

Intersectionality and equality within STEM

An interview with Cynthia Chapple

Recent statistics show that Black people comprise only 9% of the STEM workforce (with this figure dropping to as low as 5% in fields such as engineering and technology). To counter this crippling lack of diversity within STEM, and to celebrate the potential of young Black students who may otherwise feel unsupported, Cynthia Chapple founded her organisation Black Girls Do STEM. The organisation works tirelessly to encourage, inspire, and inform Black female students about the realities of a life in STEM. This vital work comprises a number of programmes which provide information and advice to young Black students, contributing to the diversity of the future STEM industry. Research Features were privileged to speak to Cynthia about her life and work.

Many people who have studied a STEM subject might fondly recall the experience which first ignited their passion. Watching an unexpected chemical reaction, perhaps, or learning how to fit pieces together into a functioning electrical circuit. It seems self-evident that we should be collectively harnessing this early passion, encouraging the youthful curiosity which could yield new and diverse scientific riches. Instead, many young people from diverse backgrounds feel that the door to a life in STEM is firmly closed. They might sense that they do not look like the celebrated men in their textbooks, or feel confused about their prospects without the proper training available to them. STEM remains an industry suffering from a huge amount

of thwarted potential, due in large part to its structural inequalities and lack of diversity.

With first-hand experience of this bleak context, Cynthia Chapple founded Black Girls Do STEM. Research Features spoke to her about her career, the work of the organisation, and about her hopes for a diverse future across STEM subjects.

Can you give us an introduction to your research interests?

As a researcher, I was primarily interested in polymer and material chemistry research. I was first fascinated with fibre analysis and material characterisation and then changed my focus to polymer and new material production. I personally researched the development

of nanocomposite reinforcement for polypropene and polystyrene and other low density vinyl polymers. From there, I went into resin and the thermosetting polymer field as it related to electrical applications and is not simply mechanical reinforcement. In this field I spent a lot of time on emulsion chemistry.

I have also always been interested in cosmetics and hair and skincare research. I have long been a member of the American Society of Cosmetic Chemists and when given the opportunity, I hope to produce my own line of specialty surfactants for the cosmetic and personal care sector. Currently I offer research consulting services for formulation, quality, and process improvements for the cosmetic industry.

STEM spaces often feel exclusionary or unreachable to those who do not conform to a white, heteronormative framework.



Cynthia Chapple.

professionalism, communication and speech, dress and what is and is not seen as a distraction or as acceptable in the workplace. We see this also in the policing of Black girls in schools. Therefore, as a result of these same tactics and forms of subjugation, we also see Black girls exit American educational systems at much higher rates than their white female peers.

We see Black women lacking the ability and the environment – both culturally, and sociopolitically – to thrive in STEM spaces.

You have spoken of the 'intersectional leaky pipeline'. Could you tell us a little about what this term means to you?

Intersectionality is a term that provides the lens by which we view the cross section of experiences of those with multiple marginalised identities, ie, to be both Black and Female. This term basically affirms that the experiences I have had are real, and that they are in fact unique to both those identities and cannot be separated out and reduced to simply a result of my Blackness or my femininity.

Specifically in science and STEM spaces, we see that due to Black women's experiences and the isolation they feel, they simply leave these spaces entirely: whether this be changing from a STEM major as a college student, or a

complete career shift as a professional. We see Black women lacking the ability and environment – both culturally, and sociopolitically – to thrive in STEM spaces. We see the policies and practices in these spaces inappropriately targeting unique cultural and social behaviour and traits that are unique to women and, more specifically, Black women. This can be seen in policies around hair and

What were some of the events and experiences that led to you founding Black Girls Do STEM?

The challenges I have faced have centred around access to STEM programmes as a young Black girl growing up on the south side of Chicago. Then as an undergraduate student working several jobs while going to school and juggling class and work. Then later, as a graduate



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Black Girls Do STEM runs the STEM Saturday Academy and the Experience, Preparation and Placement programme.



The organisation works tirelessly to celebrate the potential of young Black students.

student, tutoring to make ends meet, all the way up to the professional who continuously felt isolated and singled out in a space void of other minorities, and often of any women.

