to a deeper understanding and application of manga's aesthetic and structural idiosyncrasies. By contextualizing manga's historical development from its origins in the 12th century to its contemporary manifestations, he not only emphasizes the inseparable relationship between manga and its cultural and linguistic context, but also highlights the form's nature as an inherently transcultural manifestation, forged through an interplay with foreign influences.

Drawing parallels with other art forms like Hip-Hop and Brazilian Jiu-Jitsu, Bazzell-Smith demonstrates how the act of sharing and reinterpreting cultural expressions can foster innovation and novel techniques within a given form. By exploring the transformative power of exchange, he endeavors to challenge the Eurocentric dominance of art education in the United States and contribute to a more diverse and inclusive artistic landscape.

Throughout the presentation, Bazzell-Smith aims to answer fundamental questions: How does the pursuit of an art form from another culture engender new knowledge? What does it mean to create culture? By examining the global impact of manga, he invites participants to reflect on the transformative potential of cross-cultural artistic practices and the importance of cultural understanding in expanding artistic horizons.

His latest project, Karasu, explores the theme of loss by utilizing emptiness as a visual tool to evoke "Ma" (間), a fundamental concept rooted in Zen Buddhism. "Ma" emphasizes silence and the significance of the space between objects. Through the deliberate absence of certain elements, the viewer's attention is drawn to what is not present, fostering contemplation and introspection.

During the presentation, Bazzell-Smith will detail practical narrative techniques used in Karasu, including the utilization of "Ma," the four-arc plot structure known as Kishotenketsu, framing, closure, and the art of simulating time within the static medium of comics. By unraveling these storytelling methods, he invites the audience to appreciate the depth and complexity that can be achieved through this sequential art form.

Saunders College of Business

Alexandra Figueroa

Alexandra Figueroa

Ph.D. Candidate
University of Utah,
Eccles School of Business

Profile

Alexandra Figueroa's research lies at the intersection of behavioral ethics and diversity, equity, and inclusion in work environments. Current projects include work on gender, ethnicity/race, and sexual orientation.

Figueroa is particularly interested in organizational precursors to unethical behavior, and how the moral systems adapt to workplace environments. She also studies how external issues of social justice leak into the workplace and differentially affect employees of different backgrounds.

Abstract

Organizations as Allies: Positive Impacts for Both Target and Non-Target Employees

Recent research in organizational behavior has highlighted the importance of individual allyship in organizations. Similarly, many organizations have begun their own efforts to reduce harm to stigmatized employees. The current work expands the field's understanding of allyship by bridging these two literatures and conceptualizing the organization itself as an ally, in order to investigate the effects that organizational level allyship has on employees who witness it.

Answering the call for more research on concealable stigmatized identities, we find positive effects of organizational allyship not only for LGBTQ employees, but for non-LGBTQ employees as well. In an online observational study (N = 916), an archival study (N = 1000) and an experiment (N = 400). We show that organization-level inclusivity can increase psychological safety in both groups and even affect intended behaviors that may otherwise be reduced by microaggressions.

Drawing on Sue et al.'s (2019) definition of microinterventions, we argue that organizations themselves can create meaningful microinterventions that foster a perception of a psychological safe climate in all employees, which in turn promotes identity sharing and organizational ally work. In sum, we show that organizational microinterventions benefit all employees, not just those belonging to groups targeted by allyship efforts.

B. Thomas Golisano College of Computing and Information Sciences

Olaitan Adeleke
Kianté Brantley, Ph.D.

Olaitan Adeleke

Ph.D. Student
University of Minnesota

Profile

Olaitan Adeleke is a Ph.D. student at the University of Minnesota in the College of Design, specializing in the dynamic field of smart textiles and wearable technology. She received her BS in computer science at the Federal University of Agriculture Abeokuta, Nigeria, and her MS from Carnegie Mellon University in information technology, concentration in data science & IT Entrepreneurship.

Adeleke's current research lies in developing an Electronic Design Automation (EDA) framework for electronic textiles (e-textiles) with a focus on the stitching fabrication method as a case study to identify, characterize, and synthesize variables and relationships into EDA rules needed to build an EDA tool for e-textiles with respect to routing and components placement in e-textiles circuit. Notably, Adeleke and her team have already achieved a noteworthy milestone by developing a proof of concept for a solar textile. It was awarded the Jury award in the functional category at the International Symposium on Wearable Computers (ISWC) Design Exhibition 2022. Beyond her research pursuits, she envisions extending her research into manufacturing stitched solar textiles specifically tailored to the sub-Saharan African population once the manufacturing methods have been refined and characterized through her dissertation work.

During her enrollment at the Federal University of Agriculture, Abeokuta, Adeleke received the MTN Foundation scholarship and was a MasterCard Foundation scholar during her master's program at Carnegie Mellon University. She was a graduate teaching assistant at CMU and a research student at the Morphing Matter Lab at CMU. She is presently a graduate research assistant at the wearable technology lab, University of Minnesota.

Abstract

Developing an EDA Framework for Electronic Textiles
Case Study: Characterization & Design Rules Development for Stitched E-textiles

Printed Circuit Boards (PCB) are well established in traditional electronics. However, they do not translate well to e-textiles and wearable systems, which require more flexibility than traditional PCBs. Wearable technology innovation is bringing the fields of textiles and electronics together. The goal is to harness strengths from apparel and electronic fields—the softness of textiles and the automation of electronics to improve wearable technology applications. E-textile circuits have evolved as a potential PCB improvement to on-body wearable technology applications because it is more flexible than traditional PCBs. Still, including electronics in textiles comes with challenges because most conventional textile manufacturing techniques were not designed for rigid components, and vice versa. Textiles are mostly soft goods: flexible, conformable, hydrophilic, and absorbent, while electronics are hard goods: rigid, non-conformable, hydrophobic, and impermeable. In addition, because textiles are not a rigid and flat substrate to incorporate electronics, navigating the complexity of fabric substrate for electronics is non-trivial. Hence, redesigning hard goods into soft and flexible materials like fabrics is a strategic and important step to making textile circuit applications a reality for mass production.

