

Professor Daniel C TSUI

Citation

The life of Prof Daniel C Tsui, the Nobel laureate in physics, is the modern Cinderella story in three acts. Act one began in China where he came from the humblest of origins. His early years were spent in a poor and remote part of China's Henan province. Born into a family of unschooled farmers, he had little chance of formal schooling. But this did not stop his parents from harboring dreams of scholarship for him.

Act two opened in Hong Kong, then the refuge for those seeking a better life away from the turmoil on the mainland. At the age of 12, his parents saw an opportunity for their son to escape the poverty trap and sent him to the care of his two older sisters in Hong Kong in hopes of giving him the privilege of getting an education. Despite not knowing Cantonese, the teaching language, he excelled in every subject at Pui Ching Middle School. With his heart set on entering the University of Hong Kong, he discovered to his consternation that physics was required for admission to the university, but for lack of a physics teacher, it was not taught at the school. In his typical self-reliant way, the young boy obtained a copy of "College Physics" by Sears and Zemansky, and basically taught himself the subject in the supportive company of two schoolmates driven by the same university dream.

Staffed by highly qualified professors from the mainland who came to Hong Kong to escape the war in China, Pui Ching Middle School is a cradle for the nurturing of natural scientists. It is proof that having teachers with a passion for and mastery of their subjects, a Chinese school

is capable of sowing the seeds of great learning for the finest scholars. The seeds of interest were sowed early in the mind of this future Nobel laureate.

But Prof Tsui's future was not to be in Hong Kong. It was in the United States, the scene for the third act and the full flowering of his scientific talents. As fate would have it, he was offered a full scholarship by Augustana College where he completed the four-year bachelor degree program in three years. Besides earning his degree, he also earned the coveted title of "Mr Friendship" for his conviviality, modesty and quiet sense of levity. When he won the Nobel Prize in Physics in 1998, he became the only Nobel laureate to come from Augustana College which subsequently and proudly conferred upon him its own honorary doctorate.

His earned doctorate, however, came from the University of Chicago in 1967. The choice of Chicago was by no means accidental. It was the intellectual home of China's first Nobel laureates in physics, CN Yang and TD Lee. He was determined to follow in their footsteps. So it was natural that he gravitated to the University of Chicago, the habitat of his heroes. He stayed on for a year to do postdoctoral work before joining the Solid State Electronics Research Group at the Bell Labs in New Jersey. He was to remain at Bell Labs for over 13 years. In 1982, Prof Tsui, together with his colleague Horst Stormer experimentally discovered what has since become known as the Fractional Quantum Hall (FQH) Effect. This discovery has profoundly influenced the direction

of inquiry in condensed matter physics over the past two and half decades. In his own words, he wandered into a new frontier, the so-called physics of two-dimensional electrons. It has turned into a sizzling research topic by experimental and theoretical physicists everywhere ever since. It allows physicists to better understand the behavior of electrons in the early universe, and is useful in the development of memory for computers by allowing physicists to use the fractional charges of quasiparticles instead of the whole number values of electron charge. In 1998, he was honored for his discovery as a co-recipient of the Nobel Prize in Physics.

The same year that he discovered the FQH effect, he decided to leave Bell Labs to join Princeton University as a professor of electrical engineering. People were puzzled by this move, as his strength appeared to be in experimental physics. Even he himself did not completely comprehend this decision, except to say that it must have something to do with his deep-seated childhood deprivation and desire of learning through teaching. He was secretly yearning to answer the call of Confucius, to pursue the only meaningful life, the life of learning, and the sharing of learning through teaching.

Prior to the Nobel Prize, Prof Tsui had already received several top American national awards in physics. In 1984, he was awarded the Buckley Prize by the American Physical Society. In 1988, he was the winner of the Benjamin Franklin Medal in Physics, the highest honor in physical science in the US.

Prof Tsui's historic achievements were the direct result of hard work, of 18-hour days and seven-day weeks. And yet it would be a mistake to call scientific work hard work, for research was to him a "joyous, challenging, meaningful and rewarding undertaking", where he was allowed to tinker and do table-top experiments. It is this insatiable curiosity that as a teacher he wants to inculcate in his students. It is this quality that Hong Kong students need to cultivate and emulate.

Prof Tsui's Cinderella story would have been complete, except that he was denied its perfect fairy tale ending, for he was never to see his parents again. These two simple souls who in an act of supreme self-sacrifice sent him away to pursue a life of learning they never enjoyed. Could it be that his 29 years as a professor at Princeton University is a sublimation of his desire to honor his parents? Without doubt, it is a calling both his parents and Confucius would have approved.

Mr Chancellor, on behalf of the Council of the Hong Kong University of Science and Technology, I have the high honor of presenting to you Prof Daniel C Tsui, Professor of Electrical Engineering at Princeton University, for the award of Doctor of Science *honoris causa*.