E-News for Math Students & Alumni

— Staying in touch with You —

NUS's 5th President Professor Tan Eng Chye

The Department congratulates Professor Tan Eng Chye on his new appointment as NUS's 5th President on 1 January 2018. He will be the 23rd leader to head Singapore's oldest higher education institution, which traces its roots to a modest medical school founded in 1905. He currently serves as the University's Deputy President (Academic Affairs) and Provost.

Prof Tan, who attended Raffles Institution (1974 to 1979), obtained his Bachelor in Mathematics (First Class Honours, 1985) at NUS and his PhD (1989) at Yale University. He joined NUS as a faculty member in the Department of Mathematics in 1985, as a Senior Tutor, and has held visiting positions at various universities overseas such as the Rutgers University, University of Washington at Seattle, University of California at Berkeley and University of Maryland, USA; Universities of Tokyo and Kyoto, Japan; as well as the Hong Kong University of Science and Technology.

Prof Tan's research interests are in the Representation Theory of Lie Groups and Lie Algebras; and Invariant Theory and Algebraic Combinatorics. He has been invited to speak in numerous top conferences overseas, and has published more than 20 articles in top internationally-refereed journals and conference proceedings. He has co-authored three books on mathematics, including a well-known graduate text on non-Abelian harmonic analysis.

Prof Tan is a passionate and award-winning educator. He was a pioneer architect of the current academic system in NUS, and has seeded many initiatives such as the Special Programme in Science, University Scholars Programme, University Town Residential College Programme, Grade-free Year, Technology-enhanced Education, etc.

He was recognised with the University Teaching Award for Innovative Teaching in 1998, and was President of the Singapore Mathematical Society (2001 to 2005) as well as the South East Asian Mathematical Society (2004 to 2005).

He is a Member of the Board of Directors of the Defence Science & Technology Agency (DSTA), Ministry of Defence; Board Member of Bizlink Centre, a social enterprise; and a Member of the Board of Governors of NUS High School of Mathematics and Science. He has also sat on the boards of the Agency for Science, Technology and Research (A*STAR), Defence Science Organisation (DSO) Laboratories, National Institute of Education, and the Infocomm Development Agency. He is a member of the International Advisory Council of the Southern University of Science and Technology in China.

Prof Tan received the Public Administration Medal (Gold) at Singapore's National Day Awards in 2014 for his outstanding contributions to education.

Source: http://president.nus.edu.sg/biography.php

Professor Gan Wee Teck

Recipient of
President's Science Award 2017

Prof Gan's mathematical journey began in secondary school with an inspiring teacher, Mr Song Hoe Chye. Following a 19-year sojourn in the UK and US, he joined NUS in 2010. Prof Gan's achievements have helped to cement and enhance Singapore's standing in an important area of mathematics. We had a chat with Prof Gan to find out more.

What or who inspired you to pursue a PhD in mathematics?

When I was in Sec. 3 and 4 at the Chinese High School, I had a very inspiring math teacher (Mr. Song Hoe Chye) who exposed me to interesting mathematical problem solving. At around the same time, Singapore was invited to participate in the International Math Olympiad and MOE/NUS started a training program for that. I was fortunate to be selected for such a training and knew from then that I would like to pursue mathematical research as a career.

What is the biggest challenge you have faced in your career?

The biggest challenge for me was in the transition from being a graduate student to an independent researcher and to find my own voice in the process. As a graduate student, one is given problems to solve. As an independent researcher, one has to formulate one's own long term projects to investigate and this is an art. It took me several years to learn this art.

What advice would you give to young aspiring mathematicians?

Mathematics is a very large field these days, too large for a single person to grasp its entirety. But this should not prevent one from getting wide exposure.

My advice is to maintain the curiosity to explore and read widely. This curiosity is necessary to sustain one's work through the years, and will also open up new directions of investigation beyond one's expectations.

What are your thoughts on winning this prestigious award?

I feel very honoured to receive the PSA. I am glad to have had the chance to work with many inspiring collaborators from all over the world. I view this award as a recognition of their achievements as well, and also as a recognition of the growth of the Singapore mathematical community over the past few years.