Despite this obvious need for e-textiles circuits in on-body wearable technology applications, the development process has largely been non-standardized. Compared to their PCB counterparts, there is no standardization in the production of e-textiles circuits. E-textile circuits are mostly developed through trial-and-error methods, whereas PCBs are produced worldwide with precise production stages and processes. This production disparity is understandable because e-textile circuits are relatively new and primarily in developmental stages. As a starting point for standardizing the e-textile circuit manufacturing process, this dissertation investigates, identifies, and synthesizes e-textile fabrication parameters to develop EDA rules for e-textiles circuits using stitched e-textile circuits as a case study.

The study is divided into three major phases. The first phase investigates and synthesizes expert knowledge that will allow for the formulation of design rules regarding the manufacturability of an e-textile. The second phase involves the development of design rules for e-textiles manufacturability to standardize the development process of e-textiles in a more reliable and repeatable way, especially because repeatability and reliability are the most important factors in manufacturability. The third phase involves deploying these rules in a solar e-textile circuit application, and the choice of this application is to improve our previous proof of concept.

Kianté Brantley, Ph.D.

Postdoctoral Associate
Cornell University

Profile

Dr. Kianté Brantley is a postdoctoral scholar at Cornell working with Thorsten Joachims. He completed his Ph.D. in computer science at the University of Maryland College Park (UMD) advised by Professor Hal Daumé III. Dr. Brantley designs algorithms that efficiently integrate domain knowledge into sequential decision-making problems. He is most excited about imitation learning and interactive learning — or, more broadly, settings that involve a feedback loop between a machine learning agent and the input the machine learning agent sees.

Before coming to UMD in 2016, Dr. Brantley attended the University of Maryland, Baltimore County where he earned his BS and MS (advised by Tim Oates) in computer science. He also worked as a data scientist for the U.S. Department of Defense from 2010 to 2017. In his free time, he enjoys playing sports; his favorite sport now is powerlifting.

Abstract

Advances in Structured Prediction

The exchange of information is increasingly being shifted to digital systems. Along with this shift, modern machine learning has seen advances from ChatGPT (i.e., an AI chatbot) to AlphaFold (i.e., predictions of protein structure)–due to the scale and complex structure of information available coupled with large, computationally expensive models. As this trend continues, designing efficient techniques for learning from large-scale data is becoming critical. Structured prediction studies problems in which the input or output have complex structural interdependencies.

In this presentation, Dr. Brantley will discuss issues that arise when you ignore the underlying structure of a problem in the context of natural language processing; and he will discuss his algorithms for solving these issues. The structured prediction algorithms he will discuss draw inspiration from reinforcement learning and learning to search style algorithms.

Kate Gleason College of Engineering

Janerra Allen
Jessica González-Vargas, Ph.D.
Yareni Lara-Rodriguez
Shaun Little

Janerra Allen

Ph.D. Student
University of Maryland, Baltimore County

Profile

Janerra Allen graduated from the University of Wisconsin-Madison with a BS in materials science and engineering with a concentration in structural materials and biomaterials. Bridging her interests in technology and health, she later worked as a support engineer for Health Recovery Solutions, a telehealth company based in New Jersey that focuses on patient care and health access, specifically targeting adherence and education for patients to prevent and reduce hospital readmission rates. Her diligence led to a managerial promotion within six months.

Although this experience was very valuable, she found herself still wanting to do research. She returned to academia to obtain a Ph.D. in electrical engineering at the University of Maryland, Baltimore County. Allen is currently a doctoral candidate using brain imaging technologies, signal processing, and machine learning tools to understand brain function and develop intervention strategies. It is her goal to understand how and why alterations in brain dynamics occur, due to aging and neurodegeneration.

Understanding the spatiotemporal dynamics of the human brain will not only help us comprehend the mechanism of brain functions and predict behaviors, but also identify methods to treat disorders. She has published her work in conference journals including SPIE, LACCEI, and IEEE EMBS NER. Allen is also a Meyerhoff/G-RISE graduate student, GEM Fellow, Genentech Fellow, president of the Black Graduate Student Organization, a GSA COEIT Senator, and has served on two tenure track faculty searches. She has received additional graduate training through the Research Education Component Scholar Program with NYU Langone Health Center for Cognitive Neurology's Alzheimer's Disease Research Center, Google Computer Science Research Mentorship Program, and internships at GE Research and Genentech.

Abstract

Energy landscape analysis of complex interactions among brain regions

With the past few decades' intensive brain research, we have gradually understood that perception, cognition, decision making, and other complex brain functions and behavior generations are correlated to the activation structures and patterns of different brain regions. However, finding the exact relationship between behaviors and the spatial and temporal brain connectivity patterns is still understudied.

Understanding the spatiotemporal dynamics of the human brain will not only help us comprehend the mechanism of brain functions and predict behaviors, but also identify methods to treat disorders. Computational neuroscience models can be used to explain neural dynamics in the brain and describe variations caused by pathophysiological changes exhibited in schizophrenia and other conditions, or in normal aging processes.

One such approach is the energy landscape analysis. Energy landscape analysis utilizes functional magnetic resonance imaging (fMRI) time-series datasets to statistically extract disorder biomarkers. It can also use the fitted maximum likelihood functions to model brain state dynamics and predict the stochastic behavior of the brain migrating from one state to the other. In this work, Allen analyzed the time-series of resting-state fMRI data comparing 86 schizophrenic patients and 107 healthy controls at the resting-state networks (RSN) definitions based on the regions of interest (ROI). The RSN's included the thalamus (THL) and basal ganglia (BSL) regions in the subcortical network, along with the default-mode (DMN), frontoparietal (FPN), salience (SAN), attention (ATN), sensorimotor (SSM), visual (VIS), and auditory (AUD) networks. Generated heat maps were utilized to observe the common energy bands between the subgroups. Extracting the lower energy states showed that brain functional organization not only varied between patients and controls, but also between individuals. The results revealed that the AUD and VIS were the most distinctive.

Jessica González-Vargas, Ph.D.

