

# DIVERSIFYING AND DECOLONISING THE CURRICULUM

## AUTHORS

Student: Ava Belafonte  
Supervisor: Dr. Rehan Shah  
School of Engineering and Materials Science, Queen Mary University of London



Aiming to motivate, showcase and give credit to marginalised groups in STEM subjects

## MOTIVATION

The contributions of marginalised groups in engineering and mathematics have been largely ignored throughout history. This is highlighted by the lack of these individuals covered by the STEM curriculum. In a multicultural society and industry where the amount of individuals in minority groups contributing and seeking careers in STEM on the rise, students deserve to see the people making headway in their fields from non-traditional backgrounds, and these people deserve recognition. With Queen Mary being the most diverse of the Russell group universities, with 75% of the cohort being from BAME groups, it is critical that the curriculum that is taught is representative of the student body it is taught to.

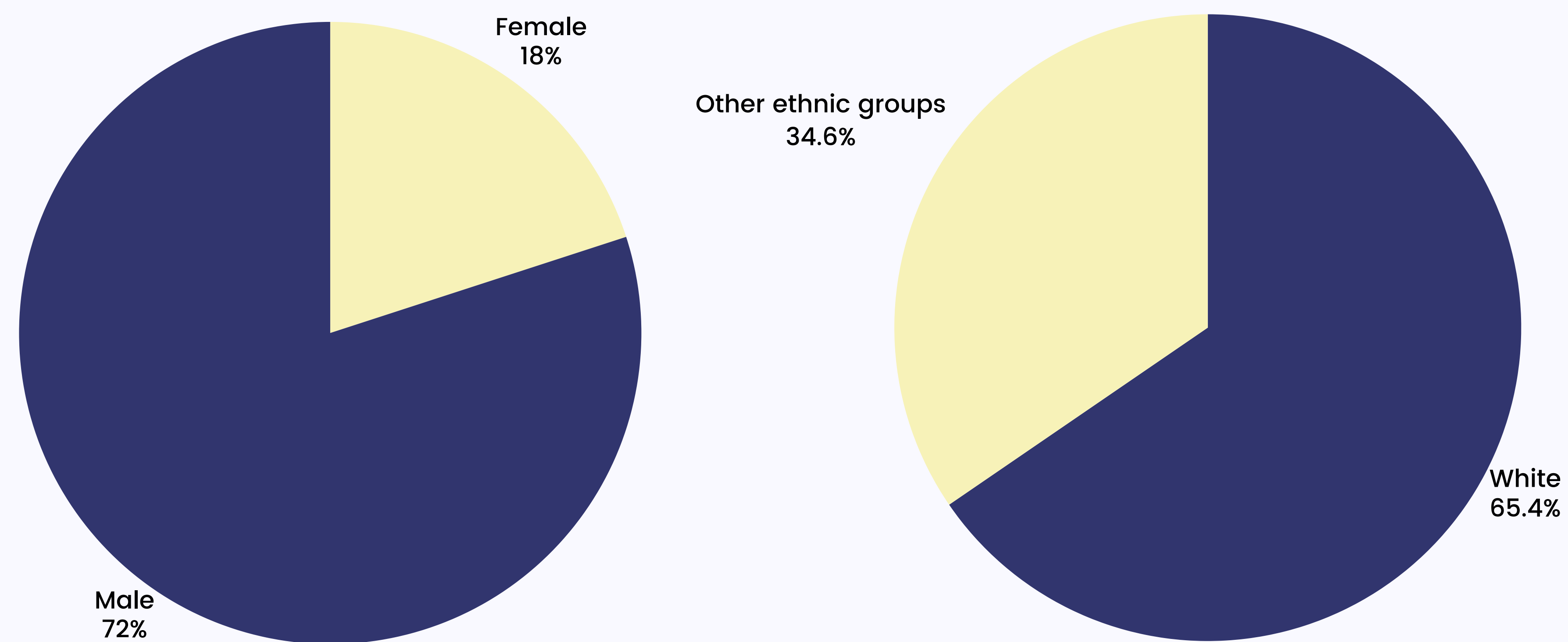


Figure shows the proportions of students studying engineering and technology at UK universities IN 2021 from data collected by the HESA [1]

## METHODOLOGY

To address this issue, a teaching toolkit has been prepared as part of a joint collaboration between the QMUL Schools of Engineering and Mathematics. This resource is a compilation of a large list of biographies of STEM champions, past and present, from marginalised groups. This list includes: individuals with disabilities, members of the queer community and ancient Islamic mathematicians to name a few. These individuals are then categorised into different areas of mathematics for ease of use in order to be effectively integrated into modules as an additional resource available to students. The aim of this being to reduce the stigma and widen the scope of who 'can' study STEM subjects.

