AKADEMI SAINS MALAYSIA

25

LEADING COLLABORATION IN SCIENCE

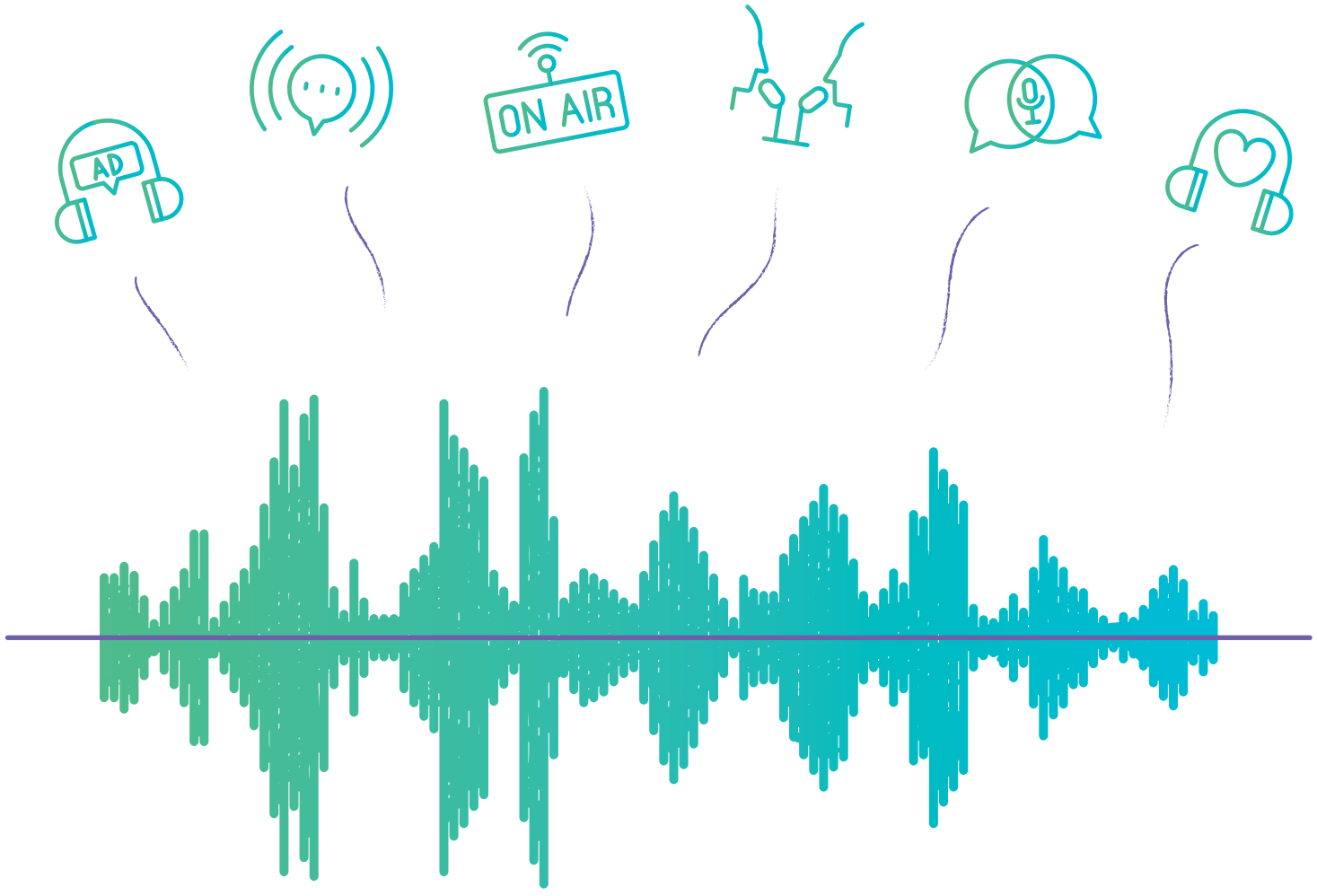
1995-2020

MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION

AKADEMI SAINS MALAYSIA

Think Science
Celebrate Technologies
Inspire Inovation

ASM PODCAST



Audio sharing on exciting topics related to Science, Technology, Innovation and Economy (STIE) with ASM's Expert Network and industry figures.

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LEADING COLLABORATION IN SCIENCE 1995-2020

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LAYING THE FOUNDATION

A SIGNIFICANT MILESTONE

In conjunction with ASM's Silver Jubilee, we share the inspirational and unwavering messages of, current and previous presidents who have strived for change, and have made it their mission to empower ASM to where it is now and so much more.

CREATING A SYSTEMIC CHANGE FOR THE GOOD OF ALL

Professor Datuk Dr Asma Ismail FASc
President, Academy of Sciences Malaysia

I would also like to thank our Expert Network members, particularly our Fellows and the ASM staff for the ideas, passion and dedication shown to give back to the nation and humanity. Thank you for all your hard work in positioning the Academy as a thought leader to make a systemic change for matters relating to science, engineering, technology and innovation.

As researchers, we need to create impact and return of values to the industry and civil society. That is why I am immensely proud about the 10-10 Malaysian Science, Technology, Innovation and Economy (10-10 *My*STIE) Framework, an initiative mooted by the Academy. The 10-10 *My*STIE Framework will impact the nation's economic recovery plan post-COVID 19 by leveraging on the science and technology drivers to move Malaysia's socio-economic strengths. The 10-10 *My*STIE Framework will criss-cross ministries and allow for researchers from all disciplines to work together, creating innovations of impact on the industries and the communities by design.

We can bridge the innovations from lab to industry via the i-Connect model by ASM, using Neutral Entities to close the gap between academia and industry. The findings from the 10-10 *My*STIE Framework can be shared in the Malaysian Open Science Platform, which is also mooted by ASM. We are creating systemic change in the innovation landscape of the nation.

Moving forward, ASM will respond with more initiatives via our SIGs (Special Interest Groups) to explore and respond to national needs, laying down the foundation to complete our innovation ecosystem and addressing the needs of SDGs. While doing so, we will address the governance, Institution, talent and innovation issues and monitor the effectiveness of our efforts.

A STRONG PUSH FROM THE START

Academician Emeritus Professor Tan Sri Datuk Dr Omar Abdul Rahman FASc
Founding President (1995 – 2001)

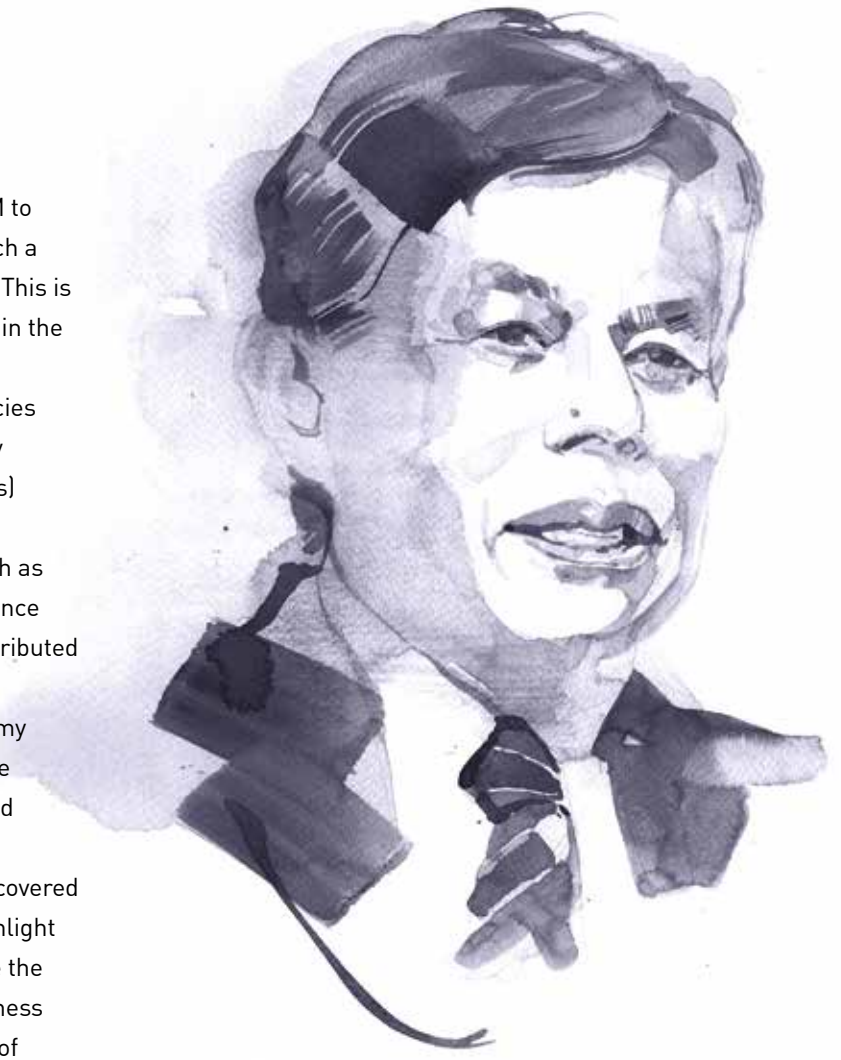
For many years, the Malaysian scientific community has realised the need for a national academy of sciences, like the ones existing in many developed countries, that serves as a platform to discuss and advise policy issues related to S&T in development and national wellbeing. My interest in S&T policy started when I was DVC Academic at UPM. Together with colleagues in the Malaysian Scientific Association, in particular the late Dr MK Rajakumar, its president, we worked towards gathering ideas and support from the then Ministry of Science and MPKSN (the National Council for Scientific Research and Development).

The push towards the establishment of an academy gained momentum when I became Science Adviser in the Prime Minister's Department in 1984. Our Prime Minister at that time - Dr Mahathir Mohammad – drove the momentum at that time because he is a firm believer in the crucial role of STI in national development. Encouraged by the conducive environment, I gathered a group of senior scientists, engineers and medical doctors to deliberate and prepare a proposal for the establishment of the Academy of Sciences Malaysia. The group was led by Dato Ir Lee Yee Cheong, Rajakumar and myself. The cabinet paper and the draft constitution that we prepared were presented the Cabinet by Dr Mahathir at its meeting on 17 Nov 1993 and was duly approved.

The hard work put in by everyone involved, from the founders to the present-day Fellows, Council members and management, has enabled ASM to grow from strength to strength. However, the Academy's presence and visibility can be improved. The setting up of the Parliamentary Select Committee on Science, Innovation and Environment is an opportunity to establish a working relationship between the Parliamentarians and the scientific community.

MOVING FORWARD IN STEM

Tan Sri Datuk Dr Ahmad Zaharudin Idrus FASc
2nd President (2001 – 2007)



The Academy has enabled the development of STEM to attain a higher profile among policymakers and reach a broader demographic of the country over the years. This is part of the capacity building process, as highlighted in the first Science, & Technology policy in 1986.

Since the formation of ASM in 1995, several policies have been formulated that not only address capacity building (which was a source of concern in the 1980s) but also have prepared the nation to meet potential challenges through forward-thinking initiatives, such as the Biotechnology Corporation policy and other Science Technology and Innovation policies, which have contributed to the growth of the economy.

The most impactful thing that happened during my tenure was the completion of the "Designing Science Education for Competitiveness" study, which outlined recommendations on measures to increase student enrolment in Science in Malaysia. The study, which covered science, technology and mathematics, aimed to highlight the importance of STEM education. I'm happy to see the Academy is continuing in its efforts to create awareness about STEM subjects, to enable the mainstreaming of science, technology and innovation.

