

January 10, 2021

BTE: Black Trailblazers in Engineering
Purdue University

I am excited about the possibility of being involved in this program because I am in need of guidance and community as it relates to my career as a researcher and professor. My research experience extends naturally from my passion for marginalized communities. Broadly, my research efforts span two focus areas: culturally relevant in-service learning and systematic thinking in social problem solving. My dissertation research sits at the intersection of these spaces by affording me the chance to investigate socially engaged design settings for the experiences of the most vulnerable populations present, the community partners. This program can help me to connect my goals with an actionable plan to connect with institutions and societies that can help me accomplish them.

My research agenda not only reflects my past and present research goals, it also connects my goals of improving access and opportunity for my shared communities with my commitment to understanding and participating in a multicultural society. In my career as a graduate student, I have had the privilege of providing outreach, teaching mentoring and coaching to a variety of student backgrounds. Within the community of African Americans and other underrepresented student groups, I have served as a mentor, tutor and coach to students interested in pursuing Engineering professions and higher learning. I have coordinated and facilitated outreach events, provided math tutoring and instruction to third and fourth grade students, and served as a formal and informal mentor of students entering or pursuing undergraduate degrees. Beyond volunteering for these roles, I have held leadership roles in the National Society of Black Engineers (NSBE) and the National Alliance for Multicultural Engineering Programs Association (NAMEPA). Within the community of marginalized women, I have served as Treasurer for Women of Proverbs (a spiritual organization for women at the University of Michigan) and on the National Student Advisory Council of the American Association of University Women (AAUW).

Once I graduate, I plan to develop and facilitate community and research-based interventions that are co-developed and conducted within the community they plan to serve. As an aspiring professor, researcher and consultant, I am embarking on a career as service-driven scholar who generates inventive access to educational resources developed by studying human experiences. I plan to continue to mentor and serve as a role models to others who are looking to create a self-empowered career path. I deeply believe that participation in the Black Trailblazers in Engineering program would be transformational in helping me accomplish my goals.

Sincerely,

A handwritten signature in cursive script that reads "Chanel Beebe".

Chanel Beebe

Research and education plan as a future faculty trailblazer in engineering

Framework of Dissertation: Non-Engineers engage in engineering and design in formal and informal ways. Socially engaged design programs, community development coalitions, and intentional and unintentional design spaces are rich with expertise and thinkers that are developing solutions to very pressing, yet complicated problems. Research on socially engaged design spaces typically focuses on the presence of practicing or developing engineers or on the tangible outcomes of these efforts. Little research is conducted on the expertise and sense-making of the non-engineers/community partners present. Given the social distance between engineers and their typical community partners, there is a strong potential for research and practice within these spaces to further disenfranchise or marginalize non-engineers. Thus, the goal of this research endeavor is to answer the questions: “How do Non-engineers make sense of their collaborative design experience in socially engaged design settings?” and “What evidence of system’s thinking can be seen in the way community partners describe their work or context?”

To answer this question, a qualitative research study is being conducted in which fifteen community partners have been observed and interviewed at various points of their engagement within three different socially engaged design programs. Programs were selected based on their inclusion of non-engineers and their proximity to the researcher. In addition to interviews, observations and artifacts from the programs have been collected to paint a richer picture of the experiences and conceptions of the community partners.

Field Contributions and Career Plans: Lessons learned from the voices of these participants has implications for the ways in which practicing engineers and scholars relate to and include non-engineers in socially engaged design spaces. Additionally, this research has implications for more novel and genuine ways to situate design learning within social spaces. Given the diverse context of the problems solved in the socially engaged design settings within this study, the results may also have implications for cross-disciplinary problem solving within and beyond the realm of engineering education including sociology, environmental justice, education and ability studies.

