

# SINGAPORE MATHEMATICAL SOCIETY EVENTS AND ACTIVITIES 2022

## 1. SMS Lecture Series

This annual lecture series, which is traditionally organized in conjunction with the Annual General Meeting of the Singapore Mathematical Society, features eminent local mathematicians or mathematics educators to share with the public some of their interests and ideas.

Date: 9 March 2022

Venue: Zoom

Title: What is a generalized function?

Speaker: Professor Zhu Chengbo

Abstract: As the name suggests, generalized functions are mathematical objects generalizing the notion of functions. The most famous example of a generalized function is the Dirac delta “function”, which is actually not a function in the usual sense, yet boldly used by Dirac and others as if it were, to great success. In this lecture, the speaker will explain the theory of generalized functions by L. Schwartz in its simplest form, and discuss the manifold uses and benefits of this theory.

## 2. Singapore Mathematical Society Public Lecture 2022

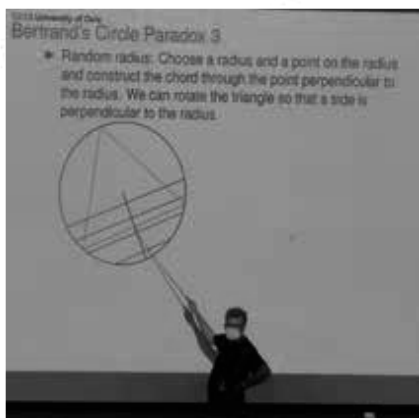
Date: 4 August 2022

Venue: NUS LT34

Title: Probability and Combinatorics in School Mathematics

Speaker: Professor Helmer Aslaksen

Abstract: Probability and combinatorics are difficult topics in school mathematics. Incorrect arguments often look plausible, and correct arguments often look surprising. We will discuss topics that both students and teachers find difficult. We will focus on paradoxes and topics from the history of probability.



### 3. Singapore Mathematical Olympiad 2022

Dates:

1 June 2022 (Junior and Senior section – Round 1)

2 June 2022 (Open section – Round 1)

25 June 2022 (Junior and Senior section – Round 2)

2 July 2022 (Open section – Round 2)

A total of 8133 students from 118 schools participated in the various sections of the Olympiad.

For Junior section, there are 3599 participants from 92 schools. For Senior section, there are 2647 participants from 98 schools. For Open section, there are 1887 participants from 61 schools.

The SMO Subcommittee 2021 consists of

- Dr Lau Jingfeng (Chairman and Senior Section Round 1 Coordinator)
- Dr Hang Kim Hoo (Deputy Chairman/Administration)
- Associate Professor Toh Pee Choon (Junior Section Round 1 Coordinator)
- Associate Professor Toh Tin Lam (Open Section Round 1 Coordinator)
- Associate Professor Tay Tiong Seng and Associate Professor Wong Yan Loi (Round 2 Coordinators)

### 4. Singapore Mathematics Projects Festival (SMPF) 2022.

This year the Project Festival attracted 27 projects from Junior section and 27 projects from Senior section.

Students submitted their projects and presentation videos for preliminary round selection. 5 teams from the Junior section and 5 teams from Senior Section were invited to for final round.

The judges for the Festival were

- Junior Section: Dr Teo Kok Ming, Assoc Prof Zhao Dong Sheng, Assoc Prof Toh Pee Choon (NIE)
- Senior Section: Dr Ku Cheng Yeaw (NTU), Dr Tay Tiong Seng (SMS), Dr Wang Fei, Dr. Liu Yiqun (NUS)

Medals were awarded to the following projects:

#### Junior section

- Gold: Hwa Chong Institution, Cornering Corners
- Gold: NUS High School of Maths and Science, Fermat's Point
- Silver: Nanyang Girls' High School, Air Hockey
- Silver: Hwa Chong Institution, The Key to Optimization
- Silver: NUS High School of Maths and Science, Hanging a Painting
- Bronze: St. Joseph's Institution, How Mathematics Can be Applied in the Creation of String Instrument
- Bronze: Anderson Secondary School, How to Make a Good Paper Aeroplane
- Bronze: Dunman High School, Battleship: Optimal Play
- Bronze: Hwa Chong Institution, Spirals into Finals
- Bronze: Hwa Chong Institution, The Bigger the Better
- Bronze: Hwa Chong Institution, Lights Out
- Bronze: Methodist Girls' School, Appreciation of Recursion in the Josephus Problem
- Bronze: NUS High School of Maths and Science, Tetris
- Bronze: School of Science and Technology, Game-Playing AI for Monopoly: Ultimate Banking
- Bronze: Serangoon Secondary School, Sangaku in a Square
- Bronze: Temasek Junior College, Strategies for Playing the Game "Exploding Kittens"

#### Senior section

- Gold (Foo Kean Pew Memorial Prize): Catholic High School, Number of Self-Avoiding Lattice Paths
- Gold: NUS High School of Maths and Science, Crossing Number of Join Product of Some Graphs
- Gold: NUS High School of Maths and Science, Modelling Singapore's Covid Pandemic Using Hybrid AI, Causal, and SEIRQV Models
- Silver: Hwa Chong Institution, Charging Ahead
- Silver: Hwa Chong Institution, Ramsey's Game
- Silver: Hwa Chong Institution, Light Links
- Silver: NUS High School of Maths and Science, Statistical Cryptanalysis of Block Ciphers
- Bronze: Hwa Chong Institution, Traffic Optimisation - A Study of Singapore's Traffic Flow
- Bronze: NUS High School of Mathematics and Science, Strengths and Variations of Elliptic Curve Cryptography in Encoding Media
- Bronze: School of Science and Technology, Bronze: Constructing Isomorphic Polynomials
- Bronze: St. Joseph's Institution, Primality Tests: An Approach Based on Time Complexity, Space Complexity and Accuracy