BRIDGING SCIENCE TO THE PEOPLE

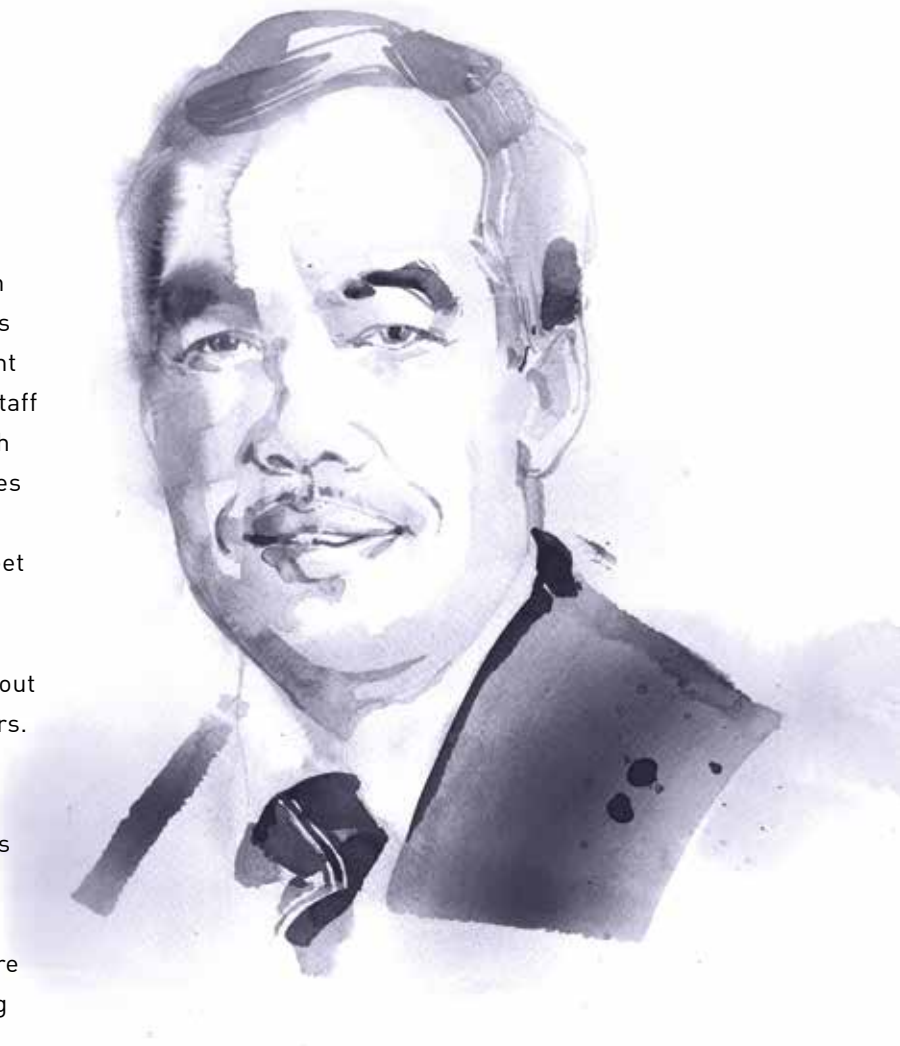
Academician Tan Sri Datuk Dr Yusof Basiron FASc
3rd President (2007 – 2010)

ASM has developed, as designed, into a vibrant Scientific Academy that provides thought leadership for matters related to science, engineering, technology and innovation. It is an agent of change by identifying the need for science- and technology-based approaches in all aspects of problem-solving to develop the country and its people. The role of science in overcoming the COVID-19 pandemic by finding vaccines in the shortest possible time testifies the importance of advanced scientific knowledge that the countries must have to face such challenges.

The most memorable memory of my time with the Academy would be building the Academy's capacity to deliver the potential of science and technology as the driver of development and growth for the country and its people. I am fortunate to have been able to launch the Mega Science project and played a part in identifying the country's top research scientists. I hope the next generation see's everything they are involved in their daily lives involves science. Having a strong scientific education will not only help in career development but also provide the ability to enjoy life by understanding why things happen the way it does.

EMPOWERING YOUTH TOWARDS LEADERSHIP IN STI

Academician Tan Sri Datuk Ir Dr Ahmad Tajuddin Ali
4th President (2010 – 2016)



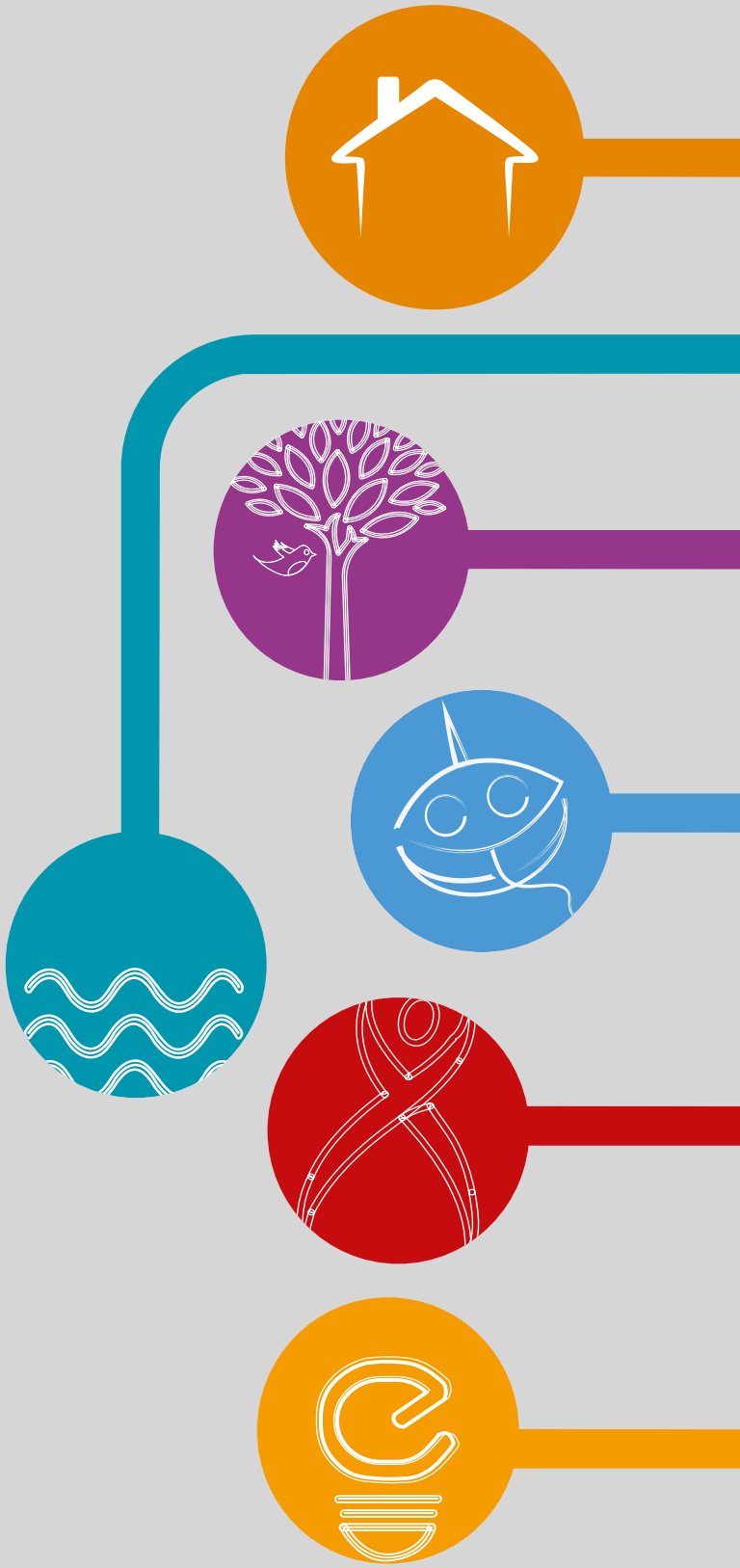
As one of the original 50 Foundation Fellows, I take great pride in the many achievements that have been made over the years. There are many fond memories from when I was elected President; the establishment of a spacious location for the Academy to house its staff and conduct signature events and meetings; the birth of the Young Scientists Network- Academy of Sciences Malaysia (YSN-ASM) and the launch of the General Assembly (GA), which is a platform for Fellows to meet and discuss topics of general interest.

The YSN-ASM network has grown tremendously over the last eight years and has been passionate about promoting impact-driven research within its members. The General Asembly (GA) has also seen positive response as this is the only platform other than the AGM, that brings together fellows from all disciplines to participate in discussions on topics of general interest.

We have come a long way since our birth, but there is still so much more to do! We need to get our young ones to be curious and interested in science and mathematics, and later to take up one of the branches of science and technology as their career. This will open up a whole realm of new possibilities and opportunities.

MAINSTREAMING SCIENCE, TECHNOLOGY AND INNOVATION

Mega Science



The government's efforts in thinking about the new economic areas Malaysia in not relying on agriculture, manufacturing, and oil and gas as our economy's sources of revenue, the ASM was took the foresight initiative including the Mega Science studies play an important role in identifying new niche areas for R&D that would create value in the new economy.

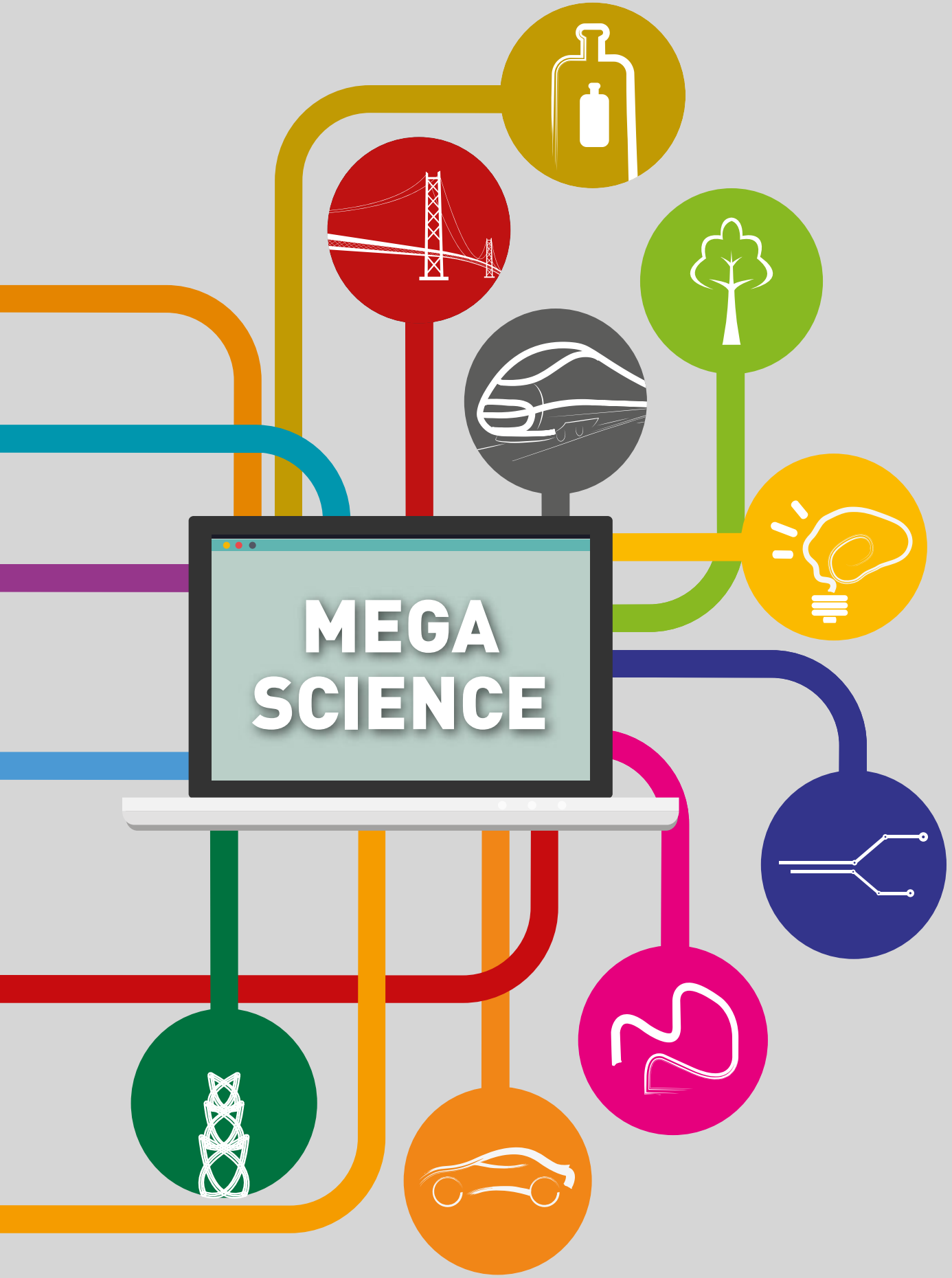
The five sectors that were studied such as Furniture industry, Automotive Industry, Creative Industry, Tourism Industry, and Plastics and Composites Industry in MS 3.0. A total of 460 participants from various government agencies, Academia, the private sector, NGOs, and ASM fellows participated in the 19 workshops held nationwide in 2015. In the final analysis, various recommendations to enhance numerous industries were presented to the Government, to work towards a brighter and more sustainable future.

