



**THE OHIO STATE  
UNIVERSITY**

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COLLEGE OF ENGINEERING

*Department of*

**ENGINEERING EDUCATION**

**EED Ph.D. Student Abstracts**



# TURHAN CARROLL

**3<sup>rd</sup> Year Ph.D. Student**

**Graduate Teaching Associate**

My research interests are primarily concerned with educational access and persistence of marginalized students in engineering education. I utilize ideas and methods from various disciplines to understand ways in which social inequities can serve as an invisible gatekeeper in engineering education. I use this knowledge to examine challenges and issues these disadvantaged students face in their pursuit of engineering degrees. I have collaborated with the BERG group to develop a framework for understanding how the construct of smartness is used as an oppressive tool in engineering spaces, and I have worked with Dr. Delaine's research group to understand how service-learning experiences in engineering can help foster empathy among undergraduate students. I have done work to understand persistence of engineering students from low-income backgrounds. The goal of my work is to understand and ultimately help reduce educational inequities in engineering.



# ABIGAIL CLARK

**3<sup>rd</sup> Year Ph.D. Student (Candidate)**

**Graduate Teaching Associate**

**Graduate Research Associate**

Abigail currently works as a GRA on the Pathways project, under the direction of Dr. Rachel Kajfez. This project focuses on understanding how various structures of First-Year Engineering programs impact students' engineering identity and community development. We are currently in the third year of the project, and will be conducting our third phase of interviews with students and focus groups with FYE instructional staff over the course of the year. This project is conducted in conjunction with Dr. M. Jean Mohammadi-Aragh at Mississippi State University. Abigail also recently passed her candidacy exam and is beginning her dissertation research. Her research focuses on engineering identity development in informal pre-college setting, specifically the Girl Scouts. She will be investigating how the completion of a Girl Scout engineering badge or Journey impact middle school girls' engineering identity development through the use of the Draw-an-Engineer Task, short interviews, and participant observations. The results of this research will be used to support the development of training for Girl Scout leaders in order to help Girl Scout leaders support engineering identity development of their troop members. Abigail's dissertation work and the leader training development are supported by a grant from the Battelle Engineering, Technology and Human Affairs endowment.



# RENEE DESING

**3<sup>rd</sup> Year Ph.D. Student (Candidate)**

**Graduate Teaching Associate**

**Graduate Research Associate**

The research that I am involved with at Ohio State University is both my own dissertation research, as well as assisting in research projects that Dr. Rachel Kajfez's RIME research group is conducting. I have been involved in a variety of research projects, including AISL, Pathways, and KEEN work. With this work I have conducted various stages of qualitative and quantitative data collection and analysis. This involvement lead to my interest in learning more about, and ultimately conducting my own, mixed methods research. My own dissertation research is underway, as I am currently collecting pilot data to inform my data collection methods moving forward. My dissertation research is a mixed methods study that focuses on investigating the impact of counterfactual thinking on career motivation in early-career women in engineering positions. I hope to defend my dissertation in the Spring of 2020. After completing my Ph.D. I am looking to pursue a job in industry that helps early career women in engineering positions be successful and motivated in their career choices.

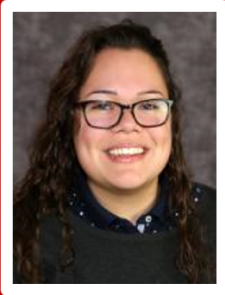


# TY DRAYTON

**2<sup>nd</sup> Year Ph.D. Student**

**Graduate Research Associate**

I am a Graduate Research Assistant working with Dr. Rachel Kajfez on a National Science Foundation Advancing Informal STEM Learning funded project to develop a collaborative program that connects and prepares researchers from divergent disciplines to creatively and effectively communicate science around convergent themes to public audiences of all ages within informal settings. Our study also focuses on the development of the researchers' motivations and identity as they progress through the program by employing the Longitudinal Model of Motivation and Identity theoretical framework. For my dissertation research, I would like to examine how the participation of undergraduate engineering students in academic makerspaces affect their engineering identity and intention to persist within engineering majors. After completing my PhD, I would like to teach and conduct research at an R1 research institution, where I can study and teach engineering education, student entrepreneurship and innovation, and makerspaces and technology-assisted learning. I envision a career in academia as a culmination of my professional experience and educational background, where my research and teaching will support student learning and engagement in engineering..



