



NATIONAL RESEARCH FOUNDATION
PRIME MINISTER'S OFFICE
SINGAPORE

Global Young Scientists Summit returns to inspire the next generation of budding science talents

SINGAPORE: The **Global Young Scientists Summit (GYSS)** began today with thought-provoking discussions such as next-gen DNA sequencing, potential discoveries from the James Webb Space Telescope, and looking at careers beyond academia. From 17 to 20 January 2023, a distinguished line-up of 21 Nobel laureates and eminent scientists will share their insights and inspire young scientists across ten plenaries and panel discussions.

The event takes on a hybrid mode for the first time, with more than 350 participants attending sessions held on-site at the Singapore University of Technology and Design, and over 1,400 attending virtually. Coming from 29 countries across five continents, these young researchers will get a chance to engage with some of the top minds around the world. These distinguished speakers include recipients of the Nobel Prize, Fields Medal, Millennium Technology Prize, and Turing Award, with six speakers joining the discussions for the first time.

The Summit was launched by **Deputy Prime Minister, Coordinating Minister for Economic Policies and Chairman of the National Research Foundation, Singapore (NRF), Mr Heng Swee Keat**, who also delivered a speech this morning.

In its 11th edition, the GYSS is organised by the NRF as an international multi-disciplinary summit to inspire younger scientists and help them build a global research network by engaging with like-minded fellows and renowned scientists worldwide.

NRF Chief Executive Officer Mr Beh Kian Teik said, "The GYSS has established itself for over a decade as an international Summit that brings the top scientific minds from around the world to Singapore, to inspire young researchers. The insights gleaned from the Summit will inspire them to grow and develop more holistically, as they fuse the traditional role of scientists with multiple skillsets, from being scientific and tech leaders to entrepreneurs. The Summit also aims to support the nation's ongoing transition towards becoming a global talent hub."

Inspiring next-generation science leaders

GYSS 2023 offers both on-site and online sessions for the first time, with 21 lectures and four panel discussions held in SUTD and online via a live streaming platform and NRF's YouTube channel. Young scientists will also be sharing their work and gleaning feedback from the speakers and fellow peers through posters presented on-site, as well as virtual presentation sessions.

Lectures and plenary sessions will touch on key topics in science such as advances in graphene research, how brain processes affect health and diseases, stomach bacteria that affects half the world's population, current trends in high-performance computing, and how scientific breakthroughs have enabled human genomes to be sequenced over a million times faster since the year 2000. Of note, Guest Speaker and British biologist **Dr Alison Woollard** will speak about the importance of Science Communications and why scientists must engage with the public in a relatable and understandable manner.

The key highlights of the Summit are the four panel discussions, which will deliberate on important topics such as the importance of scientific communications, careers beyond academia, revolutionary tools for science, and if scientists should comment on diplomacy and society.

Attending speakers span the fields of science, mathematics, and technology. Six new speakers are attending the event for the first time: Dr Alison Woollard - Science Communicator, Prof Brian Kobilka - Nobel Prize in Chemistry (2012), Prof Sir David Klenerman - Millennium Technology Prize (2020), Prof Sir David MacMillan - Nobel Prize in Chemistry (2021), Prof Jack Dongarra - Turing Award (2021), and Prof John Mather - Nobel Prize in Physics (2006).

One of the new speakers, **Prof David Klenerman** (2020 Millennium Technology Prize recipient) shared some advice with the attendees: “International events such as GYSS are platforms that will certainly be helpful for scientists to learn from each other, collaborate and share thoughts, and to bounce research ideas off each other. To young scientists, I would advise this: some things work, some things don’t work, and some things work better than expected. We must get used to things not working out, but the key thing is that we keep going at it or change the direction or find something else related to it. We may find ourselves working at the frontiers in the field with more challenges and problems, and that is where discoveries are unearthed.”

Ms Belinda Ong, 30, a PhD candidate at the Agency for Science, Technology and Research (A*STAR) and National University of Singapore (NUS), who is one of the participants at the Summit, shared her thoughts on the Summit: “The GYSS 2023 serves as a great platform for me to expand my research perspectives and knowledge through interdisciplinary discussions with distinguished scientists and fellow participants. I am keen to learn how to look at various topics from different angles and deepen my understanding of other research fields. At the same time, being passionate about advancing scientific research at a global level, I believe that the meaningful friendships and connections forged during the summit would provide opportunities for future collaborations across different disciplines.”

Exciting line-up of engagement sessions by research institutes across Singapore

The Summit will also host a slew of online engagement sessions from research institutes across Singapore, sharing insights in food innovation and production processes, molecular genomics, advances in medical science, and quantum technologies.

A key highlight will be a session by the Global Centre for Technology, Innovation and Sustainable Development, which is a joint initiative between the Singapore Government and the United Nations Development Programme. They will discuss how science can play an important role in supporting global challenges such as climate and biodiversity crises, societal inequalities and various sustainability issues brought about by the pandemic.