Cybersecurity

ASM's Cyber Security Study has been instrumental leading up to the government's recently launched Malaysia Cyber Security Strategy (2020-2024) and ensuring a safe and secure cyber environment.

In the World Economic Forum (WEF) Global Risks Report 2021, among the 5 biggest risks facing humanity in 2021 is a failure of cybersecurity measures. These days, we are seeing large-scale cyber attacks that could potentially inflict severe damage on physical and digital infrastructure. Cyber security is not merely an information technology issue but one that affects national security. Hence, there is an urgent need to protect our cyberspace and infrastructure.

ASM embarked on the Cyber Security Study in 2016 and the report was first published in 2017 and updated the following year. It was presented to the National Science


MEGA
SCIENCE

Council NSC in 2017. This advisory report addressed the challenges in legislative, regulatory and enforcement of cyber-based criminal cases. The report also addressed cybersecurity issues in a holistic manner, taking into account the cybersecurity landscape in Malaysia as well as global outlook.

One of the indicators for cyber threats is malware propagation and evolution. In 2015, Malaysians experienced around 5,000 ransomware attacks or the equivalent of 14 attacks per day. In 2016, according to Symantec Corporation, Malaysia ranked 47th globally, and 12th in the Asia Pacific and Japan region, in terms of ransomware attacks.

In achieving a safer cyberspace, careful design, development and implementation need to take place at every layer of any interconnected network devices, regardless how miniaturised or large scale the solution is. The strategy needs to come from the top which then relies heavily on governance and enforcement at a national level to facilitate a concerted effort in creating and maintaining a healthy cyber ecosystem.

Most of the recommendations in the report have been taken up in the Malaysia Cyber Security Strategy (2020-2024), a comprehensive strategy to mitigate evolving cyber threats through an integrated approach and an effective model of public-private partnership.

This strategy, launched by Prime Minister Tan Sri Muhyiddin Yassin in September 2020, has been formulated to control the growing cyber threat that has been plaguing the country in recent years. In his speech for the launch, CEO Ir. Mohd Shah Nuri Md Zain of the National Cyber Security Agency (NACSA), Malaysia had thanked ASM for its Cyber Security report which he said served as a major input to its own Cyber Security strategy development.

Malaysia 2050: Foresight Narrative Looking Beyond

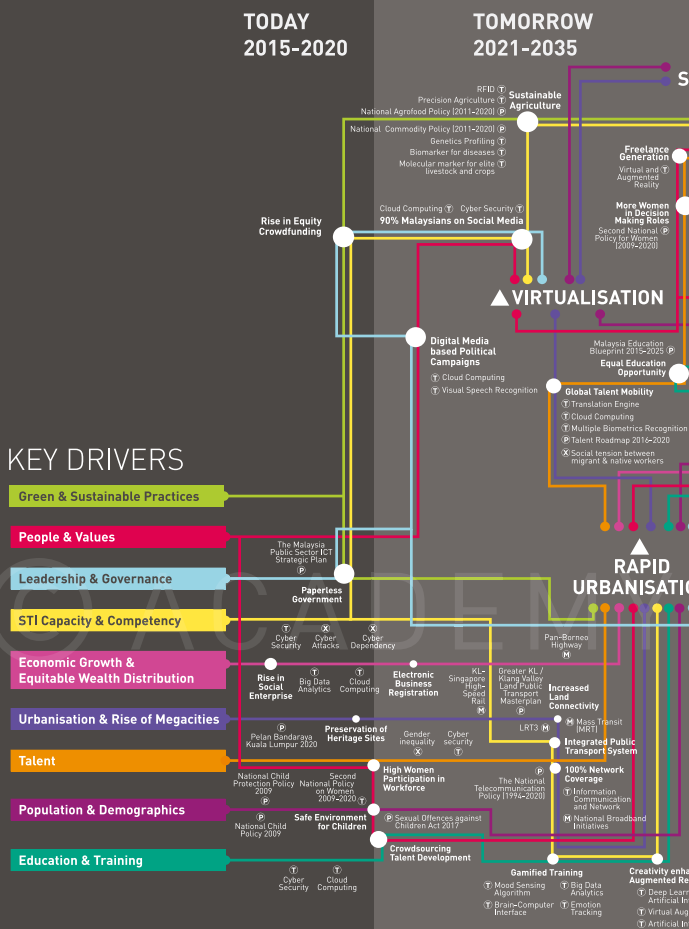
By using foresight and futures thinking, the Foresight Initiative was set in motion in 2015, to propel Malaysia towards a harmonious, prosperous and sustainable 2050.

The Foresight Initiative by the Academy of Sciences Malaysia (ASM) brought together nine national Think Tanks and institutions to form a Foresight Alliance and carry out a study that was based on an integrated and interdisciplinary approach.

The Foresight study commenced in February 2015 and involved 10 steering committee members – 11 ASM analysts, a four-member Science and Technology working group (40 members), Economics & Finance group (10 members), Governance & Geopolitics group (5 members) and Society & Culture group (10 members). There were 40 stakeholder engagements conducted including workshops, training focus group discussions and talks. More than 400 organisations and 2000 experts were involved in surveys, interviews and focus group discussions as well.

This initiative presented an opportunity for stakeholders to embrace a forward-looking, realistic paradigm for strategic planning with foresight or futures thinking. Nine key drivers were identified to steer the nation towards becoming a Progressive Malaysia 2050.

The objectives of the Foresight Study were threefold – to position, stream and leverage on science, technology and innovation (STI) for the socio-economic development of the country, to develop a shared vision and to strategise and realise a desired future.



The Journey

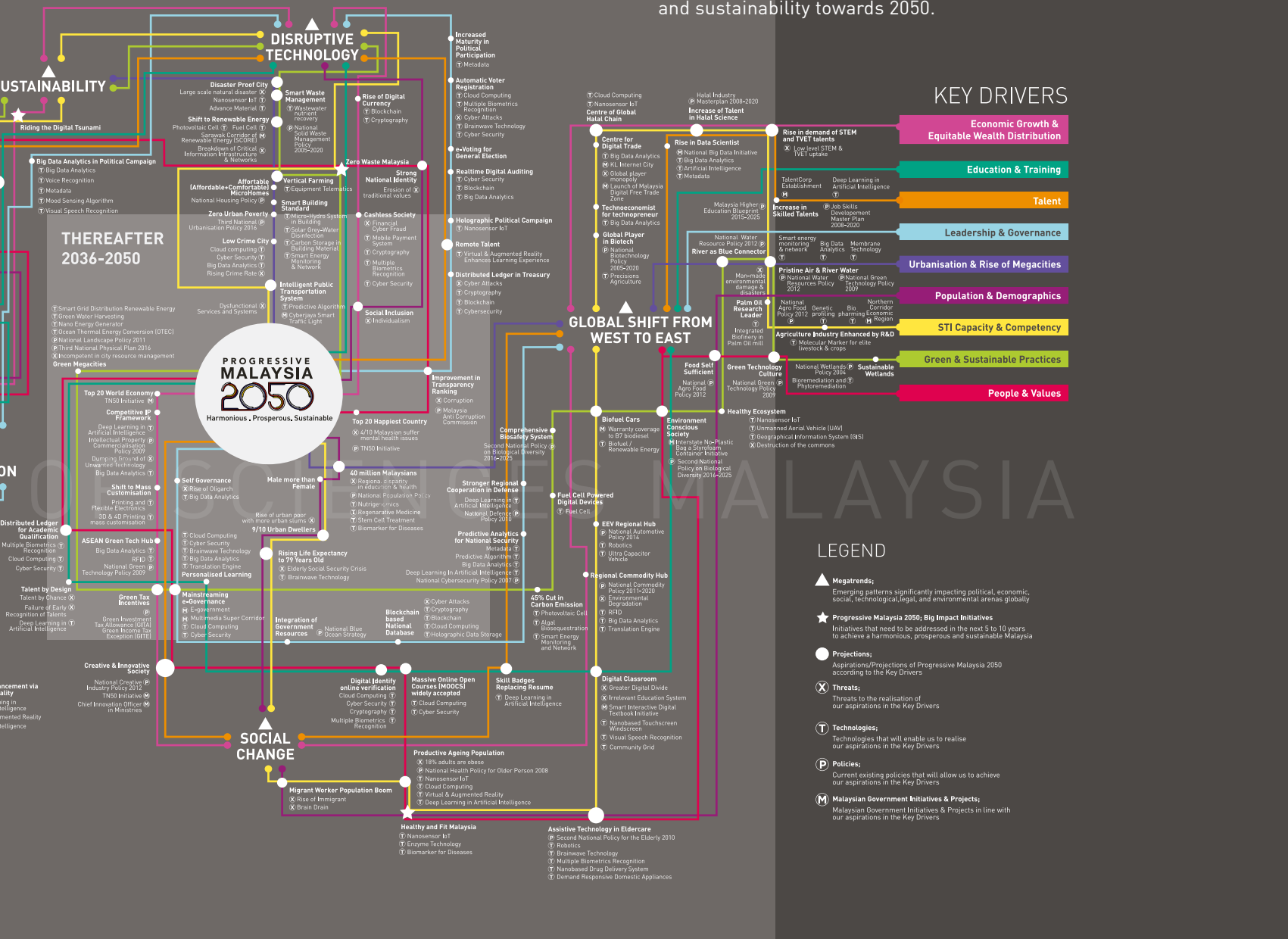
The study was conducted in several stages. At the start, a divergent thinking approach was adopted to generate

multiple ideas by exploring a broad spectrum of the different facets of the nation. The collaborative partnership of the Foresight Alliance and strategic partners addressed four different components included Economy & Finance (conducted by a team from the Faculty of Economics and Administration of the University of Malaya), Society & Culture (conducted by a team from the Institute of Integrity Malaysia), Geopolitics (conducted by a team from the Institute of Strategic and International Studies or ISIS Malaysia) and lastly, Science &Technology, which was conducted by a team from ASM.

During the second stage, the Foresight Initiative adopted a convergent thinking approach where the findings from the respective components were narrowed down based on commonalities, level of impact and degree of uncertainty.

Then came stage three, an analytical thinking approach was adopted to build several plausible scenarios for Malaysia towards 2050.

Finally, a prescriptive thinking approach was adopted and presented recommendations to the Malaysian government so it could start working towards having the right balance between social harmony, economic growth and sustainability towards 2050.



