Honorary Doctor of Science
Professor Andrew YAO Chi-chih

Citations written and delivered by Professor CHENG Pei-kai

Chairman:

Professor Andrew Yao was the Year 2000 Winner of the Alan Turing Award, reputedly considered the Nobel Prize of computer science. Professor Yao was conferred the award in recognition of his fundamental contributions to the theory of computation, including the theory of pseudorandom number generation, cryptography, and communication complexity.

Theory of computation is the mathematical science that studies the power and limitation of computing. In the world today, a computational task is often carried out through the collaborative effort of a group of computers. Professor Yao initiated the field of communication complexity, which measures the minimum amount of interaction that must occur during such a joint effort. His theory thus encapsulates the essence of communication cost in distributed computing. In the case of cryptography, a solid theoretical foundation is critical to ensure that sensitive data, once encrypted, will appear completely random, and thus convey no information, to even the most clever and resourceful attackers. Professor Yao's co-invention of complexity-based pseudorandom number generation provided a central tool for cryptographers today.

It is said that there are two kinds of mathematical scientists: those who solve hard problems, and those who propose them. Professor Yao has managed to excel in both. On the one hand, he has solved many outstanding open problems in computer science with sheer technical forte. On the other hand, he has shown great vision by conceptualizing novel ideas and thus catapulting a new field into mainstream study. In doing so, Professor Yao has helped shape the theory of computation over the last three decades, and made the theory an essential companion, at times even a precursor, to the advances in technology. In addition to the Turing award, he has also received the George Polya Prize and the Donald E. Knuth Prize for his contributions.

Professor Yao was born in Shanghai and later emigrated to Taiwan. He received a BS in Physics from National Taiwan University, a PhD in physics from

Harvard University and a second PhD in Computer Science from the University of Illinois. He has held faculty positions at MIT, Stanford, UC Berkeley, before becoming William and Edna Macaleer Professor of Engineering and Applied Science at Princeton University. He is a member of National Academy of Sciences and American Academy of Arts and Sciences, and also a member of Academia Sinica in Taiwan.

Notwithstanding all these diplomas, awards and honors, he says he is most proud of the certificate he received as a child, from a local elementary school in Hong Kong, for successfully finishing the first grade when his family lived here for two years in the 1950's before emigrating to Taiwan. In that certificate, the first grade teacher made the following remark: "Andrew is overall a good student—just a little weak in math and should work hard at it." Apparently the little boy took his Hong Kong teacher's advice to heart.

In recognition of Professor Yao's academic achievement in the theory of computation, Mr Chairman, on behalf of the University Council, I request you to confer on Professor Andrew C Yao the degree of Doctor of Science, *honoris causa*.