Postdoctoral Scholar
Pennsylvania State University

Profile

Dr. Jessica M. González-Vargas is an industrial engineer. She is an NSF-GRFP fellow and pursued her doctoral degree in the industrial and manufacturing engineering department at The Pennsylvania State University. Dr. González-Vargas' research applies human factors, usability, and engineering design principles in medical education to reduce patient complications. Her research entails developing and validating the utility of online learning and non-immersive virtual reality Central Venous Catheterization (CVC) training. With this CVC training, she reduced complication rates of patients undergoing a CVC procedure by training medical residents through a more robust standard system than traditional medical education methods. Her training systems are deployed and required by all incoming residents at two hospital institutions.

She has received several awards, including a best paper award from the Human Factors and Ergonomics Annual Meeting, the Bunton-Waller fellowship, and the Alfred P. Sloan scholarship. Dr. González-Vargas earned her bachelor's degree in industrial engineering from the University of Puerto Rico at Mayaguez and earned her master's degree in industrial engineering from The Pennsylvania State University. She is also a chair of the Multicultural Engineering Graduate Association (MEGA) and Boricua Grads at The Pennsylvania State University, where she helps foster community and create professional, social, and academic opportunities for underrepresented minorities.

Abstract

Using Engineering to Transform Medical Education: Leveraging Human Factors and Engineering Design for Central Venous Catheterization Training

Medical error is the third cause of death in the United States, with approximately 200,000 preventable deaths annually. While in the medical profession, medical students vow to "first, do no harm," these medical errors continue to occur. These medical errors are often associated with the experience level of the doctor conducting the procedure, including their lack of knowledge, experience, and supervision.

Therefore, there is an urgent need to improve medical education to enhance the knowledge and skills of medical residents and ensure that they are competent before being allowed in the operating room. As such, one procedure that medical education can improve is Central Venous Catheterization (CVC). CVC is a common surgical procedure, with more than 5 million patients receiving this treatment annually in the United States. However, due to the lack of knowledge and skills of physicians performing the procedure, there is a high incidence rate of complications, with up to 15% of patients experiencing complications. Current CVC training methods such as manikins and didactic lectures are not being effective in teaching the knowledge and skills for CVC to ensure competent residents.

This seminar will provide an overview of the design process and utility of online learning and non-immersive virtual reality as a novel method to enhance and improve current CVC training. Specifically, the seminar will demonstrate how human factors, usability, and engineering design can be leveraged to design these novel technologies and improve medical education and minimize patient complications.

Yareni Lara-Rodríguez

Ph.D. Candidate
University of Puerto Rico Mayagüez
(UPRM) Campus

Profile

Yareni Lara-Rodríguez holds an engineering degree from the Autonomous University of Nuevo Leon, Mexico. She earned an MS in materials and manufacturing in the Department of Mechanical Engineering (INME) at UPRM.

Lara-Rodríguez has worked as an instructor for Introduction to Fluid Mechanics, in the Department of General Engineering at UPRM, and as instructor for the Biosensors and Biological Geometric Design courses at UANL. Her professional career also includes being a quality engineer in manufacturing processes for a biomedical devices company in Puerto Rico.

Currently, she is a doctoral student in INME at UPRM and works at the Molecular Virology and Tissue Engineering Laboratory. Her research interests include projects on live cell imaging, mechanobiology and 3D-bioprinting. She has been awarded with the Motorola Solutions Foundation Scholarship from the Society of Women Engineers (SWE) towards her doctoral degree and received the Development Career Award from the Biomedical Engineering Society (BMES) because of her community service and academic achievements. As a member of the Society of Hispanic Professional Engineers (SHPE), she has served as a graduate chair at the UPRM student chapter, and because of her engagement in SHPE, and campus community service, she was awarded with Helen Cuesta Scholarship from SHPE to pursue her doctoral degree. She has participated in several events in Puerto Rico and Mexico as a mentor and woman in STEM roles to encourage young girls and women to pursue STEM careers. She recently received the COMPASS Outreach Grant from the American Society of Cell Biology (ASCB), to develop an outreach activity and promote STEM careers in a high school in Puerto Rico, using the electrophoresis technique. In 2023, because of her academic performance, leadership in SWE, advocacy and community service, Lara-Rodríguez was selected to receive both the WE Local Guiding Star Award, and the Outstanding Collegiate Award from SWE.

Abstract

Mechanical Forces Stimulus on Epithelial Cells

Cellular Mechanobiology studies how cells respond and sense mechanical stimulus from their local environment (cell-cell and cell-extracellular matrix interactions). Disciplines such as materials science and engineering can be used to develop these studies. This interdisciplinary field is important because it helps to understand the mechanisms in which the cells sense from their surroundings to regulate biological processes, such as protein synthesis. Also, research obtained from this field, can lead to better understanding at a tissue level, and information about its physiology and disease development.

At an extracellular matrix (ECM) level, an important concept is “Mechanobiology of Cell-Matrix Interactions” is mainly focused on the understanding of cell interaction with the extracellular environment. This can lead to studies focusing on modeling how this interaction can control cell behavior.

Efforts to mimic a cell-ECM interaction include the use of biomaterials such as Polydimethylsiloxane (PDMS), which, because of its porosity and mechanical properties, is widely used as a substrate for cell culture research studies. By varying the stiffness value in the PDMS substrate, cells can show different behavior while growing or differentiating. Lara-Rodriguez’s work consists of exploring a model where a range of stiffness on PDMS can lead to different stimuli sensed by the cells. Different scenarios of epithelial cells and PDMS (as ECM) are going to be discussed toward explaining the proposed model.

Shaun Little

Ph.D. Candidate
North Carolina Agricultural & Technical State University

Profile

Shaun Anthony Little is a fifth-year Ph.D. candidate at North Carolina Agricultural and Technical State University in the computational data science & engineering department in the College of Engineering, where he is a Chancellor's Distinguished Fellow under the direction and advisement of Dr. Kaushik Roy. He holds an MS in applied statistics & analytics (2018) from Kennesaw State University and an MBA in finance & risk management (2008) from the New York Institute of Technology, and a BS in mathematics (2004) from Chicago State University. His work experience includes leadership positions in industry (including hospitality, retail, and banking), education, government, and nonprofit. He leverages his applied and highly interdisciplinary quantitative background with his current research area of Natural Language Processing (NLP) to utilize state-of-the-art artificial intelligence (AI) and machine learning (ML) tools and techniques to advance research in topic modeling for low-resource languages, specifically Swahili.