Monitoring and Evaluation of the STI Ecosystem

Science Outlook is a flagship study of the Academy of Sciences Malaysia that aims to present insights supported by relevant data on Malaysia's science, technology and innovation landscape.

The Science Outlook 2015 (SO2015) was launched by Datuk Seri Panglima Wilfred Madius Tangau, then Minister of Science, Technology and Innovation (MOSTI) on 17 Dec 2015.

It presented an independent analysis and consolidated report on key science, technology and innovation (STI) trends and development in Malaysia and provided a reality check based on six strategic thrusts of the National Policy on Science, Technology & Innovation (NPSTI), which were STI Governance; Research, Development and Commercialisation; STI Talent; Energising Industries; STI Enculturation; and Strengthening International Alliances.

SO2015 forwarded 18 recommendations to mobilise action on several critical areas. Six working groups, dedicated to six areas of STI, were formed. These groups comprised 22 analysts, three data analysts, writers and one chief editor.

Carrying the theme "Converging towards Progressive Malaysia 2050", SO2017 was a continuation of the 2015 report, this study consisted of six working groups (including five experts, nine steering committee members, 22 analysts, four research assistants and eight writers) with the involvement of 68 ministries/agencies/organisations, 77083 participants via survey, focus group discussion and interviews (see infographic).


2015
SCIENCE OUTLOOK
action towards vision
2017
SCIENCE OUTLOOK
Academy of Sciences Malaysia
2020
SCIENCE OUTLOOK
Academy of Sciences Malaysia

Both SO2015 and S02017 were aimed at reviewing the Malaysian STI landscape and to test our preparedness to achieve STI targets as the country aspires to emerge as a developed economy.

Towards establishing SO2015, ASM adopted a three-pronged approach for data collection and analysis. It explored national archives and knowledge centres to verify and establish various performance indicators. It then engaged with ministries, agencies, media, academicians and others. Finally, it analysed local and global trends and best practices to address the gaps and arrive at recommendations.

The process of completing SO2017 centred on the collection of both primary and secondary data based on the specific outline of each focus area. Two-pronged stakeholder engagement exercises were carried out to extract relevant information and to encourage early buy-in.

SO2015 was the first evidence-based report that put the Malaysian STI landscape under the spotlight. Out

of the total of 18 recommendations made in SO2015, 11 of the forwarded recommendations were addressed and tackled directly or indirectly by the Government through 16 initiatives and programmes that had been carried out.

The SO2015 was tabled at the first National Science Council meeting in 2016, deliberated during Parliamentary debates, quoted by international reports and covered in 27 news articles and broadcasts. 216 hard copies of the study were disseminated and online it recorded 934 reads as well as 487 reach on various social media platforms. It was broadcasted internationally in Singapore, Vietnam, the United States, Canada and Brazil, and cited in four local publications/articles.

Out of 18 recommendations put forward in SO2017, 15 were taken up. There have been 146 hard copies disseminated, 901 online reads and 9547 reach on various social media platforms, as well as cited in three local publications/articles.

Conduct of the Study

Inclusive input from members of Parliament, scientific community, academia, industry leader, international STI organisations, STI professional bodies and NGOs

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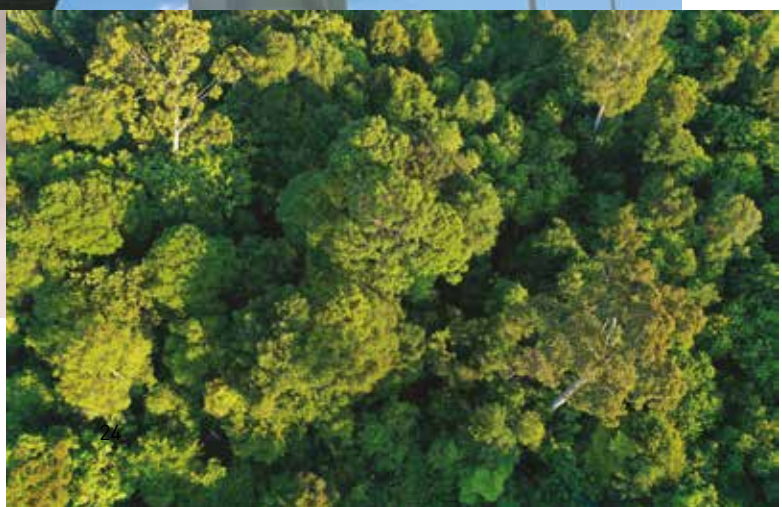
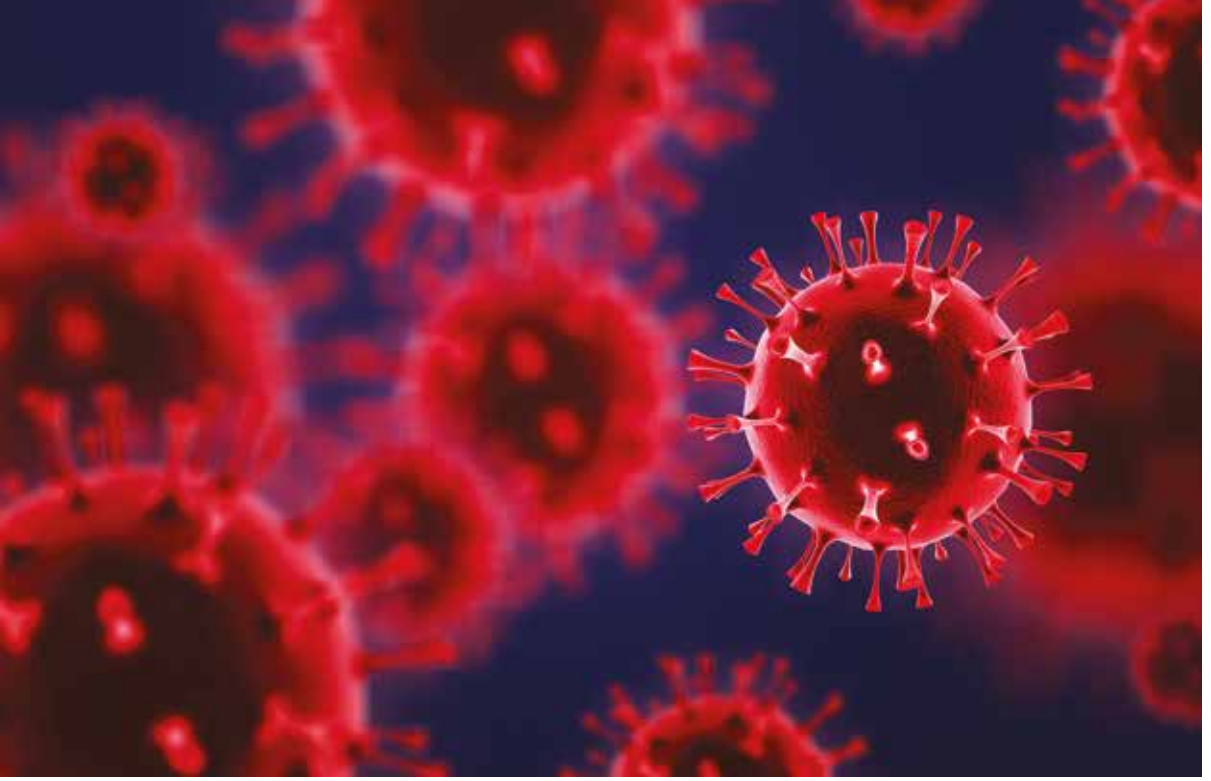
Exploring emerging and cross-cutting areas in STI





We have embarked on establishing Special Interest Groups (SIGs) to explore emerging, cross-cutting areas of importance to Malaysia in terms of realising economic growth, societal advancement, competitiveness, future focus and sustainability. SIGs are expert-driven and proactive in bridging the gap between the generators and users of knowledge to forge collaborative and transformative action so Malaysia can be ahead of the curve.

HYDROGEN ECONOMY

Green growth is gaining traction in the quest for a more sustainable society. Similar to countries across the globe, Malaysia is committed to a low-carbon energy future. This prompted ASM to establish a Special Interest Group on Hydrogen Economy, helmed by Professor Dato' Ir Dr Wan Ramli Wan Daud FASc. This SIG has developed a holistic, evidence-based position paper outlining the opportunities and challenges for Malaysia to venture into hydrogen economy.

A complete supply chain of hydrogen economy, from hydrogen production, storage and transportation to applications, was discussed. The most feasible hydrogen technologies for Malaysia, such as electrolysers and fuel cells, were highlighted. Action plans were proposed for the 12th Malaysian Plan and beyond to build a conducive ecosystem for Hydrogen Economy in Malaysia. Four key aspects of the ecosystem, i.e. governance, public and market acceptance, technical and human capital readiness as well a finance readiness were addressed.

MACHINE LEARNING

Chaired by YM Academician Tengku Datuk Dr Mohd Azzman Shariffadeen FASc, the ASM Special Interest Group on Machine Learning (SIGML) was tasked to formulate a position paper on the important role that AI will play in Malaysia's development and proposed key recommendations, based on Malaysia's economic strengths and data gaps, that will take the nation on a fast trajectory of adoption and deployment.

The position paper calls for the following overarching recommendations to build an enabling data ecosystem for homegrown AI solutions which are:

1. To call for a strategic National STI-focused AI Roadmap to shift Malaysia to a new way of looking at knowledge through AI for economic and social benefits.
2. To propose the establishment of a National AI Committee to coordinate all national level STI related AI projects under the auspices of the National Science Council.
3. To institute a national Data Czar role and data governance framework to ensure an enabling data

ecosystem for enhanced accessibility to non-sensitive public and private data towards value creation.

4. To establish an "AI Makerspace" that would leverage existing collaborative platforms to develop homegrown AI solutions in the four identified focus areas: (i) Smart Cities, (ii) Digital Manufacturing, (iii) Precision Agriculture & (iv) Connected Healthcare
5. To equip Malaysia's talent pool to have competencies and skill sets to deploy AI technology and applications.

PRECISION BIODIVERSITY

The COVID-19 pandemic brought into sharp focus how vulnerable humankind is to the impact of changes to the ecosystem, natural environment, and biodiversity. It indicates our failure in controlling zoonosis and in biodiversity preservation efforts. Malaysia is ranked as the 12th most biodiverse country in the world. However, Malaysia registers an alarmingly poor biodiversity status. Its Ecological Footprint Consumption is between 3.5 - 5.25 global hectares which is much worse than other Southeast Asian nations.

Following this, SIG on Precision Biodiversity formulated PBD a next generation approach to better conserve, preserve, and manage biological resources in Malaysia. PBD uses advanced technology platforms for protection of the planet as well as for socio-economic returns.

The major drivers for this approach are advances in:

- Computer and communications technology such as AI, ML, robotics, drones, IoT
- Biotechnology such as cloning, omics, gene editing and synthetic biology

When applied correctly, PBD reduces uncertainties in managing natural resources. It will also help to ensure optimum deployment for profitability, sustainability, and protection of the environment.

COVID-19

The COVID-19 pandemic has led to exceptional socio-economic impact and changed the lives of 7.8 billion people all over the world including Malaysia. In its efforts to facilitate public's understanding as well as to provide accurate information on the pandemic, the SIG published 11 factsheets and expert reviews that addressed various facets of COVID-19 such as diagnostics, epidemiology, therapeutics, and vaccines in easily understandable formats. While addressing COVID-19 and future pandemic, the SIG is preparing a position paper that analyses and identifies the strengths and weaknesses of the current procedures in managing the COVID-19 Pandemic.

