THE IMPORTANCE OF DIVERSITY TO MATHEMATICS

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When we think of diversity it is commonplace to associate it with our differences as a people. We see ourselves being different on the basis of race, skin color, religion, sexual orientation, economic status, political belief and so on. However, I will try to make a case about how diversity in Mathematics as regards to the people that make and teach it has contributed to its growth, as well as how diversity in its content has also created this unique blend that is comprised of intertwined subject areas that range from number theory, differential equations, linear algebra and numerical mathematics to fields like mathematical modelling, operations research and financial mathematics. Hence I share the thought that we need to harness this diversity that has made Mathematics to flourish till this modern era.

From the earliest times, Mathematicians from Egypt, ancient Greece, Persia, India, China, the Middle East to the medieval times and then to the period dominated by English Mathematicians such as Sir Isaac Newton, developed mathematics as we know it today. Several of these men and women lived thousands of miles and many years apart and for the most part shared few similarities except for their passion for Mathematics. In the parlance of science, the 16th and 17th century is referred to as a watershed in world history because men like Nicholas Copernicus a Polish astronomer (1473 1543), Rene Descartes a French philosopher (1596 1650) and British mathematician Sir Isaac Newton (1642 1727) together reformed age long misconceptions in science including astronomy and mathematics. These men were in some ways different, but their work and those of several others after them created scientific and mathematical breakthroughs that several years later culminated in putting man in space and now has driven the industrial and technological breakthrough of our era. For instance a moving car thrives on the works of several inventors and mathematicians. You can describe the position of the car using the coordinate plane system developed by Rene Descartes, or its velocity which tells you how fast and in what direction the car is moving. This is understood from Calculus pioneered by Isaac Newton and German mathematician Gottfried Leibniz (1646 1716). You can also use the principle of hydraulic fluid pioneered by French mathematician Blaise Pascal (1623 1662) to understand how the car brake function.

Over the years several diverse fields of Mathematics were created. The earliest being fields that were collectively termed pure mathematics and later on several other fields that were collectively named applied mathematics. In several ways, some of these subject areas of mathematics share little or no similarity for example number theory and differential equations but in the big picture collectively all these subject areas of mathematics can be viewed as pieces of a puzzle board that when fitted together correctly can be interpreted as being meaningful.

Nowadays when we use the word diversity, usually we refer to under-represented groups that needs a deliberate effort to include them in the mainstream. Hence I recognize that without fellowships and scholarships like the Winifred O. Stone and Presidential Graduate Scholarship for Diversity Enhancement several hardworking and deserving students might not get a chance to contribute to Mathematical learning and research. I

believe Mathematics have profited from these efforts, as these deserving recipients reciprocate this gesture by working harder. To the Universities, this means more quality Mathematics. To the donors of these fellowships and scholarships, this means more motivation to continue the program.

I was born and raised in Nigeria and one of my favorite past time when I was growing up was reading stories especially from other cultures. All I knew about the history and development of mathematics at that time could be attributed to the works of English mathematicians and several other American and European mathematicians. I thus formed the opinion that mathematics contributors could only be English, American or European. Then I came upon a story about Al-Khwrizm a Persian mathematician who lived between 780 CE and 850 CE. The story has it that Al-Khwrizm was riding on his camel to the city of Mecca with some algebraic manuscripts and he came upon three young men crying at an oasis. He stopped to ask what the problem was and he learnt from them that their dead father had left them 17 camels and had instructed that one-half the number of his camels should belong to his eldest son, one-third of his camels to his second son and one-ninth to his youngest son. However they had learnt that 17 is a prime number divisible only by one and itself and so there was no way they could carry out the wishes of their father. Al-Khwrizm thought for a while and asked if he could add his own camel to make a total of 18 camels. The boys loved the idea and so the eldest son got one-half of 18 or nine camels. The second got one-third of 18 or 6 camels and the youngest son got one-ninth of 18 or 2 camels. After this division, one camel was left, it was Al-Khwrizms camel. This was fascinating but quite strange to me, he was neither English, American nor European and yet he had mathematical skills. This discovery was very profound for me and it made me see mathematics as universal.

Several years later after I had become a mathematics major, I tried to verify the story about Al-Khwrizm and the camel, I found that mathematics professor Ian Stewart wrote about it in one of his lectures titled The Riddle of the Vanishing Camel: From Puzzle to Number Theory . The story might not have been about Al-Khwrizm or might have only been used as a mathematical puzzle over the years. Nevertheless it is very true that Al-Khwrizm was a mathematician and had made major contributions to algebra. In fact some school of thought considered him the father of algebra.

Mathematics has remained relevant today in our modern world largely because its content had been shaped by diverse men and women. In order for it to stay relevant, every group of people should have a chance not only to learn but to contribute. More importantly, efforts to reach out to under-represented groups should be sustained.