Several highly competitive, high-quality international research identity-building experiences supplement Little's doctoral training. These include a yearlong data science traineeship sponsored by the National Science Foundation (NSF) and Swahili language acquisition supported by the Critical Language Scholarship (CLS), Foreign Language & Area Studies (FLAS) Fellowship, National Security Education Program's (NSEP) David L. Boren Graduate Fellowship, and a Fulbright-Hays grant. His cultural immersion experiences in over a dozen African countries allow him to leverage his background to develop a framework to clarify his role as a global scholar by understanding how worldwide interdependencies are essential for growth as an academic and a citizen of the earth. Several STEM-based and educational honor organizations, societies, and clubs support Little's doctoral research, including the United Negro College Fund (UNCF), the Thurgood Marshall College Fund (TMCF), the National Society of Black Engineers (NSBE), the Society of Hispanic Professional Engineers (SHPE), the Hispanic Scholarship Fund (HSF) and Golden Key International Honour Society.

Abstract

Toward Developing a Swahili News Article Classification System (SNACS) Using AI

Artificial Intelligence (AI), a wide-ranging branch of computer science that constructs smart systems capable of performing tasks that typically require human intelligence, is an interdisciplinary science that uses advancements in Machine Learning (ML) and Deep Learning (DL) to power machines to model capabilities of human cognitive functions like interpreting speech and text, identifying faces, and driving vehicles. AI systems use ML/DL models to process massive amounts of data to establish patterns that facilitate decision-making or carrying out specific tasks while learning from the result.

Natural language processing (NLP) is the subset of AI fields that enables computers to process language as humans do. NLP systems can process enormous amounts of unstructured digital data (such as emails, forum posts, social media comments, reports, and newspaper articles) to make informed decisions by solving real-world problems like classifying documents, analyzing sentiment, summarizing information, and answering questions.

As digital data increases at unprecedented rates, so does the need to classify this data, including news article data. Category classification, for news, is a multi-label NLP text classification problem whose goal is to assign one category to a news article. Most news article classification research utilizes colonial languages, and little news article classification research includes low-resource languages like Swahili. In this research, they build a Swahili News Article Classification System (SNACS) that can classify news articles into one of six topics. Because manual news article classification processing can be time-consuming, an AI-powered classification system offers a faster, automated approach to identifying topics of untracked news and making valuable suggestions based on users' prior interests. SNACS contributes to learn Swahili news article classification research and is a basis for future Swahili text classification research. Progress in the field of NLP for low-resource languages will play a significant role in the overall growth of AI for the world's 7,000+ languages, and advancements in Swahili NLP research will create a crucial role in shaping the future of AI's impact on the continent of Africa.

This research fits into a larger vision of fair AI that is diverse in its development, just in its application, equitable in its usage, and whose scope encompasses considering how AI affects everyone, especially the underrepresented and underserved. It inherently pushes existing research to include projects that increase AI inclusion and diversity and further grow visibility for Afro-centered technological research.

College of Engineering Technology

José Capa Salinas
Chinonso Ezeobi
Eden Yemesegen

José Capa Salinas

Graduate Research Assistant
Purdue University – Lyles School of Civil Engineering

Profile

José Capa Salinas is a Ph.D. student in structural engineering at the civil engineering department at Purdue University, where he also pursues a graduate certificate in teaching and learning in engineering. He received his BS (2017) from Universidad Tecnica Particular de Loja, Ecuador, MS (2021) from Purdue University—both in civil engineering. He has dedicated his research to providing communities with affordable technology to inspect and maintain their infrastructure investment by focusing on Unmanned Aircraft Systems (UAS). His work involves a detailed examination of structures for potential defects using UAS and offers maintenance strategies, highlighting the importance of resilience in maintaining structural integrity. In the future, he will explore novel applications of UAS inspection, improve routine and fracture-critical bridge inspections, and enhance the evaluation of structural systems by leveraging cutting-edge technology and innovative approaches.

Capa Salinas, a Fulbright Scholar and licensed UAS remote pilot, is a Seismic Design and Performance of Bridges Committee member at the Transportation Research Board (TRB). He serves as a voting member in the Dead & Live Load subcommittee and as an associate member in the Main, Wind, and Seismic ASCE/SEI 7-28 subcommittees. The Institute of Transportation Engineers recognized him as a 2023 Young Leader to Follow and the winner of the 2023 TRB Student Contest by the National Operations Center of Excellence and AASHTO. He is a lead instructor for Purdue's Summer College for High School Students, a current mentor with Skype a Scientist, and a returning mentor for the GradTrack program. As a professor, he will provide mental health and diversity resources and support underrepresented minorities in academia, fostering an inclusive and equitable environment. His goal is for students to leave his classroom with a strong desire to continue learning and a sense of fulfillment from their educational experience.

Abstract

Leveraging Unmanned Aircraft Systems for Infrastructure Resilience

As domestic and international infrastructure ages, infrastructure resilience concerns have increasingly become a central priority of civil engineering professionals. Conventional approaches to assessing system resilience have been either prohibitively expensive, such as on-site inspections, or unconnected to actual in-service conditions, such as analytical modeling based on as-built drawings. However, the advent of Unmanned Aircraft Systems (UAS), commonly known as drones, has provided a promising solution for enhancing the evaluation of system resilience. Using UAS makes it possible to conduct inspections of various structures, including those affected by natural hazards like earthquakes or hurricanes, challenging-to-access structures, such as tall buildings or bridges, and critical infrastructure in remote or inaccessible areas, such as rural regions or areas with limited transportation infrastructure. This study aims to establish a methodology and standardized practices tailored explicitly for UAS inspection of bridges and similar structures.