ZOONOSIS

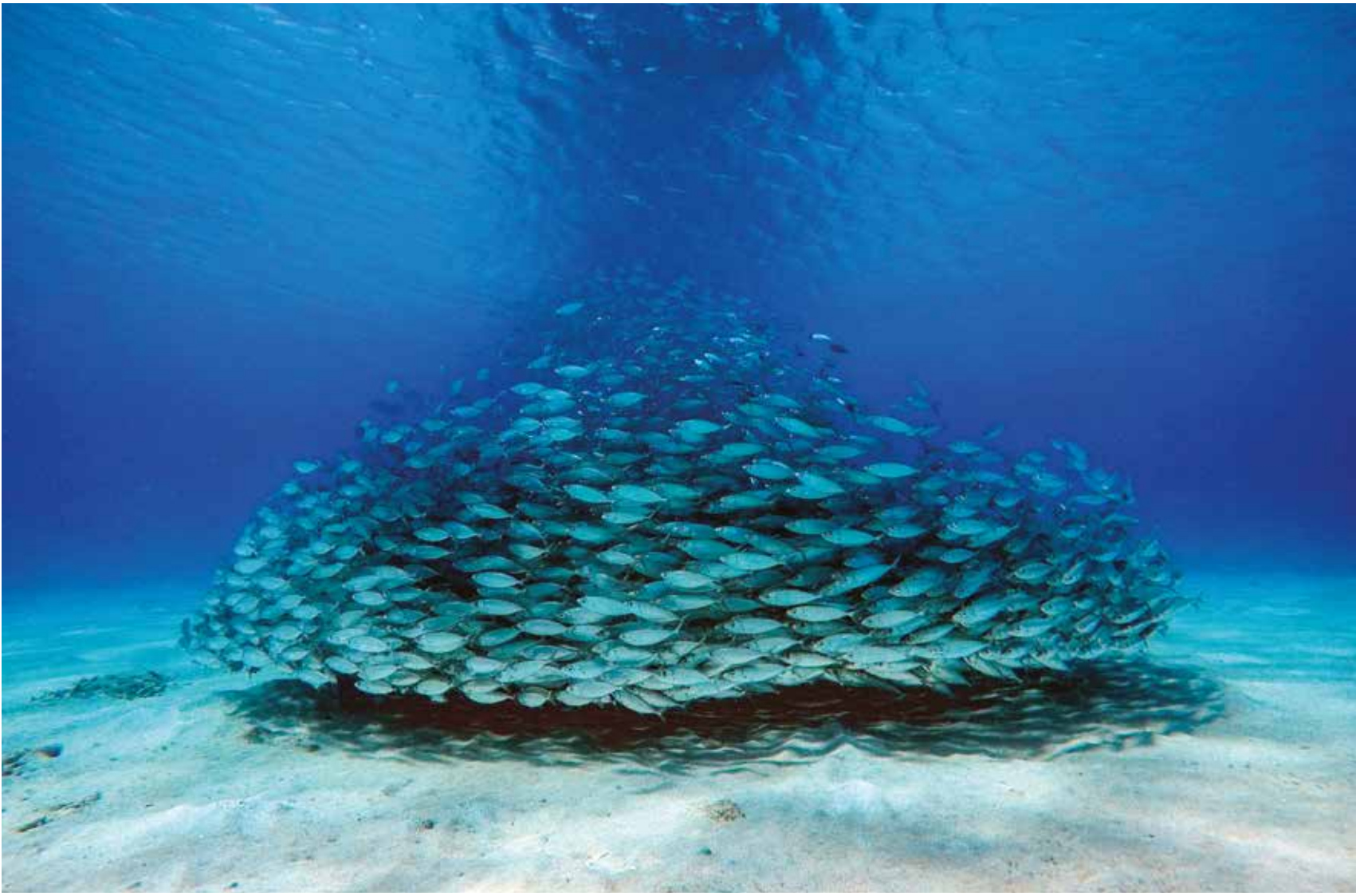
Zoonotic diseases have been an important concern to mankind since the beginning of the domestication of animals 10,000 years ago. It is responsible for an estimated 2.5 billion cases of human illness and 2.7 million deaths worldwide each year. In Malaysia itself, several zoonotic diseases have impacted the country before the COVID-19 pandemic, such as Nipah virus, SARS, H5N, H1N1, H7N9 and Zika virus.

Therefore, to better prepare of any possible infectious diseases in the future, it is vital for Malaysia to improve local capacity and understand the zoonoses transmission, its threats to human health, and approaches to minimise the damage of future outbreaks.

ROBOTICS

Robotics is a key driving technology, which underpins a whole new generation of autonomous devices and cognitive artefacts towards a seamless interaction with the world, socio-economic development, competitiveness, and advancement of the nation. It positively influences every aspect of life, raises efficiency and safety levels, and provides enhanced levels of service.

The global robotics revenue, including industrial and non-industrial segments, is forecasted to reach USD 248.5 billion annually by 2025, up from USD 48.9 billion in 2018. Therefore, it is important for robotics



development and application to be given priority towards driving Malaysia's development and advancement.

BLUE ECONOMY

Blue Economy has been among the important agenda of most countries in the world, aligned with SDG 14: Life Below Water. Due to its huge potential for socio-economic development, the global ocean economy was estimated to reach USD 3.0 trillion by 2030.

Blue Economy offers tremendous potential economic value and prospects for Malaysia.

As a maritime nation with extensive coastal and marine ecosystem rich with biodiversity, and around 70 percent of its population living along 4,800 kilometers of coastline, it is important for Malaysia to understand the Blue Economy concept. A sustainable, holistic, and informed governance structure is also needed to balance conflicts between marine resource use, habitat recovery and area development. Such an approach is important in identifying some of the key challenges its adoption poses and suggesting some broad next steps to ensure its implementation.

FORTIFYING THE SUSTAINABILITY FRONTIER

Sustainability Science

Water Sector Studies

In December 2016, the Academy of Sciences Malaysia (ASM), as a thought leader in science, technology and innovation (STI), published a two-Volume Report, entitled Transforming the Water Sector: National Integrated Water Resources Management Plan (NIWRMP): Strategies and Road Map, which provides detailed strategies and a Road Map for the managed implementation of the nation's water resources in line with the IWRM principles expounded in the 1992 Dublin Statement. IWRM was formally adopted by the Malaysian Government since the turn of the century and is also an integral part of the National Water Resources Policy (NWRP) launched in March 2012. The NIWRMP report was officially submitted by ASM to the Government in early 2017. The NIWRMP Road Map accompanying the report comprises a detailed list of strategies broken down under four discrete elements, namely, Enabling Environment, Institutional Framework, Management Instruments, and Investments in Water Infrastructure, for implementation by relevant water related Ministries consistent with their respective mandates. Conforming to the General IWRM Framework to ensure balanced development, the strategies were further listed under 2 distinct categories, namely "Water as a Resource" and "Water for Livelihood".

Water sector Transformation 2040

The Roadmap for the National Agenda on Water Sector Transformation 2040 (WST2040) Development Study is the culmination of the water sector studies carried out by ASM since 2008. ASM's contribution to the water sector was recognised by the Economic Planning Unit (EPU) when several members of the ASM Water Committee were invited to be members of the drafting committee for the Twelfth Malaysia Plan Strategy Paper on Water Sector Transformation. Subsequently, based on ASM's experience and expertise in undertaking various studies related to Malaysian water sector and our wide network of expertise & fellows, ASM was appointed as a strategic partner to undertake the study and entrusted with the responsibility to develop a roadmap towards 2040 that would transform the national water sector from one that empowers the economy to one that is dynamic and able to contribute more significantly to the country's Gross Domestic Product. This dynamic role as a new economic sector will not only directly enhance employment opportunities in the water sector but also forge the nation's science, technology and innovation development. The 20-month commissioned study commenced on 2 May 2020 and is to be completed by 31 December 2021, involves around 250 individuals from various agencies, divisions, ministries, organisations and industries.

Sustainable Mining: Rare Earth, Bauxite

In a report commissioned by ASM entitled Revitalising The Rare Earth Mineral Industry In Malaysia: A Strategic Industry, it was pointed out that Malaysia's aspiration to become a high-in come nation is very much dependent on the success of its involvement in high technology and green technology. Whilst it is true that many high-income nations do not have RE mineral industry in their own backyard, it can also be said that they have now realised that they are heavily dependent on the RE raw material producers. Realising how critical it is to have a secured supply of RE raw materials and how vulnerable their high technology industries (and their economies) are to such supplies, these countries have embarked on exploration programmes and outward investments to hedge against future threats.

In another ASM publication, A Blueprint for the Establishment of Rare Earth Industries in Malaysia – A New Source of Economic Growth, it was highlighted that the opportunity exists for Malaysia to become a centre for the manufacturing of RE permanent magnets, phosphors, lasers, and oil-refining catalysts. In order for that to come about, Malaysia must first produce domestically or acquire control over the minerals from which critical RE scan be extracted. It will then be necessary for the Malaysian industry to learn how to extract the desired RE elements from these minerals, separate the individual REs from each other and purify them to a level for industrial use. At this point, the separated and purified REs, a valuable group of commodities with a global market, will be in production and be able to be sold globally "as is." The next step in the creation of a domestic Malaysian

RE supply chain will be the creation of a domestic industry that produces, from the separated and purified individual rare earth elements, the individual high purity RE metals, alloys (for magnets and steelmaking),phosphors, and fine chemicals for the production of lasers, medical equipment, industrial equipment, and fluid cracking catalysts (for the oil refining industry). These "raw materials" produced at this stage will also be saleable into the global high tech market "as is." Finally, a domestic Malaysian high-tech consumer and industrial end-use product industry will be created to manufacture and supply RE permanent magnets to the OEM automotive industry, the aerospace industry, the power generation industry, and the consumer portable electronic industries. Many of these industries already exist in Malaysia, such as OEM automotive and computer hard-disk drive manufacturing. These industries would be the large end-users of RE permanent magnet based components, such as electric motors and generators. The existing domestic Malaysian end-users of RE-enabled products will give the domestic RE component manufacturers a solid market anchor.

Studies On Renewable Energy

- Review of EQA 1974, Update to Environmental Protection Act
- Feasibility Study on Transboundary Pollution Act (TPA)
- Disaster Risk Reduction (DRR)
- Sustainability Science/Fortifying the Sustainability Frontier

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Disaster Risk Management

Thanks to DRR Research Alliance, key researchers connect and collaborate on issues related to disasters.

The topic of disaster risk reduction and climate change is central to ASM as reflected by the establishment of the Disaster Risk Reduction Research Alliance Committee (DRR Research Alliance) to support the scientific community in Malaysia in 2017. The alliance serves as a platform to bring together key researchers and other stakeholders who are working in silo to connect, communicate and collaborate on issues related to disasters and their drivers such as climate change and to conduct flagship projects led by ASM.

On the 5th and 6th of October 2017, ASM co-hosted the inaugural National Conference on Science, Technology, and Innovation for Disaster Relief with the National Disaster Management Agency (NADMA) to promote dialogue between researchers, policymakers, practitioners from government, civil society, and industry on disaster management.

In 2018, the DRR Research Alliance met twice and key achievements were as follows:

- Papers from the inaugural National Conference on Science, Technology and Innovation for DRR to be published in the ASM Journal in 2019.
- Collation of inputs on the proposed National STI Plan for DRR from scientists engaged in DRR research in the country, where comments obtained have been channelled to NADMA Malaysia.
- Develop plans to highlight Malaysian DRR initiatives at the global level by convening two strategic conferences in Malaysia with NADMA Malaysia, SEADPRI-UKM, UNISDR and other partners.
- Exploration of collaboration with the International Science Council Regional Office for the Asia Pacific (ISC-ROAP) via ASM, to establish open-access data on DRR to support community based early warning, drawing on S&T.

El-Nino - A Review of Scientific Understanding and the Impacts of 1997/98 Event in Malaysia

The prolonged drought induced by the 1997/98 El Niño event in Malaysia had caused significant impact on the nation's environmental, social and economic sectors. The 1997/98 El Niño was regarded as one of the strongest El Niño-Southern Oscillation events in recorded history.