Other institutes include the Earth Observatory of Singapore, Centre for Quantum Technologies, Singapore-ETH Centre, St John’s Island National Marine Laboratory, Mechanobiology Institute, and the French National Centre for Scientific Research (CNRS), TUM-CREATE, and Technology Academy Finland.

Please see **Annex A** for the full list of speakers for GYSS 2023 and **Annex B** for more info on the Summit’s sessions.

* * END * *

Editor's Note:

Official photos of the sessions will be made available here: [GYSS 2023 Media Kit](#)
(Photo credits: NRF Singapore)

Media Contact

Lim Wee Ling
Director
APRW on behalf of NRF

Nur Amin Shah
Deputy Head (Corporate Communications)
National Research Foundation
Prime Minister's Office

Speakers attending the GYSS 2023 are:

1. Prof Aaron Ciechanover, Nobel Prize in Chemistry (2004)
2. Prof Ada Yonath, Nobel Prize in Chemistry (2009)
3. Dr Alison Woollard, Science Communicator, Guest Speaker (new)
4. Prof Alessio Figalli, Fields Medal (2018)
5. Sir Andre Geim, Nobel Prize in Physics (2010)
6. Prof Barry James Marshall, Nobel Prize in Physiology or Medicine (2005)
7. Prof Brian Kobilka, Nobel Prize in Chemistry (2012) (new)
8. Prof Sir David Klenerman, Millennium Technology Prize (2020) (new)
9. Prof Sir David MacMillan, Nobel Prize in Chemistry (2021) (new)
10. Prof Didier Queloz, Nobel Prize in Physics (2019)
11. Prof Sir Fraser Stoddart, Nobel Prize in Chemistry (2016)
12. Prof Hartmut Michel, Nobel Prize in Chemistry (1988)
13. Prof Jack Dongarra, Turing Award (2021) (new)
14. Prof John Mather, Nobel Prize in Physics (2006) (new)
15. Prof Sir Konstantin Novoselov, Nobel Prize in Physics (2010)
16. Dr Robert Langer, Millennium Technology Prize (2008)
17. Prof Stefan Hell, Nobel Prize Chemistry (2014)
18. Prof Sir Tim Hunt, Nobel Prize in Physiology or Medicine (2001)
19. Prof Stuart Parkin, Millennium Technology Prize (2014)
20. Prof Thomas Südhof, Nobel Prize in Physiology or Medicine (2013)
21. Prof Wendelin Werner, Fields Medal (2006)

Annex B - GYSS Programme Highlights

Plenary Lectures

Bioethical implications of the Corona Pandemic

Prof Aaron Ciechanover

The lecture will discuss bioethical issues that arose from the COVID pandemic, as well as possible solutions. They include prioritising in connecting sick patients to respirators, vaccination hesitance, mis and disinformation and the refloating of racism.

Random walk to Graphene

Sir Andre Geim

The lecture will discuss how the research on Graphene (a single plane of carbon atoms which is not only the thinnest but also probably the simplest material one can imagine) started, and why it has attracted attention as a “wonder material”.

Structural insights into G protein coupled receptor activation

Prof Brian Kobilka (NEW)

The lecture will discuss what the studies in characterising the dynamic process of G protein coupled receptors (GPCR) activation by applying a spectrum of biophysical and structural approaches have taught us about GPCR signaling.

Next Generation DNA Sequencing

Sir David Klenerman (NEW)

This talk will describe the journey of discovery and scientific breakthroughs that now allows human genomes to be sequenced over one million times faster than in the year 2000. It will then show examples of how this innovation is transforming medicine and our basic understanding of life.

The Development of Asymmetric Organocatalysis and Metallaphotoredox

Sir David MacMillan (NEW)

This lecture will first discuss the advent of organocatalysis and why organic catalysts have become widely explored in modern synthetic chemistry. It will also discuss the application of visible light photocatalysis to the discovery or invention of transformations that will be conceptually or synthetically valuable.

Exoplanet revolution, exploring the consequence of a paradigm shift

Prof Didier Queloz

Structures of Intermediates of the Cytochrome c Oxidase Reaction Cycle Suggest a Revolution

Prof Hartmut Michel

Cytochrome c Oxidases are among the most fundamental enzymes on earth. They reduce molecular oxygen taken up from the atmosphere to water, and store the energy in an electrochemical proton gradient across mitochondrial or bacterial membranes.

Recent Advances in the Design and Synthesis of Molecular Motors and Pumps

Sir James Fraser Stoddart

The lecture will describe the discovery of an example of radically enhanced molecular recognition, which represents a valuable tool for the design and synthesis of artificial molecular pumps (AMPs) and artificial molecular motors. This breakthrough has the fabrication of modes of adsorption including Mechanisorption, which can change the way gases such as hydrogen, carbon dioxide and methane are stored.

