
SINGAPORE NATIONAL ACADEMY OF SCIENCE

**44th Annual Report
of the Academy
2019/2020**

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1 **OFFICIALS**

1.1 **Council**

The following members were the representatives of the constituent societies of the Academy during the year under review:

President	:	A/Prof Lim Tit Meng	SIBiol
Vice President	:	Prof Ling San	SMS
Immediate Past President:		Prof Andrew Wee	IPS
Hon. Secretary		Dr Leong Lai Peng	SNIC
Hon. Treasurer	:	Dr Edmund Lui	SSBMB
Members	:	Prof Tan Choon Hong	SNIC
		Mr Jay Mahardale	STAS
		Mr Ng Kok Wing	STAS
		Dr Jani Tanzil	SIBiol
		Dr Toh Tai Chong	SIBiol
		A/Prof Kwek Leong Chuan	IPS
		Prof Rajdeep Singh	IPS
		Dr Koh Wee Shing	IPS
		Mrs Anne Dhanaraj	SAAS
		Dr R Subramaniam	SAAS
		Mr Ng Kwan Kee	SIS
		Mr. Alfred Koh	SIS
		A/P Victor Tan	SMS
		Dr Tang Wee Kee	SMS
		Prof Lee Yuan Kun	SSMB
		Dr Dave Ow	SSMB
		A/P Yew Wen Shan	SSBMB
		Dr Yap Lai Lai	SSBMB
		Prof B Tim White	MRS-S
		A/P S. M Piramanayagam	MRS-S
		Prof Pierce Chow	CCS
		A/Prof Mahesh Choolani	CCS

1.2 **Fellows**

Prof Bertil Andersson (Nanyang Technological University)
Prof Ariff Bongso (National University of Singapore)
Prof Hardy Chan Sze On (National University of Singapore)
Emeritus Professor Louis Chen Hsiao Yun (National University of Singapore)
Prof Chong Chi Tat (National University of Singapore)
Prof Chou Loke Ming (National University of Singapore)
Prof Ding Jeak Ling (National University of Singapore)

Prof Artur Ekert (National University of Singapore)
 Prof Gan Wee Teck (National University of Singapore)
 Prof Andy Hor Tzi Sum (National University of Singapore)
 Emeritus Professor Huang Hsing Hua (National University of Singapore)
 Prof Lai Choy Heng (National University of Singapore)
 Prof Birgit Lane (National University of Singapore)
 Prof Sir David Lane (National University of Singapore)
 Prof Lee Hian Kee (National University of Singapore)
 Prof Lee Soo Ying (Nanyang Technological University)
 (Retired) Professor Gloria Lim (Nanyang Technological University)
 Prof Lim Hock (National University of Singapore)
 A/Prof Lim Tit Meng (Science Centre Singapore /National University of Singapore)
 Prof Ling San (Nanyang Technological University)
 Prof Loh Teck Peng (Nanyang Technological University)
 Prof Lui Pao Chuen (Nanyang Technological University & National University of Singapore)
 Prof Ooi Beng Chin (National University of Singapore)
 Prof Phua Kok Khoo (Nanyang Technological University and National University of Singapore)
 Prof Shen Zuowei (National University of Singapore)
 (Retired) Professor Sim Keng Yeow (National University of Singapore)
 Prof Sun Yeneng (National University of Singapore)
 Prof James Tam (Nanyang Technological University)
 Prof Tan Chorh Chuan (National University of Singapore)
 Prof Tan Eng Chye (National University of Singapore)
 Prof Bernard Tan Tiong Gie (National University of Singapore)
 Prof Leo Tan Wee Hin (National University of Singapore)
 Prof Andrew Wee Thye Shen (National University of Singapore)
 Prof Wong Tien Yin (Singapore National Eye Centre / National University of Singapore)
 Prof Xu Guo Qin (National University of Singapore)
 Prof Jackie Ying (Institute of Bioengineering and Nanotechnology, A*STAR)
 Prof Zhu Chengbo (National University of Singapore)

1.3 **Honorary Fellows**

Prof Sydney Brenner (Deceased, Nobel Laureate in Medicine)
 Prof Anthony Cheetham (Fellow of Royal Society / University of Cambridge)
 Prof Chua Nam Hai (The Rockefeller University)
 Professor Tung Yau Shing (Harvard University)