The U.S. has over 600,000 bridges, playing crucial roles connecting communities, but also with many vulnerabilities. In recognition of their significance both as critical infrastructure and as components with potential vulnerabilities, the Federal Highway Administration mandates inspections of bridges every two years. Early detection of structural issues is crucial, as it enables timely intervention and preventive measures, ultimately contributing to the preservation and sustainability of these vital transportation assets. Currently, this inspection is limited to X. By employing UAS technology, inspections can be conducted more efficiently and safely, reducing the need for personnel to access bridges under potentially hazardous conditions physically, while increasing the quantity and quality of visual data. This research proposes a robust framework for UAS inspections and evaluates this framework through studies with DOT and industry inspectors with the ultimate goal of empowering civil engineering professionals to make informed decisions regarding bridge maintenance, repair, and replacement. This comprehensive study delves into the depth of UAS inspections, addressing crucial aspects to ensure their effectiveness. Key guidelines established included performance requirements, UAS flight capabilities, inspection reporting, operations in confined spaces, and conditions beyond the vehicle's line of sight. By addressing these variables, this study lays the groundwork for conducting inspections that are both reliable and yield valuable insights. This research also addresses the effective utilization of inspection data, extending UAS battery life for continuous inspections, routine and fracture critical inspection requirements, and achieving successful multi-UAS operations. This work answers these questions, enhances UAS inspection practices, and contributes to structures' safety, integrity, and longevity, benefiting the public and infrastructure management entities.

Chinonso Ezeobi

Graduate Research Assistant
University of Maryland, Baltimore County

Profile

Chinonso Ezeobi, a G-RISE (Graduate Research Training Initiative for Student Enhancement) Meyerhoff scholar pursuing a Ph.D. in electrical engineering at the University of Maryland, Baltimore County (UMBC). Ezeobi obtained a BS in electrical/electronic engineering (2001) from Nnamdi Azikiwe University Nigeria, an MS (2015) from the University of Vaasa, Finland, and a second MS (2022) from UMBC in electrical and computer engineering. He is a graduate assistant with PROMISE. PROMISE is an institutionalized retention and completion initiative centered on skill development and social belonging for graduate students from underrepresented minorities in STEM. In addition, he is a research assistant at the Center for Advanced Studies in Photonics Research (CASPR) UMBC.

Ezeobi became an instructor for UMBC 2023 Summer Enrichment Academy by the Center for Integration of Research, Teaching, and Learning (CIRTL); He volunteered as a judge in the Annual University System of Maryland (USM) Louis Stokes Alliance for Minority (LSAMP) research symposium for two consecutive years. A volunteer mentor at the Fair for Emerging Researchers (FER). He was a judge at the IEEE 2023 robotic challenge and a moderator at the 13th IEEE Integrated STEM conference. He is a member of Optica and the current president of the UMBC Optica Student chapter. The current secretary of IEEE Baltimore section 2023 and founder of the Nigerian graduate student association at UMBC. He has also been awarded the 2023 Black Graduate Student of the Year.

Ezeobi has over 15 years of industrial experience in telecommunications, rising from field engineer to deputy manager.

His research focuses on characterizing nonlinear optical properties of fiber optic materials using induced grating autocorrelation (IGA) and Z-scan for semiconductors. These are nonlinear free space optical techniques to measure properties of materials like absorption rate or nonlinear refractive index. His Ph.D. dissertation is on the characterization of Phase Change materials on a Nanostructured Silicon (PCNS).

Abstract

Characterization of Phase Change Chalcogenides Using Nonlinear Optical Technique

Phase Change Chalcogenides have potential applications in next-generation non-volatile memory, optical data storage, energy-efficient, photonic, and sensor technologies. The fast switching from amorphous to crystalline states changes the reflectivity of the materials allowing for data storage and retrieval.

In this research, Ezeobi's goal is to modify silicon surfaces' thermal properties and optical absorption to customize the PCC phase transition's thermal thresholding characteristics to create non-binary optical states. The hypothesis is that a PCC thin film deposited over a MacEtch nanostructured silicon surface can be designed to undergo a non-uniform phase transition at a length scale smaller than the diffraction limit, which will create a unique and previously unexplored meta-optic response. Germanium-Antimony-Telluride (GST) will be conformally coated over the surface of silicon nanostructure arrays so that it will bridge smaller voids and nanopores in the nanotextured surface topology. Since the openings, filled with air, have a much lower thermal conductivity than silicon, the statistical average thermal threshold for phase change transitions will depend on the volume fraction and porosity of the post-etch silicon. In addition, the voids can be backfilled with a polymer or dielectric to further tune the nanostructured silicon's optical, electrical, and thermal properties. As a result, phase transition thresholds will be significantly lower for GST on nanostructured silicon than on bare silicon, enabling threshold and dynamic range manipulation as a function of the nanotextured surface architecture. They investigate the structural and electrical properties of PCChs for non-volatile memory applications by collaborating with materials scientists that grow the material while they use it. To modify their optical behavior, they are exploring a novel approach to develop artificially structured sub-wavelength anisotropy in phase change chalcogenides and silicon.

Using a modified Z-scan, they measure their optical properties, such as reflectivity. The Z-scan is a nonlinear optical technique used to characterize the optical properties of semiconductors and other materials. It is a method used to analyze the nonlinear optical behavior of semiconductor materials, like their response to intense laser pulses and the presence of nonlinear optical phenomena, by measuring changes in transmission or reflection as a function of position along the optical axis (Z-axis). They have observed phase changes at 1.25mW of power and in the second phase of the experiment to determine the life cycle of these materials.

Eden Yemesegen

Ph.D. Candidate
Pennsylvania State University

Profile

Eden Yemesegen is a highly accomplished individual, serving as both a structural engineer and an experienced university lecturer. Her professional journey encompasses notable contributions to the research, construction, and consulting industry. She possesses exceptional skills in structural design, 3D printing, motivational speaking, software development, university teaching, communication, and leadership.

Yemesegen holds a bachelor's degree in civil and environmental engineering from Addis Ababa University and a master's degree focused on smart structures and systems from the prestigious Korea Advanced Institute of Science and Technology, specializing in 3D Printing for the Construction Industry. Currently, she is pursuing a Ph.D. in Architectural Engineering at Pennsylvania State University, focusing on 3D printing technology for housing and infrastructure construction.

