Portrait of a Probabilist

by Leong Yu Kiang

Last year, in 1996, the Singapore Totalisator Board set up an award, called the "Excellence for Singapore Award", to be presented each year to individuals or organisations "that bring credit to Singapore by being among the best in their areas of activity in Asia or in the world". Each award winner receives a specially-minted gold medallion and is also given the privilege of choosing a non-profit organisation or organisations to receive a sum of $10,000 donated by the Singapore Totalisator Board.

The inaugural award in 1996 went to two individuals and three organisations while this year's award went to three individuals and two organisations. The presentation of the award appears to be scheduled as a prelude to national day festivities. One of this year's recipients is Professor Louis Chen Hsiao Yun who received the award "for his high achievements and significant contributions to the field of mathematics and for his personal efforts in elevating the profile of the Singaporean mathematical community". This is, in fact, the second time that he has been nationally honoured. The first time was in 1991 when he was awarded the National Science and Technology Award — two years after he was internationally recognised by his election as a Fellow of the Institute of Mathematical Statistics, USA.

Professor Koh Khee Meng receiving the donation from Mr. Wee Kim Wee

Professor Chen was one of the pioneers of the Society in the 1970s and 1980s, having served on its Committee for many years, particularly as its Honorary Secretary and President. The Society is indeed proud that one of its past-Presidents has been so highly honoured. It is equally excited by his nomination of the Society as one of the two organisations to share the donation of $10,000, the other being the Singapore Institute of Statistics of which he had also been a President.

He will also be serving a two-year term as President of the Bernoulli Society for Mathematical Statistics and Probability, which is an autonomous section of the International Statistical Institute. This is the first time that an Asian has been elected to this office. His active involvement in professional and related organisations reflects the extent to which his professional and scholastic services expand beyond academia. On the local scene, for example, he serves on the Education Service Commisssion, while in the international arena, he is on, among others, the editorial boards of international journals.

The work for which he achieved international renown dates back to 1975 when he successfully applied a method of Professor Charles Stein of Stanford University to the discrete case of the Poisson approximation. The power and potency of this method, now referred to as the Chen-Stein or Stein-Chen Method, can be easily brought home, even to the non-specialist, by its wide-ranging applications to fields as diverse as molecular biology, random graphs, computer science, reliability theory, extreme value theory, spatial statistics and probabilistic number theory. To appreciate this, one should be aware that a lot of scientific problems can be formulated in terms of the occurrences of so-called "rare" events, and that it is important to know the exact values of the probabilities of their occurrences, which are often very difficult, if not practically impossible, to compute. This can now be overcome by the Chen-Stein Method which provides estimates of the errors incurred in using certain types of approximations called the Poisson type.

Some officials of the Bernoulli Society in Istanbul, August 1997 during the 51st Session of the International Statistical Institute

Front row from left: Jef Teugels (Former President), Louis Chen (President), Wilfrid Kendall (Scientific Secretary)

Back row from left: Claudia Küppelberg (Editor, Bernoulli News), David Siegmund (President-Elect)

Ironically, there was a long period from 1975 to 1984 when the sparsity of interest in Stein's Method within the mathematical community diverted much of Professor Chen's research interests into the areas of martingales and inequalities in probability. The next five years (1985 — 1990), however, saw a gradual growth in interest in and the eventual recognition of the potential of the Chen-Stein Method in random graphs, molecular biology and other fields. Finally, a surge of successful applications of the Chen-Stein Method by other probabilists in the early 1990s gave a fresh impetus to his earlier work on the Method and its ramifications and to his renewed interest and research activity in applications of Stein's Method to other probability approximations and in formulating new perspectives of Stein's Method. At present, he is developing a unified approach to all Poisson-related approximations via the compound Poissson approximation on groups.
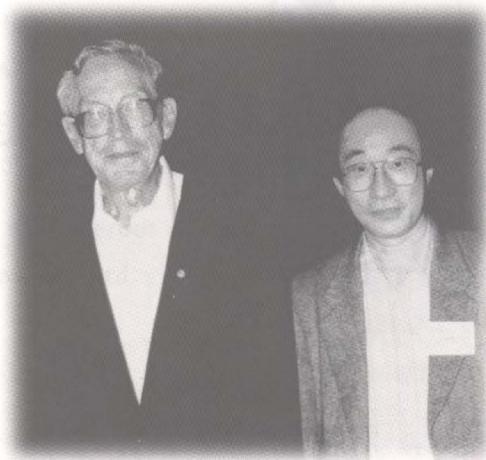
Charles Stein and Louis Chen in Vienna in August 1996 during the 4th World Congress of the Bernoulli Society