Once this study is complete, I will be able to position myself as an engineering education researcher focused on informal and cross-disciplinary design settings. As such, I plan to continue my career with a meta-analysis on the role emergence and compassion play in developing relationships with research participants in socially engaged design spaces. This will allow me to continue data collection within informal design spaces where engineers may not be present and unpack the ways non-engineers use design to overcome oppression and social inequities. This work fits perfectly within existing university job descriptions for first-year, senior capstone, and community engaged engineering classes. Additionally, this work has the potential to bridge the gaps between universities and the communities they aim to serve.

Chanel Beebe

ChanelBeebe.com
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EDUCATION

Purdue University West Lafayette, IN Anticipated Graduation: 2021
Degree: Ph. D. Engineering Education GPA: 3.67
Advisors: Dr. Monica Cardella
Research Question: How do community partners make meaning of community engaged design experiences?

Purdue University West Lafayette, IN Anticipated Graduation: December 2020
Degree: Master's in Industrial Engineering
Advisor: Dr. Bob Kenly
Research Question: What evidence of Systems Thinking present in community engaged design experiences?

University of Michigan Ann Arbor, MI 2014
Degree: B.S.E Industrial and Operations Engineering GPA: 3.066 / 4.0

RESEARCH EXPERIENCE

Purdue University, Black Cultural Center *Fall 2017 – Summer 2019*
Scholar in Residence for Black Thought Collective

- Taught and demonstrated qualitative research process
- Facilitated development of 10 student-led research projects
- Developed programming relevant to black students and their experiences
- Managed publication of student findings across various platforms including journals and symposiums

National Association of Multicultural Engineering Programs, Purdue University *Spring 2017 – Summer 2018*
Thought Leader for Cultural Hackathon

- Developed a professional development intervention that allows engineering students the chance to interface with corporate representatives on projects designed and led by community members
- Developed and Implemented programming with over 200 students and 20 community partners
- Conducted a pilot study with High School seniors to see if social problems could be addressed with the Engineering design process
- Organized Community partner and student needs into a semester-long course where students collaborated with community partners to solve community problems
- Designed and conducted research around the experiences of the community partners and design ability of the students through surveys and interviews

Purdue University, Mechanical Engineering *Fall 2016 – Fall 2018*
Research Advisory Board: TECH-AIDE Grant

- Designed three-phase qualitative study to unpack the values, norms, expectations, and experiences of African Americans across the College of Engineering
- Conducted 12 focus groups, and 25 one-on-one interviews of 54 African American students in Engineering
- Interacted with multiple University Departments and Centers to implement campus climate change through research and programming

Purdue University, FACELab *Spring/Summer 2015*
Research Advisor: Morgan Hynes

- Developed and implemented curriculum for four 9-day Everyday Engineering Camps in which 9 to 17-year-olds engaged with every step of the design process to address problems in their immediate communities
- Developed Make an Engineer Activity in which participants build a model of an engineer using their personal interests and skills to solve global engineering problem
- Conducted research on the impact of informal engineering experiences and activities

Purdue University, *Engineering Explorer's Grant*

Fall 2014

Research Assistant under Stephen Hoffmann

- Conducted research on the experience of underrepresented and international students in First Year Engineering teams.
- Developed survey to quantify student experiences in teams based on group dynamics frameworks.

Duke University, *Mary Lou Williams Center for Black Culture*

Fall 2014

Graduate Research Assistant: Durham, NC

- Conducted informal focus groups to understand African American student experience
- Developed outline of needs of African American students
- Began University-wide effort to collect data on African American Student Satisfaction

University of Michigan, *Engaged Advising Learning Grant*

2013-2014

Project Coordinator Ann Arbor, MI

- Conducted interviews and focus groups to develop a better understanding of the current state of advisor-student relationships
- Conducted research on student engagement within the classroom
- Developed a comprehensive rubric for faculty to use in evaluating and quantifying student performance
- Helped advisors to see a clearer and more detailed picture of the student's performance