### DR. GLADYS WEST

**"You're always competing and trying to survive because you're in a different group of people." [2]**

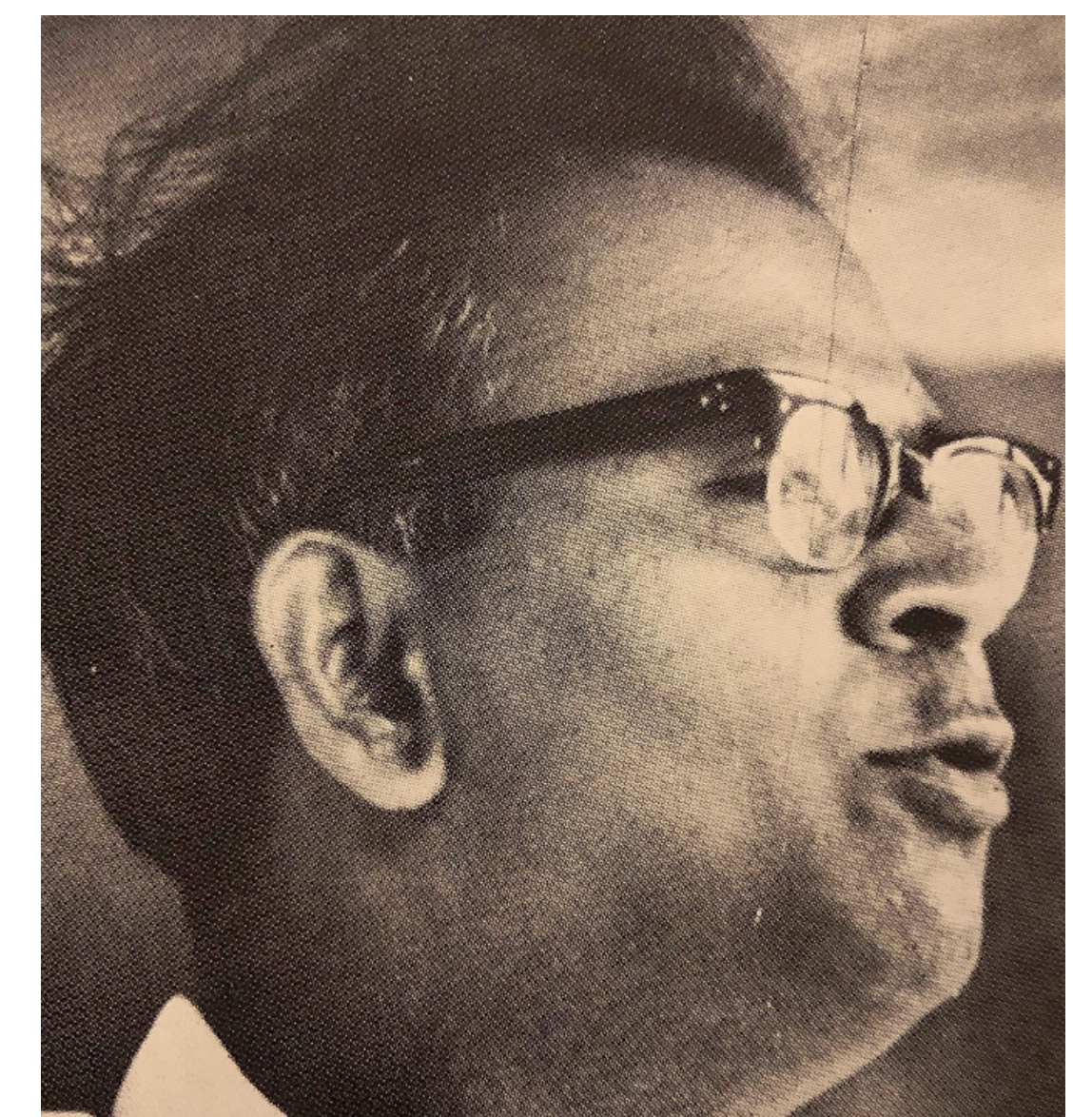


West's work enabled the development of the GPS, but due to her being a black female during a time where segregation was prevalent, she is known as one of the 'hidden figures' of history.

In the 60's after working on an award-winning piece of research, proving that Pluto's motion was relative to Neptune, West began to analyse satellite altimeter data from NASA's Geodetic Earth Orbiting program. to create models of the Earth's shape. Her team managed to reduce the processing time, proving her proficiency. This then led to her spending the 70's and 80's using programming to calculate the shape of the earth, In order to this, West created an accurate geopotential model with complex algorithms accounting for all factors impacting the shape of the earth. This model was later used as the basis of the GPS.

### RUDRANATH CAPILDEO

**"Too many brilliant scholars are not given the opportunity to make a meaningful contribution to the development of our country." - following Capildeo's death [3]**



Capildeo is best known for being the leader of the DLP in Trinidad and Tobago from 1960-1969 as well as the first leader of the opposition of an independent Trinidad and Tobago.

He was also extremely multi-talented and his contributions to mathematics cannot be ignored. Much of his work was inspired by Einstein's theory of relativity, which led to the birth of Capildeo's Theory of Rotation and Gravity, otherwise known as Capildeo's Theory, in addition to his research into 'The Flexure Problem in Elasticity'. All of these have useful applications in aerodynamics and were used in the early space expeditions in the 60s and 70s. In 1969 he was awarded the Trinity Cross for his contributions to science from the government of Trinidad and Tobago

## CONCLUSION

By providing students with relatable role models from a range of backgrounds which are in line with the multicultural society the curriculum serves, the resource developed takes one step closer to de-stigmatising and widening the access to a successful future in STEM. It also acknowledges under-credited individuals who are excluded from the everyday conversation and discourse due to systemic prejudices spanning from the past to the present that are yet to be fully dismantled. This project gives a glimpse into the huge number of individuals being ignored by the curriculum and helps identify how this has impacted student perception of STEM subjects.

## NEXT STEPS

The teaching resource is currently being piloted in first and second year engineering mathematics modules in order to collect feedback from students to help inform how well this tool can be utilised in teaching. This feedback will also provide invaluable data as to how the biases in epistemology have effected the attitude of students to STEM subjects, for example epistemic feminism.

## REFERENCES

1. Rigg, K. (2023) 'Diversity Concerns' from New Report on Engineering in Higher Education, WISE.
2. Butterly, A. (2018a) 100 women: Gladys West - the 'hidden figure' of GPS, BBC News.
3. Rudranath Capildeo Exhibition Central Bank of Trinidad and Tobago.



Queen Mary  
University of London