# GISELLE GUANES MELGAREJO

**2<sup>nd</sup> Year Ph.D. Student**  
**Graduate Research Associate**

Decisions have consequences! But, have you ever stop to think about how you make decisions? What about engineers—how do they make decisions? Or, perhaps, how do engineering students **THINK** they should make decisions? The project I'm working on being done within Dr. Dringenberg's Beliefs in Engineering Research Group (BERG) studies some of these questions, focusing specifically on beliefs engineering students in capstone design hold about decision making. Within this work, I am interested in studying the role of empathy in decision making and how educators are teaching empathy to students. My desire after I graduate is to continue my efforts in making research available to communities through engagement. For this, I am in constant communication with engineering educators from Paraguay (my home country), seeking to bridge the gap between research and practice.



# NATHAN HARRIS

**2<sup>nd</sup> Year Ph.D. Student**  
**NSF Graduate Research Fellow**

Nathan's research interests provided an excellent opportunity for him to work in the Inclusive Community Based Learning (iCBL) lab, under the leadership of Dr. David A. Delaine. In the lab, Nathan is currently leading a collaborative inquiry approach around partnership formation/initiation in STEM Community-based learning. He, along with colleagues in EED (Dr. David Delaine and Dr. Christopher Ratcliff) and members of the Charles Madison Nabrit Memorial Garden (CMNMG), have been working over the past 5+ months on this research project. His work includes the opportunity to engage the students of the STEM-to-STEAM: It's All in the Garden camp, in discussions about sustainability and renewable energy, and the limitations and functionality of the Farmbot and the solar panels. Nathan is also doing research that is focused on broadening participation in STEM and the impact that summer STEAM camps have on influencing students' pursuit of engineering careers. Additionally, Nathan is working with Dr. Elaine Richardson from the Department of Teaching and Learning on a paper on the impact of HipHop adaption in STEM classrooms. Upon completing his Ph.D., he seeks to consult for school systems to implement computer science courses that are catered toward their schools and communities.



# AMY KRAMER

**2<sup>nd</sup> Year Ph.D. Student**  
**Graduate Research Associate**

During my time in the Department of Engineering Education at The Ohio State University, I have had the privilege of being a member of the Beliefs in Engineering Research Group (BERG) lead by Dr. Emily Dringenberg. Through the exploration of beliefs, BERG's goal is to shift the culture of engineering education to be more inclusive and realistic. As a member of BERG, I have researched engineering students' beliefs about the nature of intelligence, beliefs about smartness, and the interconnection of those beliefs with their identity. For my own research, I intend to continue exploring beliefs and identity as well as engineering culture. Due to my personal experiences in industry, I intend to focus my research on early-career women in engineering to understand how engineering educators can better prepare women for a career in engineering and also understand what workplaces can do to be more inclusive. In the future, I plan to pursue a career in academia to continue my research and to educate the next generation of engineers.



# ALEXIA LEONARD

**1<sup>st</sup> Year Ph.D. Student**  
**Graduate Teaching Associate**

One of my research interests is bridging the gap between research and practice, and making engineering education research (EER) more accessible and more able to be applied for those that do not have a passion for teaching or learning. I want to explore the area of professional development and how we, as engineering education researchers, can impact the greater population of academia – those that are not seeking our research out. After graduate school, I would like to remain in the academic setting as an assistant professor.





# TYLER MILBURN

**1<sup>st</sup> Year Ph.D. Student**  
**Graduate Teaching Associate**

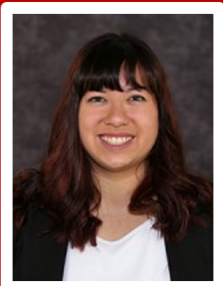
As a GTA for the FEH program in our department, I have worked with students and discussed their thoughts on choosing their major this year. As a first-year student in the PhD program, I have used these conversations to shape two of my projects this semester. One project focuses on how first-year programs use course work to introduce students to different engineering majors and the other project studies the decision process undecided engineering students use to select their major. As a former undecided engineering student myself, I am interested in studying this decision process and performing research that will help first-year programs at many universities shape their courses to better introduce students to different engineering majors and access the information they need to select their major.



