

Intersectionality: Professional identity formation and the success of women of color in higher education STEM disciplines

Dr. Sandra Johnson Austin, University of South Florida

Dr. Sandra Johnson Austin has dedicated her career to promoting diversity, equity, inclusion, and belonging of elementary, middle, and high school students in science, technology, engineering, and mathematics (STEM) education and careers. Her research is grounded in the effective implementation of STEM curricula in urban middle schools. She has published and presented on STEM education and organizational change. Dr. Johnson Austin earned a BS in Civil Engineering from The Pennsylvania State University, an MBA from the University of Notre Dame, and EdD in Organizational Change and Leadership from the University of Southern California.

At the University of South Florida (USF) she leads the project coordination for the National Science Foundation Florida Alliance for Graduate Education and the Professoriate (FL-AGEP), a \$2.4M award to Florida A&M University (with a subaward to USF and Virginia Tech), Bethune-Cookman University, Florida International, and Florida Memorial University. Also, Dr. Johnson Austin is the project coordinator and Co-Principal Investigator for Project Racism In School Exclusionary Suspensions (RISES), a \$30k grant awarded to explore the suspensions of African American middle and high school students in Hillsborough and Pinellas County Florida.

Dr. Johnson Austin held positions as: math faculty at Academy Prep Center of Tampa; executive director of Curated Pathways™ to Innovation; senior vice president for operations at the National Action Council for Minorities in Engineering, Inc.; president and CEO of St. Michael's High School; executive vice president of the Community Partnership for Lifelong Learning; executive director of the National Consortium for Graduate Degrees for Minorities in Engineering and Science; and Minority Engineering Program director at The Pennsylvania State University. She began her career as a cost engineering at Bechtel Power Corporation. In 2007 she founded Charis Consulting Group, LLC.

Dr. Johnson Austin was recognized by numerous organizations for her work in promoting equity and access to STEM education. Her most notable award is Outstanding Engineering Alumnus in Civil and Environmental Engineering from The Pennsylvania State University. She is a member of various STEM organizations including the United States White House endorsed initiative, Algebra by 7th Grade, and advisory committee member for the Smithsonian Science Education Center's 'Zero Barriers in STEM Education.' Dr. Johnson Austin is currently the President of the American Association of University Women Tampa, Inc., consultant to the board for the Caribbean Community Association of Tampa, and Interim Treasurer for the Northeast STEM Starter Academy of Mount Vernon, NY. In addition, Dr. Johnson Austin is a member of the editorial review board for the Caribbean Educational Research Journal (CERJ). She also served as a reviewer for the National Science Foundation.

Dr. Michelle Bradham-Cousar, Florida International University

Dr. Bradham-Cousar is a Certified Rehabilitation Counselor (CRC), National Certified Counselor (NCC), Licensed Mental Health Counselor (LMHC) who is translating her experience to make the university a more inclusive place for individuals with disabilities.

Dr. Bradham-Cousar is an assistant professor where she provides guidance, direction, mentoring to the next generation of students to enter the rehabilitation services field for people with physical and mental health disabilities. She has worked in the field of Rehabilitation Science for over 16 years serving individuals with disabilities.

