

# Mathematics Enrichment Camp 2014

Date: Saturday, 23 August 2014

Time: 9.00 am to 2.00 pm

Venue: Lecture Theatre 34 (Blk S17, Level 3)  
Faculty of Science, National University of Singapore

## Registration



Organized by



Department of Mathematics

# Programme

Time	Activity
8.30am	<b>Registration</b>
9.00am	<b>Welcome Address</b> By Professor Zhu Chengbo Head, Department of Mathematics
9.05am	<b>About the Department of Mathematics</b> By Associate Professor Victor Tan
9.15am	<b>Mathematics for Digital Photography</b> By Associate Professor Ji Hui
10.00am	<b>An Introduction to Dynamical Systems</b> By Professor Shen Weixiao
10.45am	Tea Break
11.15am	<b>An Introduction to Optimization</b> By Professor Toh Kim Chuan
12.00pm	<b>Once Upon a Fascinating Problem</b> By Professor Louis Chen
12.45pm	Lunch
<b><i>End of Programme</i></b>	

# Abstracts

## **Once Upon a Fascinating Problem ...**

**By Professor Louis Chen**

Back in the 1950s and 1960s when I was still a student, I came across a number of mathematical problems whose solutions fascinated and have never ceased to fascinate me. I would like to share this fascination with you by presenting four of these problems and their solutions.

### **About the Speaker**

Professor Louis Chen received his PhD from Stanford University in 1971. He is Distinguished Professor of Mathematics and Statistics at the National University of Singapore. He was Director of the Institute for Mathematical Sciences from 2000 to 2012. He was also President of the Bernoulli Society for Mathematical Statistics and Probability in 1997 - 1999 and President of the Institute of Mathematical Statistics in 2004 - 2005. He was elected Fellow of The World Academy of Sciences in 2000 and Fellow of the Singapore National Academy of Science in 2011. His research interests are in probability theory and computational biology

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## **Mathematics for Digital Photography**

**By Associate Professor Ji Hui**

The prevalence of digital cameras and camera phones has greatly changed the way we take and share pictures. Despite all the advances in digital photography, people are still often plagued by the problem of photos of low quality, particularly in the use of camera embedded in mobile phone. In this talk, I will give a brief introduction to mathematical modeling and computational algorithms developed in recent years that can automatically improve the picture quality in terms of resolution, noise, sharpness and etc.

### **About the Speaker**

Professor Ji Hui received his B.Sc. in Mathematics from Nanjing university, M.Sc. in Applied Mathematics from NUS, and Ph.D. in Computer Science from University of Maryland at College Park. He joined NUS as an assistant professor in 2006 and currently an associate professor in mathematics. His research interest is in mathematical modeling and computational methods that solve practical problems in the fields of computer vision and imaging science.

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## **An Introduction to Dynamical Systems** **By Professor Shen Weixiao**

The theory of dynamical systems studies the long term behaviour of evolution of systems. Examples include the mathematical models that describe the swinging of a clock pendulum, the flow of water in a pipe, and the number of fish each spring time in a lake, among many others. This talk aims to introduce some of the interesting phenomena (chaos), through examples and pictures.

### **About the Speaker**

Prof Shen Weixiao graduated from University of Science and Technology of China in 1995 and obtained his PhD from University of Tokyo in 2001. He is currently a Distinguished Professor in NUS. He was a recipient of the S.S. Chern award of the Chinese Mathematical Society in 2009 and will be an invited sectional lecture of the ICM 2014. He is an executive editor of Ergodic Theory and Dynamical Systems.

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## **An Introduction to Optimization** **By Professor Toh Kim Chuan**