I can recall an undergraduate professor telling me that my speech was horrendous and that as a scientist and expert witness, I would never be seen as credible because of my diction. I came to my first job post-undergraduate, and I overheard one guy refer to me as 'the black girl from Purdue'. In my first post-graduate job, I had a coffee mug that read 'I am woman'; I was told that a couple of guys therefore called me a 'feminist' and were not excited to work with me. That mug mysteriously disappeared one day from the cafeteria drying rack.

Often when women and minorities simply show up and dare have the audacity to be authentic in themselves, it is simply too much for a white, heteronormative, male culture to tolerate. There is a great deal of devaluing and taunting, rather than learning how to simply be real people and to maintain relationships with someone who is different from you. I always believed that so long as I was good at my job and I liked what I did, I would remain unbothered. However,

after a while, inevitably the backhanded comments begin to take a toll on you. I have always been committed to leaving a place that does not offer growth, and I am now even more committed to leaving a place that harms.

Academy. This operates with the philosophy of diversifying innovation and empowering Black girls to achieve equitable STEM representation. By creating a culturally unique learning space, we make room for cognitive and

I must believe that one day my little corner of the world will be a more equitable and just place for Black women and girls.

All of these moments, experiences and reflections were the glue that helped me weave the vision of Black Girls Do STEM. I imagined a space where STEM and science and joy happened freely and all of my Black Girl's Magic was allowed, affirmed, and embraced. I wanted to give that to other Black girls – I felt that this could be my contribute to positive social change.

What are some of the many programmes and events currently being run by Black Girls Do STEM?
Our signature programme is the community-based STEM Saturday

mental resilience. This contributes to the development of a STEM mindset and a belief in one's own STEM capability. It also places positive role models who look like our students right in front of them.

We strive to couple problem-solving approaches and design thinking frameworks alongside career-specific relatable experiences, to trigger curiosity and promote metacognition in real time. Through our core values of scholarship, training, empowerment, equity, and mentorship, we trigger curiosity in the minds of Black girls,

thereby building confidence and skills, and developing the future STEM workforce.

This programme is for middle school 6th–8th grade Black Girls. They meet once a month for 5 hours, for 8 months of the year. It covers integrated STEM careers such as fashion technology, cosmetic science, and civil engineering in a hands-on workshop type of way. Girls meet for one hour with a Black woman mentor and for 30 minutes to cover a social/emotional learning topic, such as establishing healthy relationships.

Our second programme that is newly released this year is for high school Black girls. It is our Experience, Preparation and Placement (EPP) programme. This programme happens through partnerships that offer support services throughout students' high school careers. These services include maths and science tutoring, ACT preparation, college and career tours, externships/internships and research opportunities with industry partners. Finally, we offer post-secondary planning which helps girls navigate what they will do after 12th grade and could include participation in certification programmes as 12th graders as well

as helping students and parents make best choices on colleges and securing scholarships.

Are there any stories that stand out for you as moments of pride during your work with Black Girls Do STEM?

The stories that stand out the most are the newly reimagined stories that our Black girls tell about themselves. When they say that they are now good at maths, when they say they can and will be engineers and architects! When the girls now affirm and validate each other and their skills and abilities, and truly reinforce that they can in fact be problem-solvers and world-changers.

Do you feel hopeful about the prospect of a diverse and inclusive future within the STEM field?

I feel hopeful, yes. However, I do not believe that this will come easily. There are women all around the world working on behalf of women and girls in STEM. I am doing my freedom work and so are so many others, and I think the cornerstone of being a true freedom fighter is you must believe that the world can change. There can be no hopelessness when it comes to demanding and working toward social progress, because it'll weigh you down and ultimately, you'll give up. I must

believe that we will win. I must believe that one day my little corner of the world will be a more equitable and just place for Black women and girls. Everyday when I rise, I am working toward an ideal that I can see, a new reality that I can feel; a world worth fighting for.

Looking forward, where do you hope to take Black Girls Do STEM?

I hope Black Girls Do STEM becomes a national model that can appear in other cities across the nation and other countries across the globe. However, I am not eager to rush the process. I believe in doing things properly and with excellence, allowing time for learning and time for improvement. I hope we can make a case for Black girls across the nation, to advocate for how traditional education can better serve Black girls as it relates to cultural, social, personal and STEM identity development.



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