One of the World's Leading Figures in Semidefinite Programming

Professor Toh Kim Chuan is the 2017 recipient of the Farkas Prize, awarded annually to a mid-career researcher in the field of optimization by the INFORMS Optimization Society .

Prof Toh was an (double) alumnus of NUS (B.Sc, First Class Honours and M.Sc in Mathematics). His strong interest in mathematics motivated him to pursue his graduate studies at Cornell's Centre for Applied Mathematics (CAM).

After graduation, Prof Toh began his academic career at NUS as Senior Tutor in the Department of Mathematics in 1991, where he presently serves as Professor, Provost's Chair and Deputy Head overseeing research and recruitment. He also holds a courtesy appointment in the Department of Analytics and Operations.

What or who inspired you to pursue a PhD in Mathematics?

When I graduated from NUS in 1990 and started to work at the National Computer Board as a programmer for a few months, it was our former Head Professor Peng Tsu Ann and my final year project supervisor Dr Tara Nanda who pursued me to continue my study. Prof Peng offered me a senior tutorship and I joined NUS to write a M.Sc thesis in Mathematics under the supervision of Dr Nanda before going to Cornell University to purse a PhD in Applied Mathematics. I am grateful to Prof Peng and Dr Nanda for their encouragement to join NUS and to continue my study.

What is the biggest challenge you have faced in your career?

The first challenge is finding good problems to work on. Fortunately when I graduated from Cornell, I had decided to move from numerical linear algebra to computational optimization, and the latter has many more interesting problems to work on since the mid 1990s because of the explosive growth of optimization research in machine learning, statistics, engineering, management science. T he second challenge is the lack of sufficient number of strong students who are capable of carrying out independent research to help in our research agenda.

What advice would you give to young aspiring mathematicians?

I think it is important to work in a field that one has a passion in and at the same time also has a reasonable chance to make an impact. I know very early on that pure mathematics subjects such as algebra or topology are not my cup of tea and I am much more comfortable with applied mathematics subjects such as ODEs, numerical linear algebra, optimization, etc. It is important to be passionate about one's research work, and to actively interact with researchers in the community to widen our perspectives and be better informed. The latter is especially necessary because Singapore is a small country with only a very small number of like-minded researchers locally and the country is geographically rather isolated from the major centers of research activities.

What are your thoughts on winning this prestigious award?

Naturally, I feel honored and privileged to be awarded the prize. It is an affirmation of the significance of the work that I have done with several collaborators, especially with Mike Todd and Reha Tutuncu on SDPT3 (a software package for semidefinite programming), and SDPNAL/SDPNAL+ (a solver for solving large scale semidefinite programming) with Defeng Sun and our former students Xinyuan Zhao and Liuqin Yang.

MATHEMATICS ENRICHMENT CAMP 2017

## *Bringing a different perspective to textbook mathematics*

Organised annually since 2005, the Enrichment Camp provides a platform for pre-university students to learn about Mathematics and its applications, beyond the realm of textbook mathematics. Through this camp, the department also hopes to inspire students to study mathematics at the university.

The half-day event was held on Saturday 19 August and comprised short talks on various topics. The camp kicked off with a welcome message and an introduction on the department's undergraduate programmes by Prof Victor Tan, Assistant Head of Department. There were three talks to cater to diverse interests, ranging from topology to data science.

Prof Tan Ser Peow provided a peek to the topology and geometry of closed surfaces. Dr Wang Fei delved into how numbers are the most fundamental concepts of mathematics, and provided insight on how it takes centuries for the notion of numbers to be extended. Dr Vincent Tan ended the camp, sharing simple models of big datasets from a statistical perspective.