TEACHING EXPERIENCE

Detroit Historical Museum, *1967 Perspectives Project*

2017 – Present

Lead Instructor for Detroit Design 2067

- Developed curricula for week-long immersion program for HS Juniors and Seniors
- Conducted research on Detroit History and developed curricula blending historical perspectives with design thinking
- Coordinated with various museum and community stakeholders to book events and activities for students
- Managed an informal learning space of 12 high school students

Purdue University, *Multicultural Engineering Programs*

Fall 2017 – Summer 2019

Instructor for Multicultural Engineering Program Seminar

- Developed curricula for Cultural Hackathon Co-Curricular Experiences
- Assigned and reviewed student reflections
- Lead various class sessions around design identity and expectations
- Managed a classroom of 35 students for two semesters

Purdue University, *Black Cultural Center*

Fall 2017 – Summer 2019

Scholar in Residence for Black Thought Collective

- Designed curricula for undergraduate students to investigate gentrification patterns across cities within the African Diaspora
- Facilitated weekly discussions around personal experiences of trauma
- Brought in guest speakers on Urban Planning and Ethnography to prepare students for research project
- Guided students through data collection, analysis and publication process

Beebe Arts LLC, *Detroit based research and design firm*

2015-2017

Research, Arts and Teaching Consultant

- Co-Designed and taught Poetry Workshop for Purdue Theatre Class
- Developed and conducted workshops on Freewriting, Painting, and Vision Boarding
- Taught design to 30 high school seniors via summer and spring break programs

Project SEED, *Detroit Branch*

Fall 2014-Spring 2017

Mathematics Specialist

- Conducted professional development for 50 Detroit Public School Teachers
- Wrote and delivered Socratic lesson plans to 150 3rd – 6th students advanced mathematics

RESEARCH PUBLICATIONS

- In Preparation: Bednar, D., **Beebe, C.** (2021). Socially Engaged Energy Justice and Design: A practical framework for more Inclusive Access, *Frontiers Energy*
- In Preparation: **Beebe, C.**, Hira, A., Holly, J., Carter, K. (2021). Who gets to engineer?, *Countering the Mythology of Inclusion and Wellness in Schooling*
- In Print: Secules, McCall, Mejia, **Beebe**, Masters, Sanchez-Peña, Svyantek (2021). Positionality Practices and Dimensions of Impact on Equity Research: A Collaborative Inquiry and Call to the Community, *Journal of Engineering Education* (In Press).
- **Beebe, C (2020)**. Emergence and Compassion: A Reflection on Interpersonal Priorities Strategies Within Collaborative Settings, *Purdue Journal of Service Learning*, West Lafayette, IN.
- **Beebe, C.** (2018). They Will Ask You. *Murmurations*, 1(1), 5-7.
<https://doi.org/https://doi.org/10.31946/meee.v1.i1.19>
- Esan, H., **Beebe, C.**, Cardella, M. (2017). Promoting Computational Thinking in Children Using Apps, *ASEE*, Columbus, OH.
- **Beebe, C.**, Hynes, M. (2017). Youth Ages 9-15 Perceptions of Mechanical Engineering by Race and Gender, *ASEE*, Columbus, OH.
- Holly, J., Joslyn, C., Hira, A., Hynes, M., & **Beebe, C.** (2016). What do you like to do? Exploring pre-college students' career aspirations and perceptions of engineering (Work in progress). In *ASEE 2016 Annual Conference*. New Orleans, LA.
- **Beebe, C.**, Sarwar, U., Jubelt, N., Hira, A., & Hynes, M. (2016). *MAKER: A Game to Make Engineering*. In *ASEE 2016 Annual Conference*. New Orleans, LA.