# EMILY NUTWELL

**3<sup>rd</sup> Year Ph.D. Student**  
**Graduate Research Specialist**

The project I am currently working on is a collaboration between the Simulation Innovation and Modeling Center (SIMCenter), EED (Dr. Ann Christy) and EHE (Dr. David Stein). It is focused on engineering professionals enrolled in an online continuing education course about the Finite Element Method. The project studies the artifacts generated in the course to gather information about the engineers as they develop knowledge and abilities to appropriately define virtual representations of complex engineering problems, critically analyze the results, and make engineering judgements based on this virtual data. These artifacts are analyzed through a framework of training transfer derived from the field of human resources development, as well as the course learning goals which define measurable attributes of critical thinking. I am also a staff member in the SIMCenter at Ohio State which is a research center that focuses on the creation of innovative engineering solutions using primarily physics-based modeling techniques. The SIMCenter also supports various educational initiatives aimed at students and working professionals to better prepare them for using simulation tools in their careers.

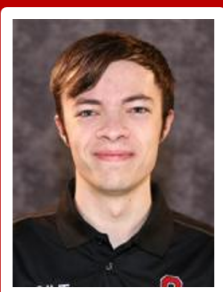


# RENEE PELAN

**1<sup>st</sup> Year Ph.D. Student**

**Graduate Research Associate**

I am currently a member of Research on Identity and Motivation in Engineering (RIME) Collaborative and am working on the Advancing Informal STEM Learning (AISL) grant as a Graduate Research Associate under Dr. Rachel Louis Kajfez. This research has given me the opportunity to explore identity and motivation development in faculty members. My research interests include diversity in engineering, teaching methods, and informal learning environments. I am currently exploring the role of parents' or guardians' involvement in their child's learning in informal learning settings. My hope is to work in an informal learning setting or in a diversity office in an engineering college.

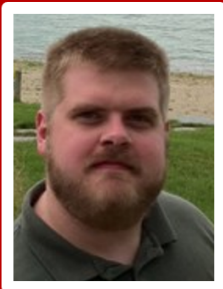


# DREW PHILLIPS

**3<sup>rd</sup> Year Ph.D. Student**

**Graduate Teaching Associate**

Drew has worked first as an Undergraduate Teaching Assistant and now as a Graduate Teaching Associate for the Department of Engineering Education (formerly for the Engineering Education Innovation Center) for 7 years. Teaching in the Fundamentals of Engineering for Honors (FEH) program became his gateway from his electrical engineering academics into his engineering education PhD research. He is interested in how teaching assistants are used in college STEM courses, what training they undergo, and how they learn and develop effective teaching skills. Currently, he is conducting a systematic literature review of teaching assistant literature and working to partially automate the process. Additionally, Drew works on other research projects relating to first-year engineering programs and cornerstone design teams. After graduation, Drew hopes to teach in a large first-year engineering or similar program which utilizes teaching assistants, develop training and development programs for those teaching assistants, and conduct some research on the side.



# ROBERT PANCOAST

**1<sup>st</sup> Year Ph.D. Student**

**Graduate Teaching Associate**

Robert Pancoast is a new Graduate Teaching Associate for the Department of Engineering Education. He graduated from The Ohio State University with a B.S. in Electrical and Computer Engineering and completed his M.S. from University of Dayton. His research interests include open educational resources, professional development, and multi-disciplinary collaboration. In his free time, he enjoys relaxing with his family and spending time at the Great Lakes.