Interspersed with the three talks were screening of short videos on related areas and interactive quizzes to engage the participants. A total of 9 lucky participants walked away with attractive prizes. The camp was attended by more than 100 students.
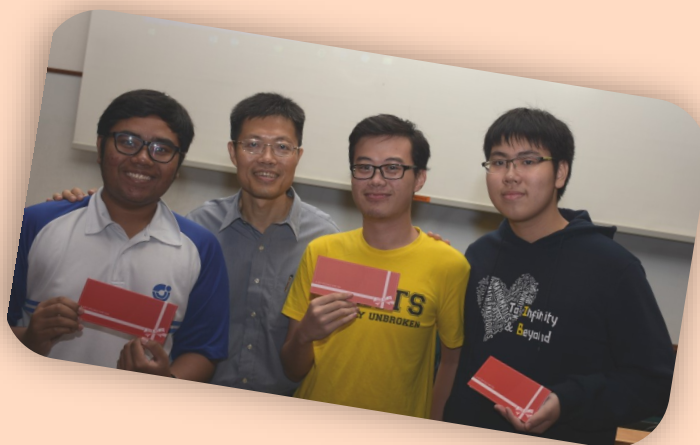
Do check out our webpage for updates for 2018 Math Camp!

Congratulations! Class of *2017!*

The Commencement ceremony for class of 2017 was held on 9 July . The Department warmly congratulates all our students on their graduation and welcome them to our alumni family.

We also congratulate recipients of the following university level medals & prizes :
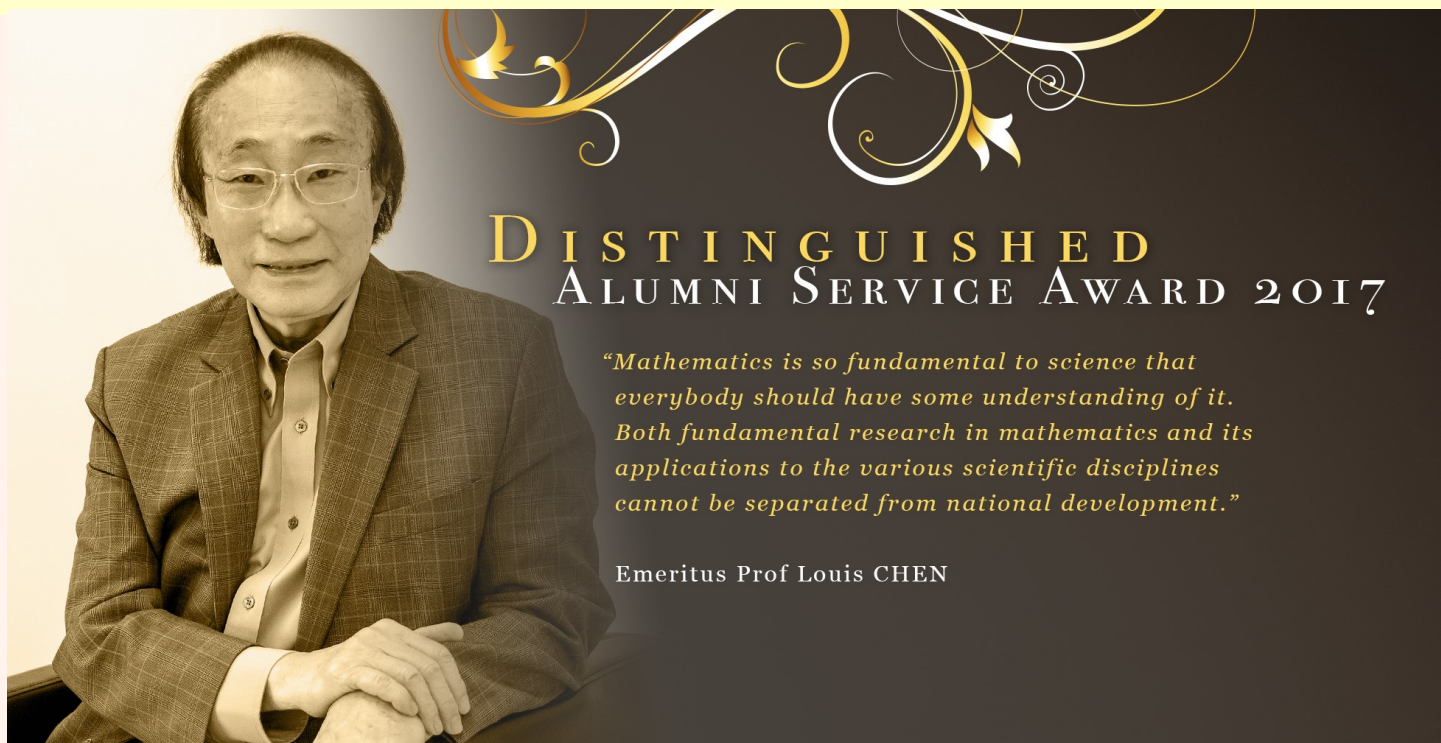
Undergraduate medals and prizes