This study assesses the impact of El-Niño on the following sectors: Water resources, Energy, Agriculture, Forestry, Industries, Marine and terrestrial ecosystems, Air quality, Health, Education and Tourism.

Despite the escalating impacts of drought including South-East Asian countries, can effectively respond to and cope with these events. There is a lack of emphasis on the development of national policies and response measures for drought risk reduction based on the best available data.

In addition, the lack of human and institutional capacity to cope with drought is also needs to be addressed. These shortcomings were fully exposed during the 1997-1998 transboundary haze event that seriously affected the South-East Asian countries.

AKADEMI SAINS MALAYSIA

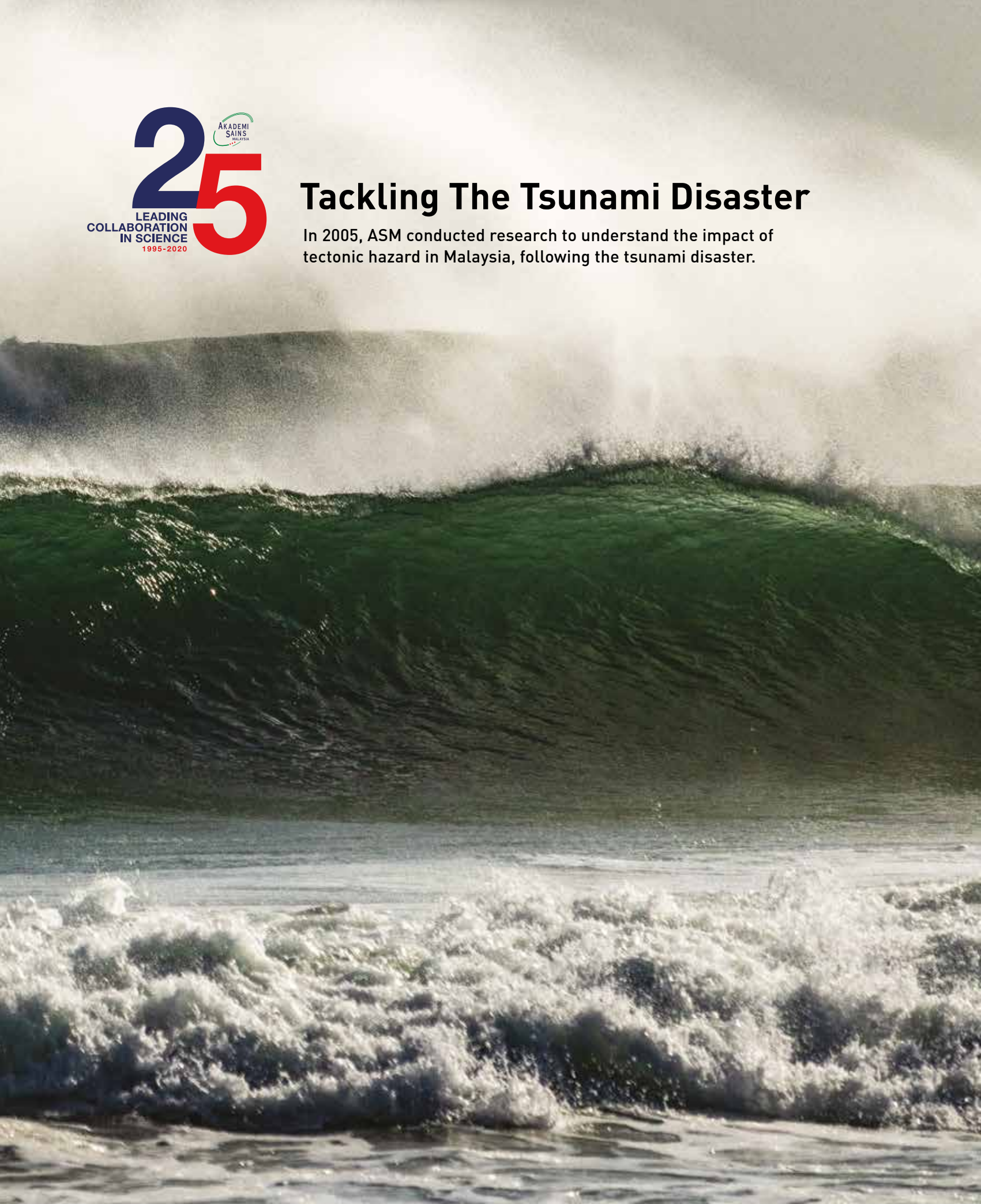
25

LEADING COLLABORATION IN SCIENCE

1995-2020

Tackling The Tsunami Disaster

In 2005, ASM conducted research to understand the impact of tectonic hazard in Malaysia, following the tsunami disaster.



December 2004, an earthquake struck off the coast of Sumatra island, Indonesia, setting off the Indian Ocean tsunami, also known as the Christmas or Boxing Day Tsunami.

Resulting from this disaster, YB Minister of Sciences, Technology and Innovation requested (ASM) to conduct research to understand the situation and impact of tectonic and seismic hazard in Malaysia. This research was carried out to provide input to national strategy and policy.

NATIONAL WORKSHOP: Tsunami and Earthquake Hazard Mitigation: Considerations for Malaysian Planning Design & Construction Practice

ASM and the Housing Research Centre, Faculty of Engineering, Universiti Putra Malaysia organised a National Workshop on "Tsunami and Earthquake Hazard Mitigation: Considerations for Malaysian Planning Design & Construction Practice" on August 22 and 23, 2005 in Penang.

The workshop was attended by about 50 participants. The objective of the workshop was to present the potential hazards resulting from earthquakes or earthquake-related natural disasters in Malaysia and countries in the ASEAN region. It also discussed possible mitigation measures including the planning, design and others in other countries. The workshop discussed policies and regulations on earthquake hazard mitigation in Malaysia. The participants also had the opportunity to visit the tsunami-affected areas in Kuala Muda, Kedah.

Tsunami and Seismic Hazards and Risk Study in Malaysia

The Ministry of Science, Technology and Innovation had directed the ASM to undertake a study relating to the impact of earthquakes and tsunamis in Malaysia. Subsequently, ASM was appointed as the Project Manager for the Seismic and Tsunami Hazards and Risk Study project on 13 December 2005. The objectives of the project were to assess the seismicity in Malaysia. Among the agencies and universities involved in the study are the Malaysian Meteorological Department, Mineral and

Geoscience Department, Universiti Teknologi Malaysia, Universiti Sains Malaysia, and Universiti Putra Malaysia.

The expected deliverables to the Government will be a report containing an assessment of earthquake and tsunami hazards.

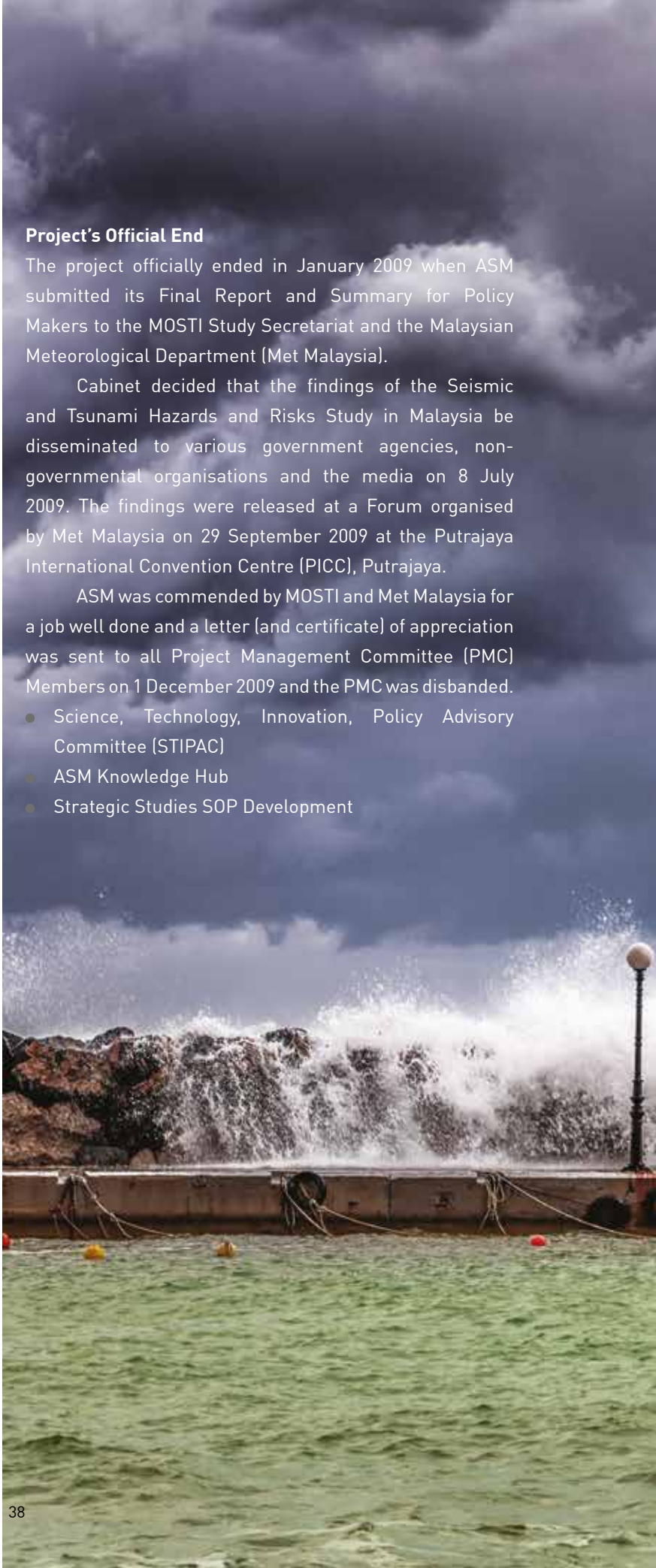
National Workshop on Seismic and Tsunami Hazards and Risks Study in Malaysia

Following an agreement signed at the end of 2005 between the Department of Meteorology Malaysia, representing the Government of Malaysia and the ASM took on the role of lead organisation in the "Seismic and Tsunami Hazards and Risk Study in Malaysia".

ASM organised a workshop in Kuala Lumpur; titled "National Workshop on Seismic and Tsunami Hazards and Risks in Malaysia", was held on 24 and 25 April 2006. A total of 17 technical papers were presented during the six sessions followed by an exhibition with the theme of 'Earthquakes and Tsunamis' was held in conjunction with the Workshop.

Policy and Planning Responses for Earthquake and Tsunami Hazards

- The ASM Council has agreed that Universiti Kebangsaan Malaysia (UKM) undertake an advisory project entitled "Policy and Planning Responses for Earthquake and Tsunami Hazards in Malaysia" for ASM. The study was to be completed by July 2008 and an Advisory Report would address the following:
  - Scientific understanding on the mechanism of tectonicity and seismicity in the Northern Sumatra and Sulawesi regions and how it affects the safety and long-term stability of Malaysian land.
  - GIS-based information on tectonic, seismic and seismic-induced hazards to the South East Asian region which pose potential risks to Malaysia that can be used for planning and policy responses.
  - Documentation on earthquake and tsunami risk analysis for Peninsular Malaysia and Sabah.
  - Recommendations on policy and planning for managing earthquake and tsunami risk in Malaysia.



Project's Official End

The project officially ended in January 2009 when ASM submitted its Final Report and Summary for Policy Makers to the MOSTI Study Secretariat and the Malaysian Meteorological Department (Met Malaysia).