2 **Membership**

The following constituent societies are members of the Academy:

Institute of Physics Singapore	(IPS)
Singapore Institute of Biology	(SIBiol)
Science Teachers' Association of Singapore	(STAS)
Singapore Association for the Advancement of Science	(SAAS)
Singapore Institute of Statistics	(SIS)

Singapore Mathematical Society	(SMS)
Singapore National Institute of Chemistry	(SNIC)
Singapore Society for Biochemistry & Molecular Biology	(SSBMB)
Singapore Society for Microbiology & Biotechnology	(SSMB)
Materials Research Society-Singapore	(MRS-S)
College of Clinician-Scientists, Academy of Medicine	(CCS)

3 **Activities**

3.1 The various constituent societies of the Academy continued to be very active throughout the year. A summary of the various activities of the constituent societies follows.

3.2 **Singapore National Institute of Chemistry**

3.2.1 The Singapore Junior Olympiad was held on 18 May (Theory) and 6 July 2019 (Practical). A total of 2481 students from 85 local and international schools participated in the Olympiad.

3.2.2 The Royal Society of Chemistry and the Women's chapter of SNIC held a panel discussion and networking event for aspiring women chemists on 2 July 2019.

3.2.3 Other events organized included Chemistry National Meeting Singapore (15 May 2019; Industry talk on Challenges and Future Trends in Pharmaceutical R&D and Productivity (25 Oct 2019); 16th Conference of the Asian Crystallographic Association (17-20 Dec 2019); Nanyang Research Conference on Synthetic Chemistry and Catalysis (15-17 Jan 2020); and a series of SNIC Lectures.

3.2.4 SNIC has launched a series of new awards to be presented to students in the graduating cohorts who have done well in Chemistry in schools, as well as to polytechnic graduates.

3.3 **Singapore Association for the Advancement of Science**

3.3.1 The Young Scientist Badge scheme, organized by the Association, the Science Teachers' Association of Singapore, the Science Centre Singapore and the Singapore National Academy of Science, continued to attract participants. A total of 3,354 badges was awarded to students from 25 primary schools and 4 home schoolers/mentored students in 2019. So far, a total of 1,076,828 badges have been awarded since the inception of the Scheme in 1982.

3.3.2 The Questa club aims to stimulate interest in science among secondary students and to encourage them to work independently in science and mathematics projects. In 2019, a total of 1,227 badges (954 Silver and 273 Gold) was awarded to students from secondary schools. Since the inception of the Scheme in 1988, a total of 117, 042 badges has been awarded.

3.3.3 For the SAAS Award for the best NIE Trainee Teacher in 2019, two awards were given in the sciences and mathematics (Primary and Secondary/Junior College categories). Each winner received a cash prize of \$500.

3.3.4 The Association presented SSEF/SAAS Award to the Best Project Poster for Science Communication. SSEF is an annual competition organized by the Ministry of Education, A*STAR and Science Centre Singapore, for students aged 15 to 20 years old. SSEF is an affiliate fair of the Intel International Science and Engineering Fair (ISEF), which is considered the Olympics equivalent of Science Fairs internationally.

The Association was invited by the Ministry of Education, to sponsor special awards for Science Communication for SSEF 2019 held from 7-8 March.

3.3.5 For the 2019 Outstanding STEM Teachers Award, there were 5 winners.

3.4 **Science Teachers Association of Singapore**

3.4.1 The Association co-organized the Singapore Youth Science Fair with the Science Centre Singapore in May/June 2019. It was well attended by students and teachers.

3.4.3 The SAAS-STAS Outstanding STEM Teacher Awards for 2019 were presented to 5 teachers.

3.4.4 The 2019 Singapore International Science Teachers Conference was jointly organized by STAS, AST, CPDD, SCS, Natural Sciences and Science Education Academic Group (NSSE) from NIE and Academy of Principals (APS), with the support from the Singapore Association for the Advancement of Science (SAAS). It was held at the Suntec Singapore Convention & Exhibition Centre from 18-20 November 2019. It attracted more than 700 educators from Singapore and overseas.

3.5 **Singapore Institute for Biology**

3.5.1 A Public Forum was held on 24 Aug 2019 at the Science Centre Singapore.

3.5.2 A total of 1462 students from 60 schools participated in the Singapore Junior Biology Olympiad for secondary students. It was held online on 24 June 2020.

