



Can you hear the shape of a drum? Space, Number, Symmetry & Equity

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African Americans constitute approximately 12% of the population of the United States. This group earned 21(1.2%) of 1,653 PhDs granted in mathematics in 2011. The mathematical sciences understand the world by performing formal symbolic reasoning and computation on abstract structures. These skills are inextricably linked to the empowerment of the African American community in the 21st century. A future in which African Americans earn doctoral degrees in mathematics at a rate consistent with their representation in the population and by extension one in which African Americans meaningfully participate in the world of abstract structure requires fundamentally transforming the teaching and learning environments which serve the majority of African American students. This presentation models a transformative and innovative approach to teaching, learning and research in the mathematical sciences that integrates music and mathematics to provide learners, particularly African American learners, at all levels of the learning spectrum, access to areas of deep and active mathematics research in a manner that resonates with their broader socio-cultural identities and connects them more meaningfully to their mathematics knowledge production traditions.

Biography

John Belcher co-leads the West Ocala Roots and STEM Initiative (WORASI), an effort which seeks to build the STEM capacity of the predominately African American West Ocala community in Ocala, FL. In addition to his background in mathematics and mathematics education, Belcher has worked for over 30 years as a drummer/composer in a diverse range of performance, therapeutic, and cultural settings. His recording, *The Sound According to John*, on the Innova label, includes compositions based upon mathematics structures. Belcher holds a BS in Applied Mathematics from Brown University, an EdM from the Harvard Graduate School of Education, and an MA in Mathematics from Boston University.

Terrence Richard Blackman graduated with honors in mathematics from Brooklyn College and he holds M.Phil and Ph.D. degrees, in mathematics, from The Graduate School of City University of New York. His research concerns aspects of the Jacquet-Langlands correspondence in the Langlands Program. His investigations are number-theoretic and they are related to Mark Kac's famous question: Can you hear the shape of a drum? Dr. Blackman is also actively engaged in research on "Access & Excellence" in the teaching and learning of mathematics in the African American community.