- Bronze: Temasek Junior College, Sum of Product of Consecutive Integers
- Bronze: Temasek Junior College, Exploring the Math Behind Divisibility Rule

## 5. SMS Essay Competition 2022

This year, we organized the 12th SMS essay competition with the theme “Mathematics and Environmental Sustainability”. The competition was officially launched on 9 March. Environmental Sustainability, being one of the pillars of Singapore Green Plan 2030 to advance the national agenda on sustainable development, is key to improving the lives of our future generations. We hope that through this competition, students will discover the different types of mathematical models for its corresponding Environmental Sustainability response.

By the closing date of 8 July 2022, we received a total of 64 essay entries from 17 schools with the following breakdown: Category A (secondary 1 & 2 or equivalent): 30, Category B (Secondary 3 & 4 or equivalent): 16, Category C (JC or equivalent): 18.

The judges for the competition were:

Category A: Mdm. LOW Leng (MOE) and Dr. TAN Liang Soon (MOE).

Category B: Mr. LOW Fook Hong (MOE) and Mr. Christian Ong GO (NUS).

Category C: Assoc. Prof. HO Weng Kin (NIE) and Asst. Prof. CHEONG Kang Hao (SUTD)

The winning essays are:

### Category A

1st Prize : Application of Mathematics in Carbon Sequestration, Hwa Chong Institution, Sim Shuan Luck and Tham Qi Yi, Andrew

2nd Prize : The Math of Environmental Sustainability, NUS High School of Math and Science, Ng Hao Xuan and Jonathan Wirawan

3rd Prize : Fractals and sustainability, Raffles Institution, Lan Shu Heng Jerry

### Category B

1st Prize : Understanding the Role of Mathematical Optimisation in Getting Electric Vehicles their Electricity, Clementi Town Secondary School, Raditya Aryo Wahyudi, Lim Li Xuan Jamie and Nguyen Bao Long

2nd Prize : Mathematics and Environmental Sustainability, Hwa Chong Institution, Zou Jiaxin, Lee Jun Kang and Nicholas Loh Jingyu

3rd Prize : Solar Sail, Hwa Chong Institution, Zhang Junjian, Wu Qinghui and Bong Jia Jun.

## Category C

1st Prize : The Mathematics behind Wind Power, Hwa Chong Institution, Ow Jing Kai

2nd Prize : Using Game theory to analyze sustainability and decision making of firms, Raffles Institution, Wang Yanqin

3rd Prize : Predictions of the Waste Recycling Rate and Carbon Emissions in Singapore based on Grey System, National Junior College, Huang Anran

Honorable Mention: The Mathematics of Predicting Global Temperature in 2050, Tampines Meridian Junior College, Jordon Yee, Eugene Lee and David Lauw

Honorable Mention: Generalised Additive Models and its Applications in Coastal Protection Measures, River Valley High School, Krystal Pek Ke Yun, Li Yutong and Liao Li Jing

## 6. SMPF Workshop on Mentoring Mathematical Research Projects in Secondary Schools

The above workshop was conducted online via ZOOM on 19<sup>th</sup> July 2022. Teachers from 22 Secondary Schools participated in the event. The workshop consists of

1. Sharing by organizer for SMPF (Wang Fei)
2. Sharing by chief judge for SMPF (Toh Pee Choon)
3. Sharing by Gold Prize winner of SMPF
  - a) NUS High School of Maths and Science.
    - i. Modeling Singapore's Covid Pandemic Using Hybrid AI, Causal, and SEIRQV Models.
    - ii. Supervisor: Ye Xiajuan.
  - b) Catholic High School.
    - i. Number of Self-Avoiding Lattice Paths
    - ii. Supervisor: Tay Kew Yeow Glenn

## 7. SMS Workshop for Teachers - Student Preparation for Mathematical Olympiads

The above workshop was organised on 31 August 2022. The workshop was conducted by Dr Hang Kim Hoo and Mr Wang Haibin. A total of 45 teachers from 25 schools attended the workshop.

## 8. SMS 55<sup>th</sup> Anniversary Forum

As part of the celebration of SMS 55<sup>th</sup> Anniversary, a forum was organised and conducted on 9 November 2022 from 3 pm to 4.30 pm. The theme of this Forum was 'The Future of Mathematics and Mathematics Education in Singapore. The two speakers at this forum were Prof Tan Eng Chye, President of NUS, and Prof Ling San, Provost of NTU). The forum was moderated by Dr Hang Kim Hoo, Vice-President of SMS.

The aim of this forum is to gather educators and thought leaders to look at several issues that are pertinent to Mathematics in Singapore. Some questions that were discussed were:

- What are the new opportunities for doing Mathematics?
- What are the implications for Mathematics Learning with the evolution of the University landscape?
- What will remain and what will have to be changed?
- Are there any conundrums vis-à-vis math education?

A total of 126 invited guests attended this forum. Attendance at this forum also included 7 Past-Presidents of SMS, Director General of Education from MOE, Director of Sciences Branch (MOE), and Mathematics Specialists and officers from both the MOE Sciences Branch and Gifted Education Branch.