CONFERENCE PRESENTATIONS

- **Beebe, C.**, Holly, Tolbert, Colquitt. "Do You See Me?: Hypervisible Invisibility #EngineeringWhileBlack, American Society of Engineering Education, Virtual, July 2020
- **Beebe, C.**, "Service-learning from the perspective of Community Partners" Poster and Exhibition. *Purdue Engagement and Service-Learning Summit*, West Lafayette IN, February 2020
- **Beebe, C.**, "Expanding Cultures Part II: Beyond Intersectionality" *Women in Engineering ProActive Network*, Virtual, October 2019
- **Beebe, C.**, "Researching Socially Engaged Design: Community Partner Narratives of Social Change and Agency Building" *Ford Foundation Fellow Annual Conference*, San Juan, Puerto Rico, October 2019
- **Beebe, C.**, "Expanding Cultures: How where I come from informs where I am going and how I will get there" *Women in Engineering ProActive Network*, Virtual, August 2019
- **Beebe, C.**, "Storytelling and Utopia as Resistance to Marginalization of African American Engineers at a PWI" *Collaborative Network for Engineering and Computing Diversity*, Washington DC, April 2019
- **Beebe, C.**, "Cultural Hackathon: Development and Considerations" *Collaborative Network for Engineering and Computing Diversity*, Washington DC, April 2019
- **Beebe, C.**, "Inclusive Community-Engaged Design" *45th Annual National Society of Black Engineers National Convention*, Detroit, MI, April 2019
- **Beebe, C.**, "Experiences and Learning of Community Partners in Community Engaged Design Settings" *2018 Conference of Ford Fellows: Academic Exchange Session*, San Jose, CA, September 2018
- **Beebe, C.**, "Youth Ages 9-15 Perceptions of Mechanical Engineering by Race and Gender." *ASEE 2017 Annual Conference*, Columbus, OH, June 29, 2017
- **Beebe, C.**, "Promoting Computational Thinking in Children Using Apps." *ASEE 2017 Annual Conference*, Columbus, OH, June 29, 2017
- **Beebe, C.**, "What do you like to do? Exploring pre-college students' career aspirations and perceptions of engineering." *ASEE 2016 Annual Conference*, New Orleans, LA, June 24, 2016
- **Beebe, C.**, "MAKER: A Game to Make Engineering." *Poster and Exhibition, ASEE 2016 Annual Conference*, New Orleans, LA, June 24, 2016

AWARDS AND HONORS

- Humanity in Action Detroit Fellow (2019)
- Ford Foundation Pre-Doctoral Fellowship (2018-2021)
- Leadership in Action Award (Purdue Butler Center – 2017)
- Spirit of Martin Luther King Jr. Leadership Award (College of Engineering – 2014)
- Outstanding Female on Campus (Alpha Phi Alpha Fraternity Incorporated – 2013)
- New Student Achievement Award (College of Engineering - 2009)
- Gates Millennium Scholarship (Bill Gates Foundation-2009)
- Rogel Match Scholarship (U of M-2009)

SERVICE AND LEADERSHIP

Purdue University

- Purdue Black Cultural Center: Black Thought Collective, Scholar in Residence (2017-2019)
- Engineering Education Graduate Student Association, Secretary (2017-2018), President (2017-2018)
- Mentoring at Purdue Program, Peer Mentor (2017-2018)
- Purdue Black Cultural Center: Haraka Writers, Spoken Word Poet, (2015-2017)
- National Society of Black Engineers, Member (2015-2018)
- Black Graduate Student Association, Member (2015-2018)

University of Michigan

- National Society of Black Engineers: Vice President (2012-2013), Finance Chair (2011-2012)
- Office of Academic Multicultural Initiatives: Academic Success Partner to 6 protégés (Present)
- Center for Educational Outreach- Project Inspire: Student Speaker (2009-Present)
- American Association of University Women, National Student Advisory Council (2010-2011)
- Gates Millennium Scholarship (Bill Gates Foundation-2009)
- Rogel Match Scholarship (U of M-2009)