• Medal of Excellence in Mathematics	LEE Si Ying
• Singapore Mathematical Society Medal and Prize	KHOR Shi-Jie
• Leong Teng Kiang Memorial Prize in Mathematics	Edmund CHAY Wei Liang
• Ho Family Prize	GAO Yuan
• The Ven Dr. D. D. Chelliah Gold Medal	GAN Nathaniel
• Lijen Industrial Development Medals	LEE Si Ying, GAO Yuan, Henry Jefferson Co MORCO
• Singapore National Academy of Sciences Award	CUI Tianyu

Graduate medals and prizes

• Louis Chen Hsiao Yun Best Dissertation Prize	QIAO Lei
• Best Graduate Researcher Award	WANG Liuquan

DISTINGUISHED ALUMNI SERVICE AWARD 2017

"Mathematics is so fundamental to science that everybody should have some understanding of it. Both fundamental research in mathematics and its applications to the various scientific disciplines cannot be separated from national development."

Emeritus Prof Louis CHEN

Emeritus Prof Louis CHEN, Founding Director of NUS' Institute for Mathematical Sciences (IMS) was conferred the Distinguished Alumni Service Award 2017 for his service to NUS and contributions to the advancement of science. He built up IMS into one of the finest institutes in the world.

Prof Chen obtained his B.Sc. (Hons) in Mathematics from the University of Singapore (now National University of Singapore) in 1964 and his M.Sc. and Ph.D. in Statistics from Stanford University in 1969 and 1971, respectively. During his 43 years with the University, Prof Chen was Head of the Department of Mathematics.

Prof Chen carried out research work in various areas of probability theory and statistics, namely Stein's method, martingale theory, Poincaré inequalities, and in biomolecular sequence analysis in computational biology. In his pioneering work on Poisson approximation in 1975, he developed a method of calculating the probabilities of occurrences of dependent rare events. This method, which is now known as the Chen-Stein or Stein-Chen method, has found wide-ranging applications in many fields, with lasting impact in science and technology.

For his achievements in his field of study, he was appointed Tan Chin Tuan Centennial Professor (July 2006 -December 2012). In January 2013, he was appointed Distinguished Professor. He received the Emeritus Professorship award in April 2017, which is conferred to full professors on retirement in recognition of their sustained contributions in distinguished scholarship and service to the University. For his service to NUS, he was awarded the Distinguished Science Alumni Award in 2004, Public Administration Medal (Silver) in 2002.

Internationally, Prof Chen was the first Asian to be elected President of the Bernoulli Society for Mathematical Statistics and Probability (August 1997-July 1999). He received one of the highest honours when he became President of the IMS in August 2004, joining the ranks of the Institute's past presidents who are among the world's finest researchers in probability and statistics. He was elected Fellow of the Third World Academy of Sciences in 2000 and conferred by the French Government of the title of Chevalier dans l'Ordre des Palmes Académiques in 2005 for his service to education. He also won the Excellence for Singapore Award in 1997, and the National Science and Technology Award in 1991.

Source: http://science.nus.edu.sg/newshub/2278-nus-alumni-awards-2017

Staff Accolades

Congratulations to Professor ZHANG De-Qi and Professor ZHAO Gong Yun for receiving the 2017 National Day Awards - The Long Service Medal. The Singapore National Day Awards recognize various forms of merit and service to the nation.

Congratulations to Mdm Rubiah Bte TUKIMIN and Mdm SIM Choo Geok, Lilian on winning the Department Quality Service Award 2017.

Professor DINH Tien Cuong has been appointed as Provost's Chair from 1 July 2017. Provost's Chair appointments are for a three-year period, and are made in recognition of the recipients' outstanding and impactful scholarly accomplishments which are internationally acknowledged.