3.5.3 The 31st International Biology Olympiad, to be held in 2020, was cancelled due to the Covid-19 pandemic.

3.5.6 For the Singapore Biology Olympiad, the theory test was held on 16 November 2019, with the participation of 295 students from 21 schools. The top 43 students were selected for the practical round, which was held on 4 December 2019.

3.6 **Singapore Mathematical Society**

3.6.1 The Singapore Mathematics Symposium was held on 27 Sep 2019 at NTU.

3.6.2 The annual Singapore Mathematical Projects Festival was held on 8 Feb, 15 Feb and 4 Apr 2020.

3.6.3 At the 60th International Mathematical Olympiad, held in Romania in 2019, the Singapore team clinched 2 Gold and 4 Silver medals. Singapore came in 8th position.

3.6.4 The Singapore Mathematical Society's Distinguished Visitor for 2019 was Prof Michael Röckner from Bielefeld University, the immediate past President of the German Mathematical Society. During his visit, Professor Röckner conducted a Public Lecture on 'Finding order in disorder: Mathematics is everywhere' on 30 Aug, and two colloquia talks at NUS and NTU on 28 and 29 Aug respectively.

3.6.5 The SMS Annual Prize Presentation was held on 31 Aug 2019 at NUS. Professor Michael Röckner was Guest-of-Honor. Winners of the Singapore Mathematical Olympiad, Singapore Mathematical Projects Festival, and SMS Essay Competition were presented prizes at the event. The Singapore Team to the International Mathematical Olympiad were also honored at the event.

3.6.5 The 9th Singapore Mathematics Symposium was held on 27 September 2019 at NTU. The half-day event included a number of invited lectures by mathematical scientists from various institutions and poster prize presentations.

3.7 Singapore Society for Microbiology and Biotechnology

- 3.7.1 SSMB co-organized a workshop on ‘Practical Approach to Allergen Management’ with Nanyang Polytechnic and the Singapore Institute of Food Science and Technology (SIFST) on 26 March 2019. There were 64 participants from food companies, schools learned societies.
- 3.7.2 SSMB organized the joint workshop on ‘Food Safety and Industry 4.0’ with Chokim Scientific and the American Society for Quality (ASQ) on 19 August 2019 at NUS. The topics included food microbial analysis, validation of testing methods, and evolution of Industry 4.0. Positive feedback was obtained from the participants.
- 3.7.3 SSMB organized a seminar on “Isolation and culture of anaerobic and microaerobic bacteria” by Lars Nordbrunch from Don Whitley Scientific, UK on 6 September 2019 at NUS. About ten participants attended the talk.

3.8 Institute of Physics Singapore

- 3.8.1 The Physics Olympiad teams for the 50th International Physics Olympiad (Tel Aviv, Israel), 20th Asian Physics Olympiad (Adelaide, Australia) and 32nd International Young Physicists’ Tournament (Warsaw, Poland) did well in 2019. The teams won 2 Gold, 2 Silver and 1 Bronze medals (placed joint 8th out of 78 countries) at IPhO; 2 Silver and 2 Bronze medals as well as 2 Honorary Mentions at APhO; and secured 1st position for seven consecutive years at IYPT as of 2018.
- 3.8.2 IPS helped to successfully organize three other local Physics Tournaments (32nd Singapore Physics Olympiad, 12th Singapore Junior Physics Olympiad and Singapore Young Physicists Tournament) for Junior Colleges and High School Physics students.
- 3.8.3 One astronomy event (26th Annual IPS Astronomy Retreat) was organized by IPS. It attracted about 87 participants from Singapore.
- 3.8.4 The 9th IPS Annual meeting was held from 13-15 March 2019 at SUTD. There were about 250 registrations and 129 presentations (including 6 Plenary and 7 Invited presentations).
- 3.8.5 There were 8 winners for the IPS Awards.