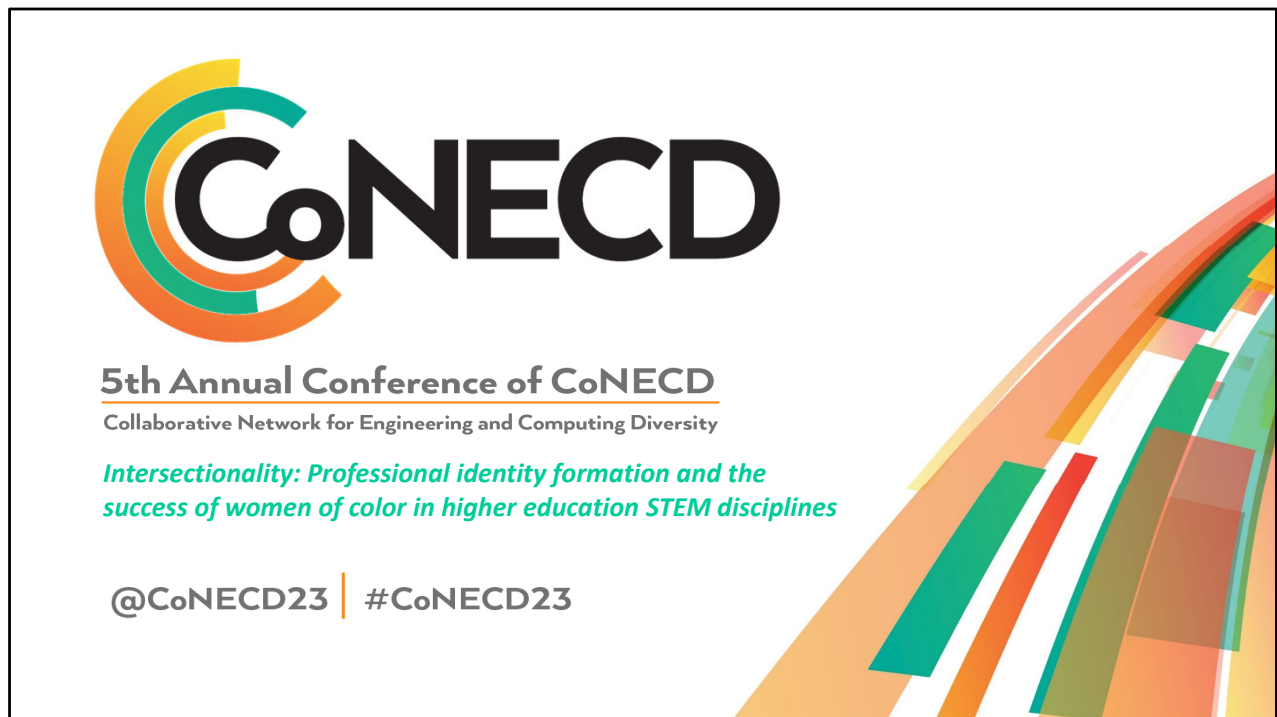
She has served in the following roles: Southern Region Chair for the American Counseling Association (ACA), Bylaws Chair for the American Counseling Association (ACA), President of the American Rehabilitation Counseling Association (ARCA) and President of the Florida Counseling Association (FCA).

Having been named "Counselor of the Year" in 2015 for her contributions to the field of rehabilitation and disabilities, Dr. Bradham-Cousar's work mostly focuses on health disparities. This is reflected in

her work with the Disability Competencies. She is currently working on research that relates to students with disabilities within the school system. Also, part of a collaborative effort she is working with various faculty members to find ways to learn and address how faculty with disabilities are successful within Academia.

Dr. Kemesha Gabbidon, University of South Florida

Dr. Kemesha Gabbidon is an Assistant Professor in the Department of Psychology at the University of South Florida. Her scholarly interests include youth sexual health and health equity. Her research is theoretically grounded and applies an intersectional lens to investigating socio-political, cultural, and psychosocial influences on the health of the individual and their community. Dr. Gabbidon has published on pediatric HIV, HIV stigma, and culture and sexuality. Her current research is aimed at investigating intersectional stigma and how it affects HIV-related outcomes in Tampa Bay by applying participatory qualitative methods. Dr. Gabbidon also teaches graduate and undergraduate courses in Psychology including Cultural Competence, Program Evaluation, and Health Psychology.



Welcome to our presentation titled:

Intersectionality: Professional identity formation and the success of women of color in higher education STEM disciplines

Today, we will present:

- (1) a counter narrative to how 'success' is defined by women of color faculty in STEM
- (2) the role of professional identity and how it interpolates with social identities to shape their experience of success, and
- (3) the sources of stress and support affecting the success among women of color in STEM disciplines.



Hold for Presenters

Author 1

Author 2

Author 3

University logos and names of the authors will appear on this slide.

Our research team was born out of a research bootcamp that we all participated in. In talking with one another, we discovered that our areas of research intersected on being women of color in higher education.

We formed a writing group that meets twice a week; two early morning sessions from 7-9 AM on Mondays and Thursdays. We had a session that met from 8-10 PM on Wednesdays but that meeting time did not work for the majority of the group (not all of us are night owls).

We hold ourselves accountable for meeting our research goals. When we report out half-way into our two hour writing sessions, we shared the projects that we were working on.

Author 1 shared an opportunity for the team to consider, which was the **Archival Publication Authors**, a National Science Foundation sponsored workshop hosted by the American Association for Engineering Education.



Background

Women account for 21.7% of faculty positions in science, technology, engineering, and mathematics (STEM) fields (Brown University, 2021).

Furthermore, women of color accounted for 3.6%, 2.5%, and 1.2% of all assistants, associate, and full professors respectively (Mack, Rankins, Woodson, 2013).