Beyond her academic pursuits, Yemesegen has had the privilege of presenting her research work and sharing her expertise as a speaker at various conferences. She actively participates in professional organizations such as ASCEC, AEI, SWE, and NSBE, engaging with like-minded individuals in her field. Yemesegen's research contributions have been recognized through multiple publications in esteemed journals like the *Construction and Building Materials Journal*, *Journal of Green Building*, and *Precision Engineering Journal*. Her outstanding achievements have been acknowledged through the prestigious Faculty for the Future Fellowship Award from Schlumberger, which she has received for three consecutive years.

Furthermore, Yemesegen actively inspires and engages young minds in STEM programs. She volunteers for K–12 outreach activities, motivating children to explore the realms of science and technology. As a co-founder of the Girls Can Code program, she empowers high school students through programming training. Additionally, she advises the Engineering Ambassadors program at Penn State, actively participating in outreach programs throughout Pennsylvania.

Yemesegen's achievements, research dedication, and commitment to promoting STEM education make her an invaluable asset to her profession and a role model for aspiring engineers and students.

Abstract

Experimental Study of 3D Printable Cobcrete and Hempcrete Materials

This paper presents an experimental study on 3D printable cobcrete and hempcrete materials, aiming to investigate their feasibility and performance as sustainable construction materials.

Cobcrete, a combination of cob (a mixture of clay, sand, and straw) and concrete additives, and hempcrete, a composite material made from hemp fibers and lime-based binders, have gained attention for their potential in 3D printing applications. The study focuses on assessing the workability, mechanical properties, and environmental sustainability aspects of these materials. A series of laboratory experiments are conducted to evaluate the printability, compressive strength, flexural strength, and water absorption characteristics of the 3D printed cobcrete and hempcrete specimens.

Additionally, the impact of different mix ratios and curing conditions on the material performance is examined. The findings reveal that both cobcrete and hempcrete exhibit favorable printability and demonstrate promising mechanical properties suitable for construction applications. Moreover, these materials showcase sustainability advantages, including low embodied energy and potential carbon sequestration for hempcrete. The study contributes to the understanding of the feasibility and performance of 3D printable cobcrete and hempcrete, providing insights into their potential as eco-friendly alternatives in the construction industry.

The results underscore the need for further research and development to optimize these materials for broader adoption and to address challenges such as standardization, regulatory compliance, and market acceptance. Ultimately, this study paves the way for utilizing 3D printable cobcrete and hempcrete in sustainable construction practices, contributing to the development of greener and more environmentally conscious building technologies.

College of Health Sciences and Technology

Angela Omondi, DrPH

Angela Omondi, DrPH

Visiting Assistant Professor
Jackson State University

Profile

Dr. Angela Omondi is a social behavioral researcher with specialized training in cervical cancer and HIV prevention research. Currently, Dr. Omondi is a Visiting Assistant Professor in the Department of Behavioral and Environmental Health at Jackson State University. Her research is motivated by over 10 years of experience working with marginalized communities in the United States and internationally. Specifically, she focuses on three disease outcomes that disproportionately impact women and sexual gender minority populations: cervical cancer (CC), HIV, and maternal and child health. This research is informed by her previous work experience and interdisciplinary training as a dietitian, doctoral training in public health, and postdoctoral fellowship in population health evaluation.

Dr. Omondi earned her doctorate in public health from the College of Health Sciences, School of Public Health, at Jackson State University and an MPH from the Robert Stempel College of Public Health and Social Work, at Florida International University. She also completed a postdoctoral fellowship in the Department of Community Medicine and Population Health, College of Health Sciences at the University of Alabama. Dr. Omondi is also a recipient of a Cancer Epidemiology Education in Special Populations (CEESP) traineeship scholarship from the City University of New York. Supported by this grant, she conducted an extension of her dissertation in her home country Kenya, Eastern Africa. The study published in the *African Journal of Reproductive Health* explored factors that influence cervical cancer screening knowledge, beliefs, and behaviors, among pregnant women in Nairobi County, Kenya.

Dr. Omondi uses a conceptual framework she developed in her doctoral candidacy to explore health behaviors. In this framework, she weaves behavioral and environmental theories to understand the role of physical and social environments on women's and gender minorities' preventive behaviors. She investigates these questions using a mixed-method design guided by a participatory approach.

Abstract

Promoting Women's Health: An Empowerment Perspective

Cervical cancer (CC), even though preventable through routine screening, is the fourth most common cancer worldwide. Approximately, 90% of CC cases occur in low and middle-income countries. In Sub-Saharan Africa, CC is the leading cause of cancer deaths. Even though Sub-Saharan Africa is burdened with CC, disparities in CC are also documented in developed countries including the United States (U.S). In the U.S. cervical cancer is the 14th most common type of cancer and the second leading cause of cancer death among women aged 20 to 39 years. Further, Black/African American women are disproportionately affected by CC. Recently, two formative research were conducted in the United States, a developed country and in Kenya, a low-income country, to better understand CC and CC screening knowledge, beliefs, and behaviors among women in their reproductive age. Through a mixed-method approach, Dr. Omondi weaved environmental and behavioral theories to explore the complex environmental factors that influence CC screening behaviors. Findings from these studies substantiate the need to develop interventions that increase access, especially for women living in Kenya without access to screening services and in Mississippi, awareness campaigns should be developed to provide younger women with the knowledge of where CC screening services are located.

College of Liberal Arts

Mosiah Bluecloud
Vanessa Núñez

Mosiah Bluecloud

Ph.D. Candidate
University of Arizona

Profile

Mosiah Bluecloud is an enrolled member of the Kickapoo Tribe of Oklahoma. He began working in Indigenous Language Revitalization in 2008. He started as an intern at the Sauk Language Department in Stroud, Oklahoma. He transitioned from an audio and video technician to a member of the Sauk Language Department's Modified Master Apprentice Program in 2010.