Cabinet decided that the findings of the Seismic and Tsunami Hazards and Risks Study in Malaysia be disseminated to various government agencies, non-governmental organisations and the media on 8 July 2009. The findings were released at a Forum organised by Met Malaysia on 29 September 2009 at the Putrajaya International Convention Centre (PICC), Putrajaya.

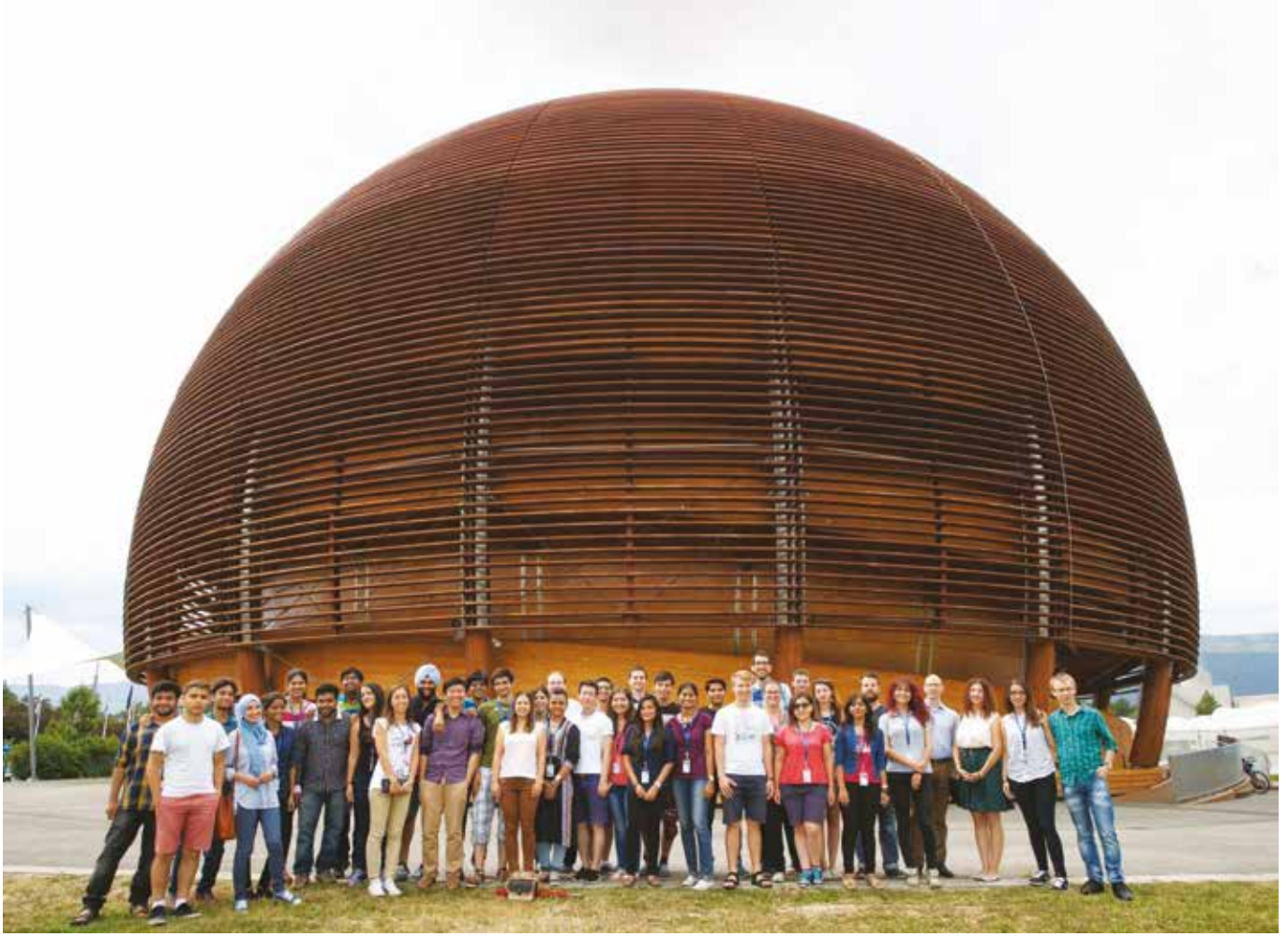
ASM was commended by MOSTI and Met Malaysia for a job well done and a letter (and certificate) of appreciation was sent to all Project Management Committee (PMC) Members on 1 December 2009 and the PMC was disbanded.

- Science, Technology, Innovation, Policy Advisory Committee (STIPAC)
- ASM Knowledge Hub
- Strategic Studies SOP Development


25
FORGING A CULTURE
OF SCIENCE
EXCELLENCE

National Nobel Laureate Programme

The National Nobel Laureate Programme sparked a lot of enthusiasm and spurred a concerted national effort to raise the level of Malaysian scientific excellence.



In 1998, then Prime Minister Datuk Seri Dr Mahathir Mohamed posed a challenge for the Malaysia scientific community to produce a Nobel Laureate by 2020. Two years later, the Academy of Sciences Malaysia (ASM) was tasked by Ministry of Science, Technology and Innovation (MOSTI) to recommend a plan of action with the aim of producing a Nobel Laureate by the year 2020!.

And so the National Nobel Laureate Programme story began. Initiated by the Malaysian Government under the 8th Malaysia Plan (from 2001-2005) and continued under 9th MP (from 2006-2010) the National Nobel Laureate Programme was implemented by ASM, with the support of the MOSTI.

The objectives of this programme were to catalyse excellence in Science, Technology and Innovation (STI) in Malaysia for national competitiveness and international recognition, to provide a platform for or to facilitate scientific exchange and collaboration (build networks and linkages with Centres of Excellence), and to develop high calibre scientists capable of contributing to the advancement of STI and gain international recognition (mentoring/benchmarking).

The National Nobel Laureate Programme was then initiated under the 8th Malaysia Plan with MOSTI acting as the funding agency, and ASM as the implementing agency. A total of RM8mil was allocated (RM3.5 mil from Eighth Malaysia Plan, RM4.5 mil from Ninth Malaysia Plan) for this programme.

ASM's strategy at the time was to achieve excellence in science and gain international recognition. When such a level of excellence was in place, producing a Nobel Laureate would then be a bonus. In 2001, ASM produced a study report entitled "Achieving Excellence in Science – the Nobel Path."

Several plans and projects were introduced under this programme. The Lindau Nobel Laureate Meeting, for example, was a national level selection for outstanding Young Malaysian Scientists to participate in the annual Lindau Nobel Laureate Meeting in Lindau, Germany. ASM had signed a Memorandum of Understanding (MoU) with the Lindau Council and the Lindau Foundation, in which it was agreed that Physiology & Medicine would alternate with Chemistry & Physics fields every year, with an interdisciplinary meeting every five years. ASM's

first participation was in 2004 and to date, 73 Malaysian participants have attended the annual Lindau Meetings.

From 1996 to 2009, several public lectures, scientific discourses and science motivation sessions were conducted in Malaysia, and graced by Nobel Laureates and other eminent scientists. Nobel Laureates hosted by ASM include Sir Aaron Klug (Chemistry 1982) in 1996, Prof Dr David Baltimore (Physiology & Medicine 1975) in 1997, Prof Dr Lee Yuan Tseh (Chemistry 1986) in 1998 and 2004, Prof Dr Werner Arber (Physiology & Medicine 1978) in 1999, Prof Dr Douglas Osheroff (Physics 1996) in 1999 & 2004, Prof Dr Peter Doherty (Physiology & Medicine in 1996) in 2001, 2003 & 2006, Prof Dr Leland Hartwell (Physiology & Medicine 2001) in 2004, Prof Dr Arthur Kornberg (Physiology & Medicine in 1959) in 2002, Professor Dr Ahmad Zewail (Chemistry 1999) in 2002, 2006 & 2007, Sir Harold Kroto (Chemistry 1996) in 2004 and Professor Dr Carl Wieman (Chemistry 2001) in 2004.

In 2002, Malaysia bid to host the travelling Centennial Exhibition of the Nobel Prize. ASM Secretary-General Dato' Seri Mazlan Othman FASc signed the official agreement with the Nobel Foundation, and Malaysia became the only country in South-East Asia, and the third in Asia, after Japan and South Korea, to host the exhibition in 2004.

The Centennial Exhibition, themed "Cultures of Creativity: Individuals and Milieus", was held at the Pusat Sains Negara held from March 20 to June 27 June and attracted around 310,000 visitors. In conjunction with this, six Nobel Laureates presented public lectures and orations. A special forum with researchers and a science motivation dialogue was held at six universities as well.

In 2006, the late Prof Ahmed Zewail (1946-2016) was conferred an ASM Honorary Fellow. The chemist born in Damanhur, Egypt, is known as the "father of femtochemistry". He was the recipient the Nobel Prize in Chemistry in 1999, while he was affiliated to the California Institute of Technology (Caltech) in Pasadena. Prof Ahmed earned his prize for his studies on the transition states of chemical reactions using femtosecond spectroscopy.

In 2007, ASM made a technical visit to world renowned Centres of Excellence (COEs) and STI institutions towards establishing scientific exchange and collaboration in R&D and human capital development.

In 2011, Prof Lee Yuan Tseh was conferred an ASM Honorary Fellow. The Nobel Prize in Chemistry in 1986 was awarded jointly to Dudley R. Herschbach, Yuan T. Lee and John C. Polanyi for their contributions concerning the dynamics of chemical elementary processes.

In 2012, via the study visits to COEs under the Lindau Nobel Laureate Meeting, ASM got in touch with the European Organization for Nuclear Research (CERN in Switzerland), one of the world's largest and most respected centres for scientific research, and an Expression of Interest (EoI) was signed between the two

organisations, enabling Malaysian undergraduates to attend CERN's annual summer camps. The first call for application to participate in the CERN Summer Student Programme (CSSP) was held in 2012.

From 2004 to 2008, a Scientific Advancement Grant Allocation (SAGA), which is research funding to support budding scientists with a proven track record in identified priority areas of fundamental sciences, totalling RM20mil was allocated for 88 projects.

Without a doubt, the National Nobel Laureate Programme has created awareness and branding for the Nobel Prize. It developed and enhanced visibility of high-calibre Malaysian scientists capable of international recognition. Malaysian scientists have gone on to become members of the research teams of Nobel Prize winners. And the programme has led to the establishment of the Young Scientists Network—Academy of Sciences Malaysian (YSN-ASM).

What's more is that the public lectures, scientific discourses and science motivation sessions by Nobel Laureates and other eminent scientists created a platform to increase interaction between the Malaysian scientific community, students and the general public, and Nobel Laureates as well as renowned scientists.

On top of all of this, SAGA's impact was quantifiable, with 617 publications in refereed international journals, 213 collaborations with STI Centres of Excellence or renowned research groups in fundamental sciences, 123 scientific findings, three patents filed, one patent obtained, one copyright obtained, 14 technology and knowledge corridors created and 30 utilised and obtained technologies.

International Conference

In 2012, the ASM International Conference (ASMIC) was held in order to identify strategic STI drivers to accelerate the socio-economic transformation of Malaysia and lead the nation into becoming a high-income developed economy by 2020.

ASMIC 2012 had the benefit of three keynote addresses by speakers from the United States, South Korea and Malaysia, and 13 plenary papers by both foreign and local speakers on two focus areas which were:

1. Strategic drivers for high income – learning from high-income economics
2. Maximising national assets for fast-tracking high-income growth

An open forum of eminent panellists from six sectoral groups consisting of manufacturing, plantation agriculture, IT, services, mineral resources and bio wealth was also held.

The presentations and discussions of ASMIC 2012 confirmed and strengthened the understanding of the ingredients needed for a high-income economy, and that Malaysia has the resources and capacity to deliver what is needed.