Socio-cultural and institutional barriers to the science, technology, engineering, and mathematics (STEM) disciplines continue for women in higher education.

This study explores the entrepreneurial mindset development that is associated with professional identity formation (Clarke, Hyde, Drennan, 2013; Park & Schallert, 2020).

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Why does this matter?

Improved
Physiological
and Mental
Health Benefits

Improved
Educational
Outcomes

Improved
Scope of
Research

Increased
Productivity

Studies of women of color have mostly focused on students. Additionally, the studies have engaged the work from other frames that did not include an entrepreneurial mindset. The entrepreneurial mindset looks at the engagement of work from a model of success. Next, are research studies that we will reference to make the case for why this is important.

Physiological and Mental Health Benefits: We will share personal accounts on this subject and seek audience input.

Faculty (Davis, et al., 2015): Five African American women experiences; and purposeful sampling.

Non-Tenure Faculty (Crick, et al., 2020): Sampled nontenured faculty; examined six environmental supports; structural equation model looking at the relationships between the supports and faculty satisfaction; and self-determination theory.

Women Faculty in STEM (Casad, et al., 2021): NSF ADVANCE organizational change interventions; and improved Educational Outcomes.

Tenure Faculty Women of Color in STEM (McGee, et al., 2021): Improved scope of research.

Women Faculty of color in STEM (Ong, et al., 2018): Increased productivity.

Intersectionality (Hill, et al., 2017): Three power focal points were explored; examine power and politics from the lens of African American Women; discuss the intersection of participatory democracy; and conceptual work.



PICOT Model

P – Population refers to the sample of subjects you wish to recruit for your study. There may be a fine balance between defining a sample that is most likely to respond to your intervention (e.g. no comorbidity) and one that can be generalized to patients that are likely to be seen in actual practice.

I – Intervention refers to the treatment that will be provided to subjects enrolled in your study.

C – Comparison identifies what you plan on using as a reference group to compare with your treatment intervention. Many study designs refer to this as the control group. If an existing treatment is considered the 'gold standard', then this should be the comparison group.

O – Outcome represents what result you plan on measuring to examine the effectiveness of your intervention. Familiar and validated outcome measurement tools relevant to common chiropractic patient populations may include the Neck Disability Index (V⁶) or Roland-Morris Questionnaire.⁷ There are, typically, a multitude of outcome tools available for different clinical populations, each having strengths and weaknesses.

T – Time describes the duration for your data collection.

Our study is exploratory in nature; therefore, we are using the PICOT framework to fit the study design. Here we see how



ENTREPRENEURIAL MINDSET

THE 3C's



CURIOSITY

In a world of accelerating change, today's solutions are often obsolete tomorrow. Since discoveries are made by the curious, we must empower our students to investigate a rapidly changing world with an insatiable curiosity.



CONNECTIONS

Discoveries, however, are not enough. Information only yields insight when connected with other information. We must teach our students to habitually pursue knowledge and integrate it with their own discoveries to reveal innovative solutions.



CREATING VALUE

Innovative solutions are most meaningful when they create extraordinary value for others. Therefore, students must be champions of value creation. As educators, we must train students to persistently anticipate and meet the needs of a changing world.

“An entrepreneurial mindset² (EM) influences the way you think about the world and act upon what you see. It is a collection of mental habits that empower you to question, adapt, and make positive change, leading you to: 1) Recognize and identify opportunities; 2) Focus on their impact; and 3) Create value in any context

While these abilities are important in many different fields, our focus is on engineers. **The entrepreneurial mindset amplifies the work engineers already do**, equipping them to solve societal problems and create an environment for human flourishing.”

Entrepreneurial mindset plus engineering skill set equals educational outcomes.

It is known that engineers find success and personal fulfillment when they couple their skills with a mindset to create extraordinary value for others. It is not just about skill. It is about mindset.

Therefore, the entrepreneurial mindset addresses the 3C's: **Curiosity, Connections, and Creating Value.**

- Have a constant **curiosity** about our changing world and employ a contrarian view of accepted solutions.
- Habitually **connect** information from many sources to gain insight and manage risk.
- **Create value** for others from unexpected opportunities as well as persist through, and learn from, failure.

² <https://engineeringunleashed.com/mindset>



Research Questions

RQ 1:

How does entrepreneurial mindset shape the professional identity (interest) of women of color (population) faculty in higher education STEM fields (context)?