After 1,280 hours of learning Sauk as an apprentice and 668 hours of professional development training in Native Language Teaching Methodologies, Bluecloud became the lead instructor of the Sauk Language. He taught community classes across three counties, a Sauk Language course at Bacone College, and two levels of Sauk at Shawnee High School. He left the Sauk Language department and got his BA (2016) in linguistics, from the University of Oklahoma, and established the Oklahoma Kickapoo Language program later that fall.

Bluecloud built the Kansas Kickapoo Teacher Training Program in 2018 and started doing trainings, workshops, and consultations for various language movements and planning projects across the country. He went back to school at the University of Arizona and completed his MA (2020) in Native American languages and linguistics, and is now a Ph.D. candidate in Linguistics at The University of Arizona. He often teaches at the American Indian Language Development Institute and has taught at Colang 2022: The Institute on collaborative Language research. Additionally, he has recently represented the North American Indigenous Language revitalization movement at the international conference and workshop on preservation of Uyghur Culture and promotion of Uyghur language in diaspora.

Abstract

Language Policy and Planning to Facilitate Reclamation and Revitalization

At this time in human history, endangered languages across the globe are struggling to find a place where they can thrive. This struggle is important because within each human language exists libraries of knowledge and unique worldviews that serve as a living record of the interconnected human experience. Groups belonging to these endangered languages need more resources. These resources can be developed by the expertise of linguists and community leaders.

Linguistics meets leadership at the intersection of language policy and planning. Many Indigenous language revitalization efforts have ended before they could begin due to poor language policy and planning. For the purposes of his research, Bluecloud has defined Language policy and planning as the structured effort to impact the behavior of members in a particular speech community regarding language learning, acquisition, documentation, and revitalization.

The situation from one endangered language community to another can seem worlds apart. Sometimes the only common ground endangered language communities share is that their languages are disappearing. Bluecloud's research aims to lay the groundwork for a future language planning project to build a bridge between different endangered language groups. The language planning project he is proposing is centered around a planned language that facilitates connections between the Meskwaki, Kickapoo, and Sauk communities.

This planned language will be in effect, a standardization of three separate languages that were once one. Bluecloud calls this proposed language, Keweahaatoweeweni. Keweahaatoweeweni could be the bridge to bring learners and language workers of different Algonquin languages together. Since it is not one single language it can be freely used across tribal lines to facilitate Algonquin language study, pedagogy, new word creation, and revitalization and reclamation of major critically endangered Algonquin languages.

Language planning has been successfully carried out by the Gaelic, Arabic, and Hawaiian communities. This will be the first attempt at language planning for the Algonquin speaking community at large. The aim of this research is not that all people of the world or all Algonquin people learn this planned language, the aim is for Algonquin people that do not know where to start in their reclamation journey to have access to a community of like-minded individuals and a planned language to facilitate reconnection, reclamation, revitalization of their indigenous identities, free from political, tribal, and religious dogma.

Vanessa Núñez

Ph.D. Candidate
University of Nevada

Profile

Vanessa Núñez is a doctoral candidate in the Department of Sociology at the University of Nevada, Las Vegas (UNLV). Earlier Núñez earned her BA in sociology at the University of California, San Diego (UCSD) and a minor in Spanish Literature. She then worked as a program coordinator for GEAR-UP in San Diego following a cohort of students on their journey to higher education leading her to take a position as academic advisor at UNLV. There, she learned about local contexts that contribute to limited opportunities for undocumented students because of the lack of legislative and institutional support.

Núñez then began her doctoral studies and research on experiences of undocumented students in southern Nevada and learned more about the undocumented student movement locally. Her MA research focused on barriers and access to resources for undocumented students. She demonstrated that although students encounter roadblocks on their pathway to college and continue to experience exclusionary practices once on their college campus, their success relies on their social ties and network. A key observation was that while undocumented student activists are the driving force behind change on college campuses, faculty, staff, and other allies also play crucial roles pushing for institutionalizing campus policies and procedures supporting undocumented students. This observation is the focus of her dissertation research.

Núñez's work is funded by competitive national and institutional scholarships and fellowships. She has earned a Ford Foundation Dissertation Fellowship, UNLV President's Research Fellowship, a California State University Chancellor's Doctoral Incentive Program Fellowship. At her institution, she helped establish the Latinx Graduate Student Association and has served as president and will serve as vice president in the organization. She has also served as social media co-chair for AAHHE and on the Graduate Student Committee of the Latinx Section of the American Sociological Association (ASA).

Abstract

Rule Breakers and Boundary Holders: How Identity, Power, and Exclusionary Experiences Play a Role in Motivation for Action

Núñez's research stems from an observation from her previous work on undocumented student access to higher education at Desert Rose University (DRU) where they shared with her the ways that faculty and staff utilized their positions and power to leverage change at the institution and how they collaborated with students to empower them on campus. She noticed that there were faculty who would openly advocate and show up to rallies and teach-ins, and so she wanted to learn more about them.

Núñez draws from sociological work on racialized organizations to conceptualize DRU as a site where racial inequalities are reproduced and enacted on its non-white members at all levels—administration, faculty, staff, and students. This collective experience helps understand how deeply DRU is racialized and can better understand motivations for change among the institutions' members. She uses the concept of linked fate—the idea that folks can feel a sense of connectedness and common fate with those outside their individual identity groups—as critical to explaining why faculty of color leverage their power to support undocumented students. Linked fate allows the lived experiences of faculty and staff to see themselves in undocumented students and as a strong motivation to become institutional actors.

For example, one of her findings suggests that a sense of linked fate is stronger among Latinx faculty and those who have an "immigrant consciousness" due to their own experiences as immigrants or immigrant background and influences their more radical tactics for change. She also uses an intersectional lens for her analysis on this project to demonstrate how interlocking systems of oppression create a bond or a sense of solidarity among institutional actors and undocumented students.

College of Science

Karen Acros, Ph.D.
Govanni Granados

Karen Acros, Ph.D.