ENTREPRENEURIAL EXPERIENCE

Beebe Arts LLC, Art & Research Design Solutions

2017-Present

Founder and CEO: Detroit, MI

- Consultant with Detroit Historical Museum to design and implement a 10-Day Immersion Program for High School Seniors to learn about Detroit History and Co-Develop Community Solutions
- Thought leader with the National Association of Multi-Cultural Engineering Programs Advocates to Design a Cultural Hackathon to develop the skill sets and opportunities of Underrepresented Engineers
- Commissioned Art Projects with community groups and individuals
- Develop and Design Publications such as newsletters, poetry books, presentations and flyers
- Mentoring, Coaching and Advising to students of color
- Poetry Publication Consultation for Young Writers
- Poetic Speaking Engagements for Non-Profit Organizations

PROGRAM CERTIFICATIONS

- Advanced Graduate Teaching Certificate, Purdue University, Center for Instructional Excellence, 2019
- Different Lenses Workshop Series Completion, Purdue University Center for Intercultural Learning, 2019
- Applied Management Principles Program Graduate, Purdue University Krannert School of Business, 2019
- Dissertation Institute Fellow, University of Houston, 2018

PERSONAL PUBLICATIONS

- Beebe, Chanel (2020) Views from the Inside, Beebe Arts LLC, Detroit, MI
- Beebe, Chanel (2019) Proof, Beebe Arts LLC, Detroit, MI
- Beebe, Chanel (2017) Fractal, Beebe Arts LLC, Detroit, MI
- Beebe, Chanel (2017) Now, Go!, Beebe Arts LLC, Detroit, MI
- Beebe, Chanel (2016) Reveal, Beebe Arts & Ahmad Barber Photography, Detroit, MI
- Beebe, Chanel (2015) Now & Then, Beebe Arts, Detroit, MI

WORK EXPERIENCE

The Boeing Company, Consumer Aviation Services Lean Enterprises Summer 2013
Industrial Engineering Intern: Renton, WA

- Completed Shingo training and developed a better understanding of perfected business practices
- Designed and developed a visual management system for managing team projects that was eventually implemented to over 200 employees
- Constructed Values Stream Mapping of change request process and completed root cause analysis to eliminate security issues
- Conducted time studies on Kent Distribution Center Receiving Process
- Facilitated and developed accelerated improvement workshop that decreased receiving time by 50%

Dow Chemical Company, Hydrocarbons Improvement Team Summer 2012
Supply Chain Intern: Houston, TX

- Facilitated informational discussions with international teams to gather needs of stakeholders and design informational dashboard
- Reevaluated key corporate processes to streamline workflow by building decision trees and flow charts
- Built a balance sheet to manage \$500 million in Canadian Ethylene sales

Wal-Mart Stores Inc., Information Systems Department Summer 2011
International Department Intern: Bentonville, AR

- Developed strategies to successfully integrate a recently acquired company
- Oversaw budgets of \$200 million+
- Interfaced with international groups

January 22, 2020

Dear Colleagues,

I am writing to nominate Ms. Chanel Beebe for the Black Trailblazers in Engineering program. Ms. Beebe is currently enrolled as a graduate student pursuing a PhD in Engineering Education, she has completed all of the department and university requirements for the PhD except for writing and defense of the dissertation, and as her advisor I currently anticipate that she will defend and deposit her dissertation this year. Ms. Beebe has exceptional potential for a career in engineering academia based on her excellence in research, teaching and service and I believe she has an exceptional history of working to promote a climate that values diversity and inclusion.

Ms. Beebe has a broad perspective on the field of engineering education. Much of her research and expertise is centered around engineering design, which is a core and distinguishing aspect of engineering and a critical focus in terms of engineering education research. She also has a broad perspective in terms of having conducted research in settings that span pre-college and higher education. In addition to her interest in engineering design education, Ms. Beebe has actively engaged in research related to African American students' engineering experiences. Additionally, she is investigating how students and community partners engage in systems thinking in the context of community-based engineering design projects. Ms. Beebe's work is best characterized as a combination of theoretical and applied work. Much of the work that she has done during her graduate studies (in addition to her dissertation research) is theory-generating – but she is committed to connecting this research to practice. For example, the work she is doing with cultural hackathons provide her with an opportunity to apply theory and empirical research as she is designing experiences for students (particularly BIPOC students) to participate in community-engaged engineering design learning experiences.