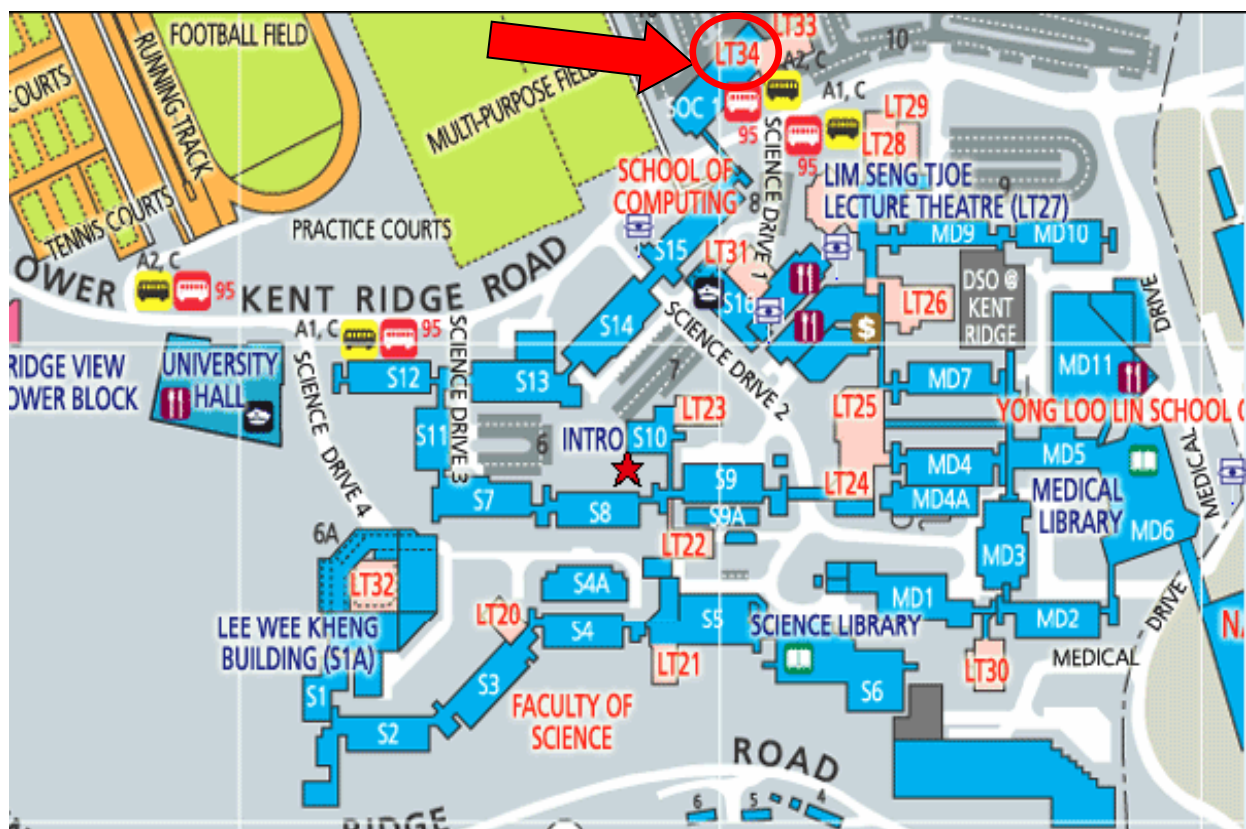
Optimization is a major branch of applied mathematics focusing on modeling and finding the optimal solutions, or the best course of actions, for decision problems (typically from economics, management, science and engineering) that are constrained by limited resources. The goal is often to maximize objectives such as profit, production output, and bandwidth, or to minimize objectives such as cost, error, and risk. Optimization is used extensively in social and economic activities ranging from optimal time management and resource allocation to optimal design of manufacturing processes and instruments. In this talk, we will see various essential applications of optimization in diverse areas such as machine learning, computational chemistry, finance, and engineering.

### **About the Speaker**

Toh Kim Chuan received his B.Sc. in Mathematics from NUS and PhD in Applied Mathematics from Cornell University. His research interest is in the design, analysis and implementation of algorithms for large scale conic optimization problems; as well as their applications in science and engineering. He is recognized for his work on SDPT3, a software package for semi-definite programming. He has been invited to speak at various international meetings. He is an Associate Editor of SIAM J. Optimization, and an Area Editor of Mathematical Programming Computation. He won the NUS Outstanding Researcher Award in 2003.

# *Getting to the Camp*

1. Take the MRT and alight at Kent Ridge MRT Station.
2. Transfer to Internal Bus Service A1 / D2 at the bus-stop.
3. Alight at the bus-stop in front of the Lim Seng Tjoe Lecture Theatre 27 in NUS.
4. Lecture Theatre 34 is located at Block S17 Level 3 (opposite LT 27 bus stop).
5. For an interactive map of NUS, please visit <http://www.nus.edu.sg/campusmap/>



## Mathematics Enrichment Camp 2014

### Registration Instructions

1. The Registration Fee per person is **S\$10 (GST inclusive)** and this includes 1 tea break and lunch.
2. Payment is by **cheque only**. Please make cheque payable to **National University of Singapore**.
3. Cancellations are **not refundable** although participants can be substituted.
4. Please send the completed registration form together with the cheque **by Thursday 31 July 2014 to:**

Ms Chan Lai Chee  
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Blk S17 Level 4  
National University of Singapore  
10 Lower Kent Ridge Road  
Singapore 119076

5. For further information, please contact Ms Lynette Wong (6516 8322, [matwongl@nus.edu.sg](mailto:matwongl@nus.edu.sg)), or Ms Chan Lai Chee (6516 2762, [matclc@nus.edu.sg](mailto:matclc@nus.edu.sg))