While his mathematical contributions are well-known and well-documented, we mention some less well-known information which will add colour and depth to a more multi-faceted composite picture of an unusual scholar.

He received a traditionally Chinese education at Catholic High School before switching to an "English stream" at St Joseph's Institution for his pre-university education. While at school, he excelled in competitions organised by the Society (then called the Malayan Mathematical Society) and even seriously contemplated pursuing a religious career. However, he quickly discovered his true inclinations, and after a short stint as a temporary school teacher, he was awarded a State Scholarship (which was equivalent in those days to the present President Scholarship) to study at the then University of Singapore. After obtaining an Honours degree in mathematics in 1964, he taught briefly at the Singapore Polytechnique which was then located at Prince Edward Road, off Shenton Way. He then went back to the University of Singapore as a temporary assistant lecturer and taught for one year while working on his M.Sc. problem in analysis. (Some of his colleagues at the National University of Singapore recalled that it was on the topic of statics, which then formed part of the syllabus of the traditionally British subject of applied mathematics, that he lectured them.)

Shortly afterwards, before completing his M.Sc. studies, he left Singapore for graduate studies on a Stanford University Scholarship with Fulbright-Hayes Travel Grant. There, at Stanford, he laid the foundations for his future career with the completion of his studies for the degree of M.S. (1969) and Ph.D. (1971), and for his future family with his marriage to Annabelle Yip, then an undergraduate student from Hong Kong and attending Summer School at Stanford. Years later, the seminal paper based on his Ph.D. work on the Stein Method resulted in important ramifications for probability theory as well as in cross-disciplinary inroads that are unexpected and penetrating.

Before he returned to Singapore to take up a lectureship at the University of Singapore, he held a visiting position at Simon Fraser University. On his return, he began to be involved in the activities of the Singapore Mathematical Society. Not many people are aware that he was one of two people (the other being Professor Leonard Yap) responsible for the conception (including the name) of the Medley. He was, in fact, on the editorial board which produced the first issue of the Medley in 1973, which in those days (of the early and mid-1970s) was printed, almost manually, using the old faithful departmental cyclostyling machine. (The Medley, with the objective of catering to a wider audience among its members, succeeded the Society's more technical and research-oriented Bulletin in 1975, and it continues to generate a popular appeal.) Since then, Professor Chen had been active in matters of the Society until his more specialised interests led to his deeper participation in the Singapore Institute of Statistics and the Bernoulli Society. These commitments were additional to his normal teaching duties and research activities and, more recently, to his new responsibilities as Head (since July 1996) of the Department of Mathematics of the National University of Singapore. He had also held visiting positions at Stanford University, Massachusetts Institute of Technology and Université de Provence (in France).

There is a second passion in his life. That is his life-long passion for classical music, manifested energetically in his student days through singing lessons and through playing the recorder and cello. Amidst the piles of reports that need to be read or written, he finds time to listen to his favourite operas and occasionally to play the recorder.

Now in his 56th year and with two grown-up daughters, Professor Chen shows no signs of slowing down or of resting on his laurels. He continues to be engaged in consultancy work and in basic research, exploring old and new domains for problems that can be resolved with his new methods and compelling ideas.