3.9 Materials Research Society-Singapore

- 3.9.1 The 10th International Conference on Materials for Advanced Technologies (ICMAT) was held from 23-28 June 2019 at Marina Bay Sands. There were: 2952 participants. The program included 4 Nobel Laureate Plenary Lectures (Hiroshi Amano, Andre Geim, J. Fraser Stoddart and Klaus Von Klitzing), 2 Nobel Laureate Public Lectures (Andre Geim and J. Fraser Stoddart) and 45 Technical Symposia (covering almost all aspects of materials science), with 6 jointly organized with other MRSs.
- 3.9.2 The 10th Trilateral Conference on Nanoscience: Energy, Water & Healthcare was held from 21-23 Nov 2019 at NTU. The program included 3 invited talks from speakers from India, China and Singapore and about 60 poster presentations. There were about 100 participants.
- 3.9.3 At the 22nd MRS-S Annual General Meeting held virtually on 24 April 2020, former President Prof B.V.R. Chowdari was offered the honorary title of President Emeritus and position of Senior Executive Director in the MRS-S administration.
- 3.9.4 MRS-S has been hosting IUMRS Asia Regional Office since 1 Jan 2019. It will host IUMRS Headquarters Office with effect from 1 Jan 2021. Further, MRS-S has been entrusted with the responsibility of carrying out all the financial operations of IUMRS with effect from 1 Jan 2019.

3.9.5 To promote research collaborations between materials scientists in Singapore and those from the Asian region, MRS-S signed agreements with both NUS and NTU for them to host mid-career materials scientists. To cover the travel and living expenses of the visiting scientists, MRS-S donated a sum of \$300,000 to NUS and \$250,000 to NTU in 2019. MRS-S is now working together with NTU and NUS to promote and operate the MRS-S Visiting Researchers Programme.

3.10 **College of Clinician Scientists**

3.10.1 The College launched a webinar on “Impact of COVID-19 on the future of clinical trials” on 17 July 2020. It was co-sponsored by Roche and supported by IQVIA. It was attended by 280 participants.

3.10.2 The Academy of Medicine, Singapore and the College of Clinician Scientists launched the Seah Cheng Siang Memorial Research Award in July 2020 to perpetuate the memory of Professor Seah Cheng Siang, distinguished Academician and Past Master of the Academy. The Award shall be used for clinical, translational or basic research in any important area of medical and dental sciences in collaboration with a research centre, either within or outside Singapore.

3.11 **Singapore Society for Biochemistry and Molecular Biology**

3.11.1 The Young Scientists’ Symposium for polytechnic students in the Life Sciences was cancelled owing to the Covid-19 situation.

3.11.1 SSBMB Prizes/Medals were presented to students from Singapore Polytechnic and Ngee Ann Polytechnic.

4 **Young Scientist Awards**

4.1 The Academy instituted the above in 1997, with the support of the Agency for Science, Technology and Research (A*STAR).

4.2 The Young Scientist Award carries a cash prize of \$10,000, a Trophy and a Certificate.

4.3 The winners of the awards for 2019 were:

Physical, Engineering & Information Sciences

Dr Lim Ci Wen, Charles

Assistant Professor, Department of Electrical and Computer Engineering and Centre for Quantum Technologies, NUS

For his research on quantum cryptography that paves the way to practical quantum-safe Networks.

Biological & Biomedical Sciences

Dr Shao Huilin

Assistant Professor, Department of Biomedical Engineering, NUS

Principal Investigator, Institute for Health Innovation & Technology (iHealthtech), NUS

Joint Investigator, Institute of Molecular and Cell Biology, A*STAR

For her research in developing innovative diagnostic technologies.

5. Publications and Research

- 5.1 Members have been very active in research and continued to publish their findings in leading scientific journals.

6. Proceedings of the Singapore National Academy of Science

- 6.1 The following guest-edited issue is now with the publisher and will be published shortly:

Low Boon Chuan: Cell Signalling and Diseases

- 6.2 Work on a number of issues are nearing completion, with the following guest editors:

Toh Tin Lam and Chew Tuan Seng: Henstock integration: Theory and applications.
Leo Tan Wee Hin and R. Subramaniam: STEM education

As of Sep 2020, the review process for the manuscripts submitted for both issues is underway.

