Mathematics Enrichment Camp *2015*

Date: Saturday, 15 August 2015

Time: 8.30 am to 2.00 pm

Venue: Lecture Theatre 25
          Faculty of Science, National University of Singapore

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NUS
National University
of Singapore

Department of Mathematics

Programme

Time	Activity
8.30am - 9.00am	**Registration**
9.00am - 9.05am	**Welcome Address** By Professor Zhu Chengbo Head, Department of Mathematics
9.05am - 9.15am	**About the Department of Mathematics** By Associate Professor Victor Tan Assistant Head, Department of Mathematics
9.15am - 10.00am	**Our exploding universe** By Professor Brett McInnes
10.00am - 10.45am	**How to transmit messages through a noisy channel?** By Associate Professor Ma Siu Lun
10.45am - 11.15am	Tea Break
11.15am - 12.00pm	**What is game theory?** By Professor Zhao Gongyun
12.00pm - 12.45pm	**The genius of Ramanujan** By Professor Gan Wee Teck
12.45pm	Lunch
	End of Programme

Abstracts

Our exploding universe
By Professor Brett McInnes

In 1998 one of the greatest scientific discoveries was made: our Universe is expanding faster and faster, instead of slowing down. This seems to mean that distant galaxies must be receding from us faster than the speed of light..... but isn't that forbidden by Relativity? In this talk we will see how mathematics allows us to resolve this apparent contradiction, and allows us to predict what the Universe will look like billions of years from now.

About the Speaker

Prof Brett McInnes has written over 80 papers, and co-authored several more, on applications of differential geometry and Lie group theory to particle physics, cosmology, and black hole theory.

How to transmit messages through a noisy channel?
By Associate Professor Ma Siu Lun

How to transmit messages through a noisy channel? In this digital era, a digital Message is first encoded using an error correcting code before transmit through a noisy channel. The use of error correcting codes enables us to correct errors incurred during the transmission. Shannon's channel coding theorem tells us that one can encode messages in such a way that they have a good chance of being transmitted correctly, provided that one does not exceed the "capacity" of the channel by trying to transmit too much information too quickly. In this talk, basic ideas of error correcting code are discussed and some applications are studied.

About the Speaker

A/Prof Ma Siu Lun obtained his Ph.D. (in Mathematics) from the University of Hong Kong in 1985 and joined the National University of Singapore in 1988. His research area is Algebraic Combinatorics. In particular, he works on applications of algebraic methods on combinatorial structures like block designs, difference sets, Hadamard matrices, weighing matrices and MWBE codebooks.

Abstracts

What is game theory?
By Professor Zhao Gongyun

Game theory analyses how people make decisions to maximize their individual payoffs when a person's payoff may be affected by other people's actions. Many such multi-person decision making problems arise from Economics, Politics, etc. With some examples from Economics and Politics, we will show how Nash equilibrium (the essence of game theory) provides mathematical solutions to such problems.

About the Speaker

Prof Zhao Gongyun received his B.Sc. and M.Sc. from Xiamen University, China, and PhD from Wuerzburg University, Germany. He has worked in NUS for more than 20 years. His teaching and research interests are Optimization and Game Theory.

The genius of Ramanujan
By Professor Gan Wee Teck

We give a brief discussion of the life and work of Ramanujan, followed by a 30 minute video of a documentary on Ramanujan's 125th birth anniversary.

About the Speaker

Prof Gan Wee Teck did his undergraduate studies at Cambridge University and obtained his PhD at Harvard University in 1998. Since then, he has been a faculty member at Princeton University and University of California, San Diego, before moving to NUS in 2011. His research interest lies in the areas of number theory and representation theory.

In recognition of his work in the Langlands program, Prof Gan was awarded the NUS Outstanding Researcher Award in 2015.

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. Follow the map and walk to Lecture Theatre 25.