In addition to her research contributions, Ms. Beebe has made substantial contributions to the graduate student community within the School of Engineering Education, the College of Engineering, and Purdue University. Ms. Beebe has impacted the success of graduate students at Purdue through regular informal peer-mentoring relationships with Engineering Education students as well as students from other departments. She actively participates in and supports the work of the Black Graduate Student Association as well as Minority Engineering Program (MEP) Graduate Student Groups. Ms. Beebe has also impacted the success of Engineering Education graduate students through formal mentoring relationships and her service in leadership roles within in the Engineering Education Graduate Student Association (ENEGSA). Ms. Beebe served as secretary for the ENEGSA from 2016 to 2017, and in this role she created and implemented “Milestones Boards” in the Engineering Education Commons Area to allow students to share their progress towards PhD with each other. She also developed the Social Justice and Inclusion committee, and facilitated mental health conversations. As president of the ENEGSA (2017-2018), she initiated a new process

of creating a “State of the Department” report presentation that is shared with the Department Head and Graduate Committee chairs. She also continued to support the Social Justice and Inclusion committee and instituted a process of establishing vision and norms within the ENEGSA Executive Board meetings to focus the ENEGSA Board on leadership and inclusion. Finally, in her role as Social Justice and Inclusion Chair (2018-2019), Ms. Beebe led a “Whole Engineering” initiative that helped graduate students practice mindfulness and self-care while pursuing excellence in engineering education research and she facilitated a “Wait, That’s not Ok” event that allowed students to share concerns related to diversity, inclusion and equity. She continues to be an active participant in the ENE Equity Group.

Ms. Beebe has demonstrated excellence in teaching and service efforts that respond to the needs of students from diverse backgrounds. After gathering undergraduate student feedback through the Minority Engineering Program, Ms. Beebe developed and implemented a series of “Cultural Hackathons” for first-year engineering students that provide additional opportunities for them to develop and practice engineering design and entrepreneurship skills. The programmatic structure Ms. Beebe created has been adapted for a number of different learning environments at Purdue including as a week-long design module of a high school senior recruitment summer program, as a curricular component of a first-year engineering student seminar facilitated by the Purdue Minorities in Engineering Program, and as a campus-wide event through the Division of Diversity and Inclusion. She has also shared this model with academics and cultural institutions outside of Purdue through her consulting work. In addition to leading the Cultural Hackathons, and leading the design skill development sessions, she has also provided mentoring to the first-year engineering students who participate, actively seeking to understand student needs and working one-on-one to coach them during and after the program experience. Ms. Beebe also took on a lead role with the School of Mechanical Engineering TECAID (Transforming Engineering Culture to Advance Inclusion and Diversity) group, performing qualitative studies to understand the Black mechanical engineering student experience and participating in critical discussions with faculty to create an action plan for culture change. Ms. Beebe regularly participates in campus improvement initiatives and in Black Cultural Center initiatives and also provides mentoring in that space. She has also served as a volunteer in a variety of public and poetic speaking events on campus. For example, when Purdue hosted the National Association of Multicultural Engineering Program Advocates’ national conference in 2017, Ms. Beebe reflected the quality of Purdue through her presentation of her poetry.

In summary, I believe that Ms. Chanel Beebe is an ideal candidate for the Black Trailblazers in Engineering program based on her demonstrated excellence in research, teaching and service, her demonstrated promise for continuing achievement as a scholar and educator, and her ability to leverage her own experiences and her research in pedagogically productive ways to respond to the learning needs of students from diverse backgrounds.

Sincerely,



Monica E. Cardella,
Professor of Engineering Education