

Professor Andrew Chi-Chih YAO

Citation

Professor Andrew Chi-Chih Yao is a rare mathematical scientist; he not only solves the most trying of problems, but he creates new challenges as well. Over the last 30 years he has put his technical genius and great vision to work, opening up new vistas for others to follow and, in the process, endowing the entire discipline of theoretical computer science with the fruits of his research.

The breadth of Prof Yao's scholarship encompasses the development of some of the key fields of computer science, extending from his crucial early work on pseudorandom number generation — a problem that lies at the heart of cryptography — through his development of communication complexity, and culminating in his present cutting-edge studies into the power of quantum computation.

Physicists have been interested in quantum computation for many years, but it is only comparatively recently that pioneering computer scientists, such as Prof Yao, have assumed the initiative in this arena and begun to use quantum physics, and the unique properties of atoms and nuclei, with a view to developing computer processors and memory.

Prof Yao views quantum computation as a radically different, futuristic kind of computing — one that possesses huge potential. Whilst recognizing that the discipline is embryonic in nature at present, and acknowledging that only time will tell its future, it is clear that this is exactly the kind of challenge relished by the man we are honoring today.

Such a pioneering spirit could not fail but to be universally acknowledged, and Prof Yao has gained the overwhelming acclaim of his peers. Most notably in 2000, he became the first and only Chinese to

receive the Association of Computing Machinery's A M Turing Award, considered the Nobel Prize of computer science.

The A M Turing Award was granted “ in recognition of Prof Yao's fundamental contributions to the theory of computation” and the fact that he “has helped shape the theory of computation” and “established new paradigms and effective techniques in many areas” of theoretical computer science.

Among his many other distinguished accolades, Prof Yao is the recipient of the George Polya Prize from the Society for Industrial and Applied Mathematics, and in 1996 he became the first winner of the Donald E Knuth prize for outstanding contributions to the foundations of computer science.

He is a member of the US National Academy of Sciences, the American Academy of Arts and Sciences, Academia Sinica, and the Chinese Academy of Sciences. Last year Prof Yao was also the recipient of an honorary Doctor of Science from the City University of Hong Kong.

Prof Yao has held academic positions in the United States at MIT, Stanford, Berkeley, and most recently as the William and Edna Macaleer Professor of Engineering and Applied Science at Princeton University. Only two months ago, he proceeded from Princeton to take up the post of Professor in the Centre for Advanced Study at Tsinghua University.

Prof Yao considers Tsinghua an ideal place for theoretical computer science and algorithms to take root in China. It is fitting that he should now be returning to China to nurture students and world-class researchers, and the entire country will benefit from his scientific and technological expertise.

Deeply attached to China, Prof Yao was born in 1946 in Shanghai and spent the early years of his childhood in Hong Kong, studying at a local elementary school where his first-year teacher commented that he was “a little weak in math”. He later moved to Taiwan with his family.

There he entered university in 1963, at a time when computer science was still a very new discipline. His focus even then was on the theoretical side of science, with physics his chosen field and an academic career his goal.

After graduating from Taiwan University, Prof Yao went to the US and took a PhD in physics from Harvard in 1972. Soon after, his academic career burgeoned when he discovered the fascinating new discipline of algorithms and complexity. He took up graduate study in computer science at the University of Illinois and received his second PhD in a record time of two years. Since then, there has been no looking back for this giant of computer science.

Mr Pro-Chancellor, I have the honor to present to you, on behalf of the University, Prof Andrew Chi-Chih Yao, winner of the A M Turing award and Professor of the Centre for Advanced Study at Tsinghua University, for the degree of Doctor of Engineering *honoris causa*.