University of California President's
Postdoctoral Fellow
University of California Santa Cruz

Profile

Dr. Karen Arcos is a first-generation Latina University of California President's Postdoctoral Fellow in the psychology department at the University of California, Santa Cruz. Her research focuses on learning and memory in the context of cognitive neuroscience in laboratory and applied settings. Specifically, she focuses on 1) effective study strategies for student learning and 2) modalities' role in learning and memory among blind and sighted individuals. Her research has been published in peer-reviewed journals and international conferences, including Elsevier's Brain Research, Springer's Experimental Brain Research, and Psychonomic Society's Annual Meeting. Dr. Acros earned her Ph.D. and MS in cognitive neuroscience (2019 and 2020), as well as a Field Emphasis in Chicano/Latino Studies (2020) from the University of California, Irvine. She also earned a BA in psychology and a Spanish minor from the University of Southern California (2015). Dr. Arcos has accomplished feats such as being a former National Science Foundation Graduate Research Fellow (2015) and a Ronald E. McNair Scholar (2013–14) despite being totally blind.

Thanks to those who have helped her be where she is today, Dr. Acros is passionate about serving her community. For almost a decade, she has mentored over 20 disabled and nondisabled underrepresented minority students on undergraduate and graduate admissions processes, as well as on conducting experimental procedures, to show them that they, too, can pursue advanced degrees. Most recently, she served on a committee of fellow postdoctoral scholars to organize a virtual writing retreat for fellow postdocs and advanced graduate students focused on demystifying writing while finding voice amidst the many isms faced. During her free time, she enjoys reading mysteries, spending time with family and friends, and hiking.

Abstract

Are you sure? : Uncertainty's Impact on Learning New Information

Learners may be uncertain about whether encountered information is true. In some situations, uncertainty may encourage people to critically assess information's accuracy, serving as a kind of desirable difficulty beneficial for learning. Uncertainty may also have negative effects, however, leading people to mistrust true information and/or to later think that false information is true.

To explore these ideas more deeply, in three experiments, participants were exposed to history statements. In one condition, all the statements were true, and the participants knew it. In the other two conditions, some statements were true and others were false. Participants were either told the statements' accuracy or asked to guess the statements' accuracy prior to feedback. All participants were then tested on their ability to recall the true information and to identify true from false statements. Although mixed across experiments, the results suggest that uncertainty may potentially enhance learning, perhaps by inducing people to encode to-be-learned information more deeply than they would otherwise. This benefit may come at a cost, however, leading them to also be more likely to think that false information is true. Given the increased opportunities to learn on the internet and the greater demand for independent learning, understanding the impact of information accuracy on remembering is important.

Developing the above research project has fueled Dr. Acros' interest in conducting research on underrepresented groups via behavioral measures, fMRI, or EEG. She is particularly interested in questions about how to increase the number of underrepresented minorities pursuing science. Understanding more about students' motivations for pursuing an undergraduate education might also reveal ways of adapting study strategies to better meet their needs. Greater awareness may also aid in identifying and implementing necessary structural changes to reduce educational inequities.

Govanni Granados

Ph.D. Candidate
Purdue University

Profile

Govanni Granados is a mathematics Ph.D. candidate at Purdue University, where he also received his MS in mathematics. Previously, he attended California State University, Northridge, where he completed his BS in mathematics—statistics option with a minor in philosophy.

His current research interests are in inverse problems for partial differential equations (PDEs). Granados has been particularly focused on inverse shape problems where he enjoys developing algorithms in order to reconstruct unknown regions within a known object or media. Solving these problems requires tools from a range of mathematical topics such as, but not limited to, Functional Analysis, Numerical Analysis, and Analysis of PDEs. During summer 2023, he was an intern at RAND Corporation where he contributed to a research project in the National Security Research Division studying the effects of retrodirective beamforming on array processing.

As of fall 2023, he serves as a graduate teaching assistant in the Department of Mathematics at Purdue University. He has led various recitation sections for all levels of Calculus and has taught his own Applied Calculus I and II courses. He has also been a grader for Discrete Math and a supervisor of the departmental tutoring center.

From fall 2017 to summer 2020, he was a graduate assistant in Areas of National Need Fellow. He was recently awarded the Bilsland Fellowship for spring 2024. Granados served two terms as treasurer in Purdue's Latinx Graduate Student Organization. He has worked directly with undergraduate students as a mentor in Purdue's LSAMP chapter since fall 2021. Granados is also a member of SACNAS and mathematical societies such as SIAM and AMS. During spring 2023, he received the Excellence in Teaching and Excellence in Service awards from Purdue's Department of Mathematics.

Abstract

Qualitative Methods for Small Volume, Inverse Shape Problems

Qualitative methods in inverse problems are known for requiring less a priori knowledge and for being less computationally expensive than iterative techniques. These methods have been employed in geophysical exploration, medical imaging, and engineering. In these physical applications, the goal is to develop a qualitative reconstruction method. This would allow one to infer the interior of an object using only physical measurements on its surface as data. More precisely, given a partial differential equation that describes the behavior of a physical system, the goal of an inverse shape problem is to determine the underlying properties of the system from behavior observations. Once the unknown region has been reconstructed, a natural extension would be to consider the inverse parameter problem. In the near future, Granados intends to research how key parameters found in the studied boundary value problem may also be analytically determined from measured data. Furthermore, he also plans to develop non-iterative and computationally inexpensive methods to numerically recover these parameters.

In this presentation, Granados will consider inverse shape problems coming from diffuse optical tomography and the Helmholtz equation. In both problems, the goal is to reconstruct small volume interior regions from measured data on the exterior surface of an object. In order to achieve this, they will derive an asymptotic extension of the reciprocity gap functional associated with each problem. The reciprocity gap functional takes in the measured Cauchy data on the exterior surface of the object. In diffuse optical tomography, they prove that a MUSIC-type algorithm that does not require evaluating the Green's function can be used to recover the unknown subregions. This gives an analytically rigorous and computationally simple method for recovering the small volume regions. For the problem coming from the Helmholtz equation, they recover the subregions of interest via a direct sampling method. The direct sampling method presented here allows us to accurately recover the small volume region from one pair of Cauchy data, requiring less data than many direct sampling methods. They will prove that the direct sampling method is stable with respect to noisy data. Numerical examples will be presented for both cases in two dimensions where the measurement surface is the unit circle.

Notes

Notes

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