- 6.3 Other issues which have been published earlier include:

Volume 1, No: 1 (May 2005) on Statistics & Applied Probability
Volume 2, No: 1 (May 2006) on Quantum Information
Volume 3, No: 1 (Nov 2007) on Nanoscience & Nanotechnology 1
Volume 4, No: 1 (May 2008) on Selected Modern Applications of Chemistry
Volume 4, No: 2 (Nov 2008) on Nanoscience & Nanotechnology 2
Volume 5, No. 1 (May 2009) on Materials Science & Engineering 1
Volume 6, No. 1 (May 2010) on Introduced Species in Singapore
Volume 6, No. 2 (Dec 2010) on Chemistry of Nanomaterials
Volume 7, No. 1 (June 2011) on Materials for Advanced Technologies
Volume 8, No. 1 (June 2012) on Biomedical Applications of Coordination Complexes
Volume 8, No, 2 (June 2013) on Science Education
Volume 9, No. 1 (Dec 2013) on Molecular Spectroscopy and Microscopy
Volume 10, No.1 (Dec 2014) on Cellular delivery of drugs and nucleic acids.
Volume 11, No.1 (Dec 2015) on Food Security
Volume 12, No. 1 (Dec 2017) on Climate Change
Volume 13, No. 1 (Dec 2019) on Biotechnology for the Asian Century

7. SNAS Awards

- 7.1 The winners of the awards for 2019 are:

National University of Singapore

Chemistry

Biological Sciences

Mathematics

Statistics

Physics

ONG HAN WEE

JAVAN LEE TZE HAN

XIA RUI

YEO WEI DE LLOYD

MELVIN TAN JUN KEONG

Nanyang Technological University

Biological Science
Chemistry & Biological Chemistry
Physics & Applied Physics
Mathematical Sciences

HOW JIAN BOON
NEO REN KAI EDWARD
KON WEN YU
JIN YE

National Institute of Education, NTU

Biology
Physics
Chemistry
Mathematics

TAN CASSANDER
PANG AARON JIANSHENG
LIM XIN YING
ELAINE WONG

7.2 The winners of the awards for 2020 are:

National University of Singapore

Chemistry
Biological Sciences
Mathematics
Statistics
Physics

GLENN QUEK
HANNAH LAU SI HUI
ANDREAS DWI PUTRA SOEGIARTO
LIU RUOFAN
CHUA SING TENG

Nanyang Technological University

Biological Science
Chemistry & Biological Chemistry
Physics & Applied Physics
Mathematical Sciences

(to be confirmed)

National Institute of Education, NTU

Biology
Physics
Chemistry
Mathematics

DOMINIC KOH JING QUN
WAN MUHAMMAD ALIFF BIN RAHMAT
CHAU PEARLWE
CHUN GUAN YANG

7.3 In the past, the students were presented with the awards during the SNAS AGM. However, as this year's AGM will be held online owing to the Covic-19 situation, a separate function will be organized to honor the recipients.

8 Relations with international bodies

8.1 The Academy continues to be a member of the Pacific Science Association, the Third World Academy of Sciences, and the Association of Academies and Societies of Sciences in Asia.

8.2 The Academy continues to be invited to participate in ASEAN and international scientific conferences and fora.

9 SNAS ASEAN Fellowship Programme

- 9.1 The National Research Foundation (NRF) has agreed to fund the SNAS ASEAN Fellowship Programme which aims to attract bright postdoctoral researchers (or would-be faculty members) from ASEAN countries to Singapore universities for a 2-year postdoctoral fellowship.
- 9.2 SNAS will administer the programme in which applicants will be required to find a willing host in a local university in an agreed field of research preferably in science, medicine, engineering, and computer science.
- 9.3 SNAS will form a review panel consisting of members of the academy to review and recommend the award to the applicants based on academic records, essays, letters of recommendation, the application itself, and other appropriate materials as the basis for determining the extent to which candidates meet the eligibility requirements and the positive factors for selection. The quality of the plan of study or research, the bibliography, the appropriateness of the proposed fellowship activities, the choice of host institution, and the potential for career enhancement will also be carefully reviewed.
- 9.4 The candidates may propose any field of research done in Singapore universities. For the 1st batch, preference will be given to candidates working on infectious diseases. Up to 10 Fellowships will be offered each year but starting with about 5 in the first batch offered in 2020.
- 9.5 The SNAS ASEAN Fellowship has been offered to:
Kong Xin Ying (NTU)
Nguyen Nguyen Ngan (NUS)
Ng Mei Li (NTU)
Isom Hilmi (SUTD)
Le Thien Thi Thanh (SUTD)
- 9.6 Nguyen Nguyen Ngan has since rejected the offer due to personal reasons.

10 Acknowledgements

- 10.1 The Academy thanks the National University of Singapore, the Nanyang Technological University, and the Science Centre Singapore for their strong support and encouragement towards the Academy's mission objectives.



President

1 September 2020

Date