RQ 2:

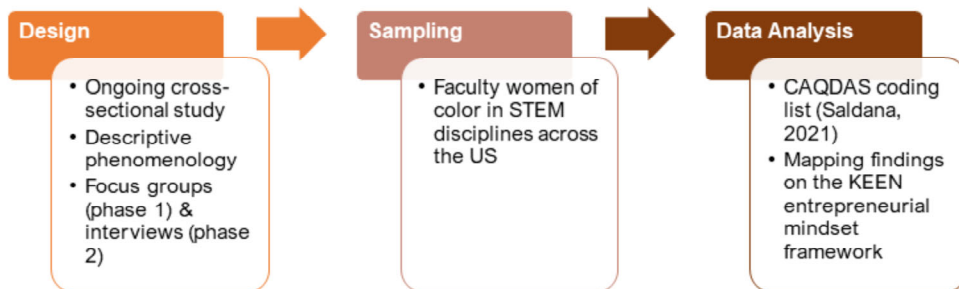
How do women of color (population) in higher education STEM fields (context) define and realize academic success?

Our study is exploratory in nature; therefore, we are using the PICOT framework to fit the study design.

Research Question 1 is: How does entrepreneurial mindset shape the professional identity (interest) of women of color (population) faculty in higher education STEM fields (context)?

Research Question 2 is: How do women of color (population) in higher education STEM fields (context) define and realize academic success?

For both research questions, data will be analyzed as collected (time) until we have met both theoretical and data saturation, wherein responses do not unearth new information and all aspects of the KEEN framework (Engineering Unleashed, 2022) have been incorporated.



1. **Descriptive phenomenology** - focuses on the pure description of people's lived experiences.
2. To gather appropriate data, we are currently using **focus groups and interviews** with women of color in STEM disciplines.
3. Our team is using **CAQDAS** code list (Saldana, 2021) that would help streamline the coding sets for a formalized standard of coding that would help with our reliability.

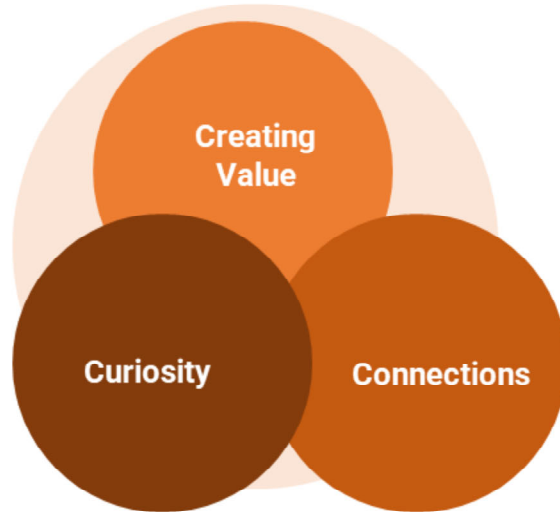


Interview Questions

1. When you hear the word success, what comes to mind?
2. How do you define success in your career as a higher education professional?
3. What experiences inform your definition of success?
4. (For tenured faculty) What has led to your success in the field?
5. Describe your professional identity?
 - a. What achievements contributes to maintaining that professional identity?
6. What early influences led you to want to be a professional in your field?
7. How do you identify racially/ethnically? (Use their answer for next part of the question.) What does it mean to you to be a(n) [insert their answer] woman in your department?
8. What do you consider your primary source(s) of stress?
9. Tell me more about the sources of support, both internal and external, to your department that enable you to thrive/persist in your professional trajectory.
 - a. What would you need to thrive in your position if you are not already thriving?



Preliminary Findings Entrepreneurial Mindset and Success



Upon conducting the pilot interviews and focus groups, we have the following findings:

1. Considering the tenets of entrepreneurial mindset and the supports needed to achieve success, connections was the most salient aspect of the KEEN framework.
2. Specifically, participant reported the need for mentoring, affinity groups, and creating community to foster their success.

- Safe spaces
- Inclusive policies
- Fiscal support
- Self care



There were several other factors outside of entrepreneurial mindset that participants felt supported their success, including safe spaces, inclusive policies, fiscal support, and self care.

Our limitations will be presented in conjunction with study significance. This way, the reviewers/editors see the limitations of our findings but are then reminded of the contributions and the significance.

We may also present how we attempted to limit those shortcomings. Limitations most relevant are those that obscure study findings and interpretations.



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Here are the references associated with our study.