Chiral spin textures on the racetrack

Prof Stuart Parkin

Chirality is a fundamental property of nature that plays a dominant role in the formation of novel spin textures in certain classes of both bulk materials and thin film magnetic heterostructures. The lecture will touch on the principles and applications of chiral spin textures, as well as the SUPERTRACK memory device that he has recently proposed.

Towards understanding synapse formation in health and disease: Implications for neurodegeneration

Prof Thomas Sudhof

Many diseases of the brain, especially neuropsychiatric and neurodegenerative diseases, affect synapses as a primary point of pathophysiology. The talk will discuss his latest laboratory results addressing the question how synapses are formed and maintained. It will focus on a few signatory projects that explain the

challenges in pursuing the question focusing on the relation of synapse formation and maintenance in Alzheimer's disease as analyzed in human neurons.

Lessons from a life in Science: How I Stumbled on the Secret of Cell Division

Sir Tim Hunt

The talk will dive into how he grew up in a biochemistry department, studying the control of protein synthesis in young red blood cells, which led to the discovery of the cyclin protein family, components of the key regulators of the cell division cycle.

When randomly chosen objects can surprise us

Prof Wendelin Werner

The talk will illustrate, through examples, of a rather general feature: When one chooses at random an object in a big (i.e. infinite) set, then its properties can be quite different from what we thought was actually possible or imaginable. It will discuss random numbers, random groups, random functions, and random landscapes.

Science Communication: why and how?

Prof Alison Woollard (NEW)

The talk will discuss the topic of Science Communications.

Sir Konstantin Novoselov (NEW)

A plenary about his research in graphene.

The Fruits of Curiosity

Prof Ada Yonath

The talk will discuss the structure of the extremely complex ribosome, which sheds light on the molecular basis of genetic code. It will look into studies that have paved the way for the design of next generation eco-friendly novel antibiotics and initiated investigations on human severe diseases (cancer, anemia) associated with ribosome's mutations.

Optimal Transport: Math and Beyond

Prof Alessio Figalli

The talk will discuss optimal transport, which was introduced more than two centuries ago as a tool to understand the most efficient way of transporting a distribution of material from one place to another to build fortifications.

How bad luck, Incompetence and fraud, delayed a discovery by 100 years:

Examples from the Nobel Prize in Medicine 2005 for the discovery of the bacteria which causes ulcers.

Prof Barry Marshall

The talk will reflect on the reasons why a stomach bacterium, which infects half of the world's population, and sometimes causes fatal bleeding ulcers, could remain undiscovered for 100 years. During that time, since Louis Pasteur in 1860 and Robert Koch in 1884 had proven the bacterial cause of infectious diseases, stomach bacteria were discovered, ignored and forgotten by many medical scientists. It will discuss the mistakes made and lessons learnt.

An Overview of High Performance Computing, the Importance of AI/ML and Future Requirements

Prof Jack Dongarra (NEW)

The talk will examine how high performance computing has changed over the last 10-year and look toward the future in terms of trends. It will look at the challenges and opportunities presented by the convergence of High Performance Computing (HPC), big data, and machine learning, and discuss what is driving this convergence and what capabilities it might provide over the current scope/timescale of traditional HPC.

Opening the Infrared Treasure Chest with the James Webb Space Telescope

Prof John Mather (NEW)

The lecture will focus on Cosmology and satellites.

From nanotechnology to mRNA therapies and what's to come: How overcoming skepticism and barriers led to new vaccines and ways to tackle global health challenges

Prof Robert Langer

The lecture will discuss his early research on developing controlled release systems for macromolecules and how that led to the isolation of the first angiogenesis inhibitors which then led to nanoparticle-based

drug delivery. Nanotechnology may also be useful in delivering DNA and siRNA as well. Approaches involving polymers and lipids will be examined as well as possible future directions.

Molecule-scale resolution in fluorescence microscopy

Prof Stefan Hell

The lecture will show how an in-depth description of the basic principles of diffraction-unlimited fluorescence microscopy has spawned a new powerful superresolution concept, namely MINFLUX nanoscopy.

Panel Discussions

Revolutionary Tools for Science [17 Jan, 3.30pm – 4.30pm]

Featuring: Prof Aaron Ciechanover, Prof Didier Queloz, Sire Konstantin Novoselov
Moderated by: Gisbert Schneider

Should Scientists comment on diplomacy and society? [18 Jan, 3.30pm – 4.30pm]

Featuring: Sir Tim Hunt, Sir Andre Geim, and Prof Chan Heng Chee
Moderated by: Leong Ching

Careers Beyond Academia [19 Jan, 9.00am – 10.00am]

Featuring: Dr John Mather, Dr Zhou Lihan and Dr Shi Xu
Moderated by: Lim Jui

Science Communication [20 Jan, 9.00am – 10.00am]

Featuring: Sir David Klenerman, Prof Alison Woollard, and Valerio Scarani
Moderated by: Gene Tan