5. For an interactive map of NUS, please visit http://www.nus.edu.sg/campusmap/
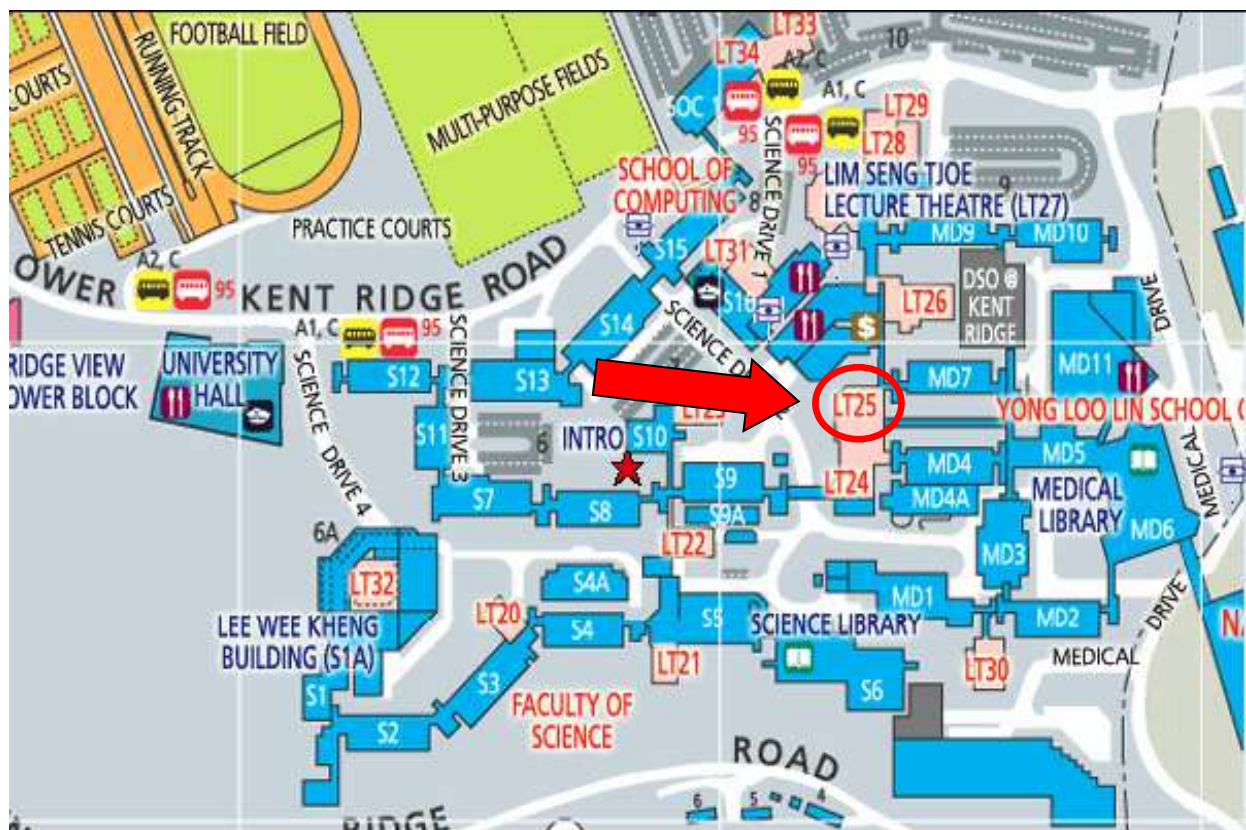
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Registration Instructions

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 (see next page) together with the cheque **by Friday, 31 July 2015 to:**

> Ms Chan Lai Chee
> Department of Mathematics
> 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), or Ms Chan Lai Chee (6516 2762, matclc@nus.edu.sg)

Mathematics Enrichment Camp 2015

Registration Form

Individual Registration

    Name: _____

    Institution: _____

    Email: _____

    Phone: _____

    Bank & cheque number: _____

Group Registration - Please also complete GROUP REGISTRATION LIST on the next page.

    Institution: _____

    No. of students: _____

    Name of teacher-in-charge: _____

    Email: _____

    Phone: _____

    Bank & cheque number: _____

Mathematics Enrichment Camp 2015

Group Registration List

Complete and return this page together with the registration form and payment. Enter the particulars on a new page if necessary.

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