# AMENA SHERMADOU

**3<sup>rd</sup> Year Ph.D. Student**

**Graduate Teaching Associate**

**Graduate Research Associate**

Within engineering education, service-learning courses are often designed with an emphasis on engineering technical skills development. Despite the expected encounters with cultural difference, learning outcomes aimed at these interactions are often an implicit focus. When not addressed, unintended consequences of these encounters can lead to increased prejudice, stereotypes and other negative behaviors towards outgroup community members of service-learning partnerships. Prior literature in the engineering service-learning space has been largely quantitative in nature, with limited insights into the nuanced individual student experience when encountering cultural difference. My dissertation research will use a qualitative approach to answer the research question: How do undergraduate engineering students make sense of encounters with cultural difference while participating in service-learning experiences? The outcomes of the presented research can provide contextual insights on individual student intercultural awareness while participating in engineering service-learning experiences.

I am a member of Dr. David Delaine's research group, The iCBL Lab. After completing my PhD, I hope to pursue either tenure-track faculty or clinical faculty positions.





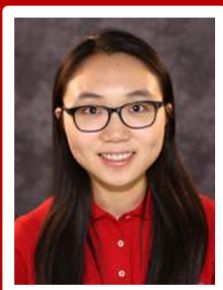
# CASSIE WALLWEY

2<sup>nd</sup> Year Ph.D. Student

Graduate Teaching Associate

Graduate Research Associate

My research experiences have been housed primarily in Dr. Rachel Kajfez's RIME research group. The project that I am currently working on focuses on engineering students' development of engineering identity after their first-year experiences. This project has given me experience in qualitative research methods such as interviewing, coding, memoing, and analysis. I also participated in collaborative research between RIME and Emily Dringenberg's BERG research group studying students' perceptions of what it means to be smart, and how this impacts their identities as smart. This research was recently presented at the 2019 FIE Conference. My own research interests, that are currently informing the creation of my dissertation proposal, involve how feedback given to students in engineering classrooms impacts their motivation. These interests are inspired by my experiences teaching first-year engineering students, as I am also a GTA for the FEH program here at Ohio State. In the future, I hope to pursue a job educating young engineering students and developing strong engineering programs at smaller schools.



# LINJUE WANG

3<sup>rd</sup> Year Ph.D. Student

Graduate Research Associate

I am Linjue Wang, a third-year international PhD student in the Engineering Education Department. I am now a GRA of the Inclusive Community Based Learning Lab (iCBL Lab) led by Dr. David Delaine. My research experience is mainly to lead the 3-year-long National Science Foundation Project (Award Number 1821866) focus on empathy development in engineering community based learning (CBL) context. Through this project, our team collaborates with researchers from the University of Georgia, in order to design contextualized empathy modules and close the gap between humanity and engineering, e.g. Service-learning. Currently, this project has been moved mid-way around 6 different CBL cases. My dissertation plan is to prepare 3 journal article drafts from the results of this research. Before I graduate, I intend to design a proposal as the follow-up study to validate empathy modules in practice. I am also collaborating on an ASEE paper with the BERG group on empathic reasoning in the decision-making process through the capstone design process. My future plan is to lead a research-based community engagement program affiliated with a university, which provides a two-way road between the university and different stakeholders (local community, science center, K-12 etc.).



# MEG WEST

**2<sup>nd</sup> Year Ph.D. Student**

**Graduate Teaching Associate**

**Graduate Research Associate**

I am a graduate research associate working under Patrick Herak (OSU) and Blake Hylton (Ohio Northern University) on an NSF funded project that seeks to develop curricular activities and assessment guidance for K-12 science and engineering educators to incorporate engineering problem-framing design content into their biology, chemistry, and physics classes. These activities were designed to incorporate the cross-cutting ideas published in the Next Generation Science Standards, and draw on best practices for instructional design of problem-framing activities from research on design and model-eliciting activities. These results will be used in conjunction with teacher feedback to improve the design experiences and the evaluation process. Data will also be collected to evaluate the impacts of these activities on student attitudes towards engineering, and on teacher efficacy towards teaching engineering content. My career goals are focused specifically on K-12 teacher engineering education. I would like to aid in increasing teacher motivation to teach engineering concepts in their classrooms through making engineering teaching education and resources more accessible.