Global R&D Leaders & CEO Forum

With the theme "Injecting Soul into R&D", ASM organised the Global R&D Leaders and CEOs Forum in 2015. This inaugural forum was premised on the idea that it is time to move R&D beyond the pressures of commercialisation and business. R&D leaders and CEOs, visionaries and change-makers came together to pave the way forward to address the needs of the bottom billion.

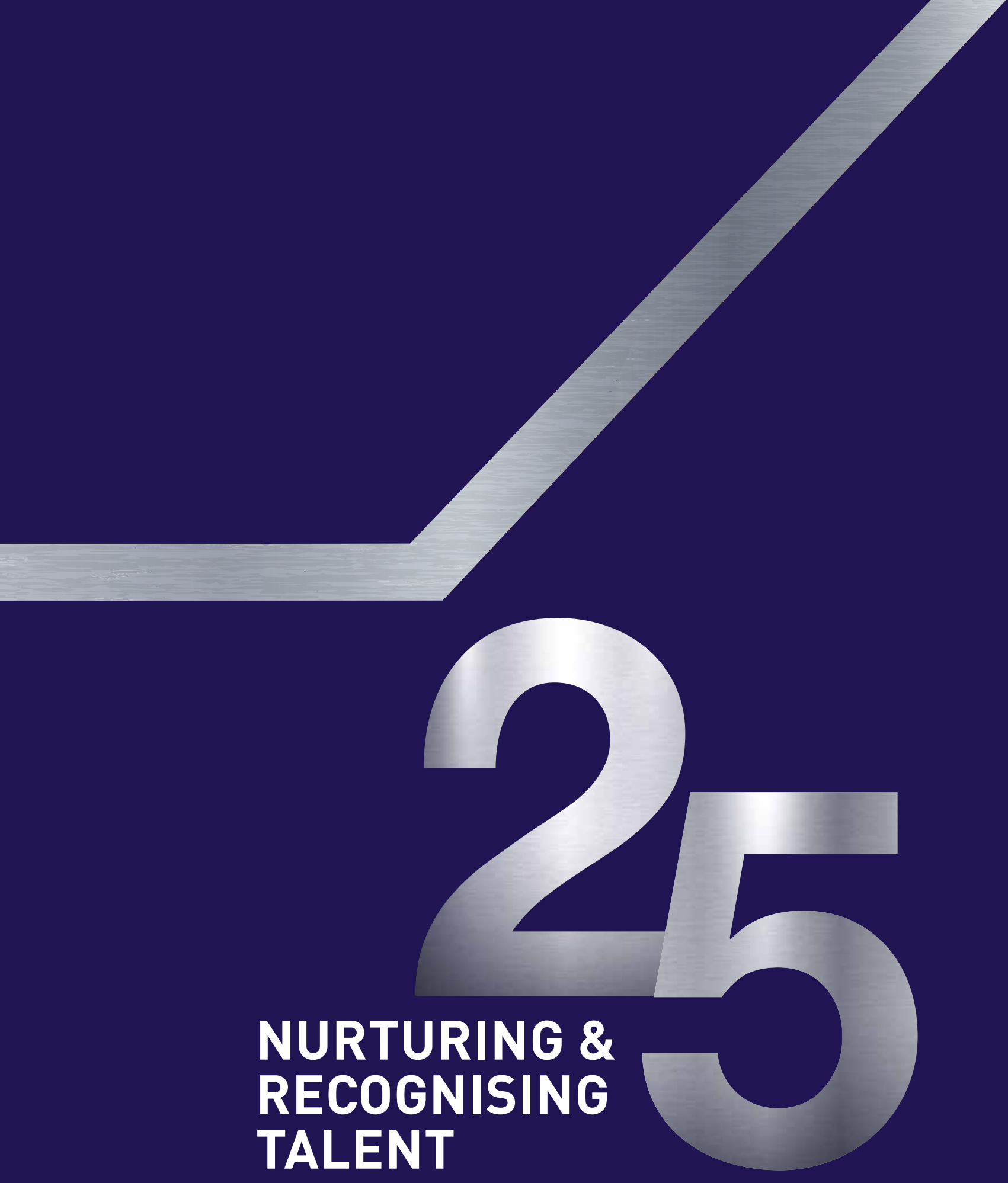
The two-day forum consisted of six sessions including how to leverage social innovation and entrepreneurship, technology sharing and sustainable financing. Several ideas were mooted for the way to venture forward including:

- A change of mindset at all levels of the quadruple helix (Government, Academia, industry and Community).
- Inculcate elements of social responsibility and a caring society at all education levels.
- Role models such as social philanthropists to lead the way to galvanise research that addresses the needs of humanity.
- To have champions at all levels of the quadruple helix to forge the agenda for soul-based R&D.
- Working with the bottom billion community to realise value creation for them as our "customers".
- A collaborative framework for enabling mechanisms at all levels to create value-based solutions.
- Create a proper governance structure for R&D such as the National STI Council to drive the agenda of the bottom billion.

International Conference on Science for Peace

The International Conference on Science for Peace was held in 2016. Took place in Kuala Lumpur, the conference was themed "More for Peace, Less for War" and officiated by His Royal Highness Sultan Nazrin Muizzuddin Shah, Sultan of Perak, who also delivered the keynote address which set the tone of the conference. His Royal Highness urged the use of STI for peace and not war in addressing the seven basic human needs for security and recommended that STI talents could contribute to the peace agenda through more dialogues and engagement with stakeholders using Science Diplomacy via education, communication and engagement.

The conference highlighted the role of the government of the day in setting the direction for S&T in the country. From prioritising critical research focus areas to power of authority in the use of science, the decisions that the policy makers decide upon have a long-lasting effect on the S&T of the country. By creating the right ecosystem for good S&T to flourish, we are able to reap the benefits of science for the good of humanity by boosting the economy, alleviate poverty and increasing inclusivity. We first need the right people with the right skillset and mindset. Quality talent in STEM is essential in driving the knowledge economy.


25
NURTURING &
RECOGNISING
TALENT

Nurturing Talent Through Training

Throughout the years, science and technology training programmes were key components of ASM.

The noble vision was for the Muslim world to rededicate themselves to master science and technology to ensure that they can face challenges of the new global economy.

From October 7 to 10 2003, the inaugural OIC Conference on Science and Technology took place in Kuala Lumpur, Malaysia. It was organised by ASM in collaboration with Ministry of Science, Technology and Innovation with the support of the Ministry of Foreign Affairs and the Organisation of Islamic Cooperation (OIC) Standing Committee on Scientific and Technological Cooperation (COMSTECH).

The conference was organised as a side event to the 10th session of the Islamic Summit Conference, which was held from October 11 to 18 2003 in Putrajaya. This conference produced the Resolution called "Kuala Lumpur Declaration on Science and Technology for Socio-Economic Well Being of the Ummah". It declared Vision 1441 as a vision for Muslim world to rededicate themselves to mastering science and technology to ensure that they can face challenges of the new global economy.

Vision 1441 was then adopted by the 10th Session of the Islamic Summit Conference. Seven key strategic thrusts in achieving Vision 1441 have been identified and these include "Capabilities and Capacities".

Under this thrust, six recommendations were made to strengthen Science, Technology & Innovation (STI) capabilities and capacities including the launch of STI management training course for senior personnel of STI institutions as well as those from the industry amongst OIC member countries.

Malaysia's commitment saw the country organising several science and training courses for OIC Countries.

From 2005 to 2015, as many as 11 eleven (11) STI Management Training Courses for Researchers in OIC Countries were organised under the Malaysian Technical Cooperation Program (MTCP), MOFA. These training courses will not only contribute towards developing the human capital of OIC countries but go a long way towards building greater people-to-people understanding among the Ummah.

Objective

Its objectives included sufficient theoretical insights on current trends in science and innovation management including the concept of a National Innovation System; science awareness; R&D commercialisation; technology transfer; public industry linkages and techno-entrepreneurship. Malaysia's best practices in STI Management was shared with participants.

Also included were skills on sound research management practices including the writing of research proposals and presentation of technical reports as well as activities aimed at fostering a creative and innovative organizational culture. It also provided opportunities to establish joint research collaborations among member countries.

Conclusion

Overall, there were 297 participants (101 Malaysian, 196 OIC countries). The training courses were essential in building networking and research collaborations

between researchers and scientists in OIC countries. Malaysian universities will be recognised by researchers and scientists in OIC countries. Malaysia's expertise and experts in STI will also be recognised among OIC countries. It also promoted Malaysia's best practices in STI management.

MTCP Global Geopark Planning and Development Workshop (2016 – 2018)

The Malaysian Technical Cooperation Programme (MTCP) was established in 1980 with the aim of providing technical assistance to developing countries.

Through MTCP Global Geopark Planning and Development Workshop, participants were exposed to fundamentals of Geopark including theories and practices. The Geopark concept arose in the mid-1990s as a response to the need to conserve and enhance the value of areas of geological significance. In November 2015, Geoparks became a full-fledged programme under UNESCO.

The protection and sustainable development of Earth's heritage and geodiversity through Geoparks initiatives contributes to the objectives of Agenda 21. This is the Agenda of Science for Environment and Development into the 21st century adopted by the United Nations Conference on Environment and Development (UNCED, Rio de Janeiro, 1992) and reconfirmed by the World Summit on Sustainable Development 2002 in Johannesburg.

In this regard, Langkawi UNESCO Global Geopark is Malaysia's first established Geopark.

Objectives

- To provide insights on theories, strategies, elements and issues related to Geopark management.
- To enhance knowledge and skills in the various Geopark Management approaches and techniques.
- To enhance awareness on Geopark management among the participants.

Conclusion

Overall, there were 62 participants who took part in the workshop. They were exposed to the fundamentals of Geopark including theories and practices. There was increased awareness of the importance of the area's geological heritage in history and society.

Participants learnt about how Malaysia manages Langkawi UNESCO Global Geopark, particularly when it comprises o99 islands. They also learnt about the spill over effects and creation of innovative local enterprises, new jobs and high-quality training courses through the development of Geoparks. They were able to assess and identify shortfalls in the management of Langkawi UNESCO Global Geopark and make constructive recommendations for improvement.

The National Science Challenge

The National Science Challenge is one of ASM's conscious efforts to build the capacity and capability, as well as nurture and cultivate the young generation's interest in science, technology, engineering, and mathematics (STEM).

ASM believes that the development of talent is by design and not by chance. A transformative approach formulated to attract the young generation's interest in STEM is absolutely necessary to intensify talent development.

NSC started from humble beginnings as a science competition where quizzes were distributed to schools across Malaysia, which was then manually marked by a team of dedicated staff members.

As the years progressed, the quiz utilised technology to conduct online quizzes for its participants, vastly reducing paper usage while increasing its reach to all corners of the country. Only students at the Form Four level of public secondary schools were allowed to participate at that time.

Schools (and then universities) were roped in to help

as the state level, where physical quizzes were conducted with much fanfare and support, adding the "fun factor" to the otherwise sterile competition.

The national level competition's aim has always been to take the students' noses off their textbooks to experience education in an informal setting. After all, education is more than just rote learning; it is also about creating a meaningful network of acquaintances and friends, building self-esteem and self-confidence, as well as seeing scientific theory in action.

Therefore, semi-finalists from each state were then transported to attend a week-long science camp, where they carried out pitching sessions, hands-on experiments, and prototype creation. These activities provide a glimpse into the lives of scientists. Along the way, knowledge was gained, communication skills were honed, and friendships were forged.

The peak of the competition is the grand final where the final four teams compete to win the Prime Minister's Challenge Trophy. Apart from the quiz itself, participants are exposed to science communication and design thinking skill modules curated by the Young Scientists Network-Academy of Sciences Malaysia (YSN-ASM). They are the brilliant minds behind coming up with the exciting content for NSC every year.

The YSN-ASM members come from diverse scientific background, possessing a variety of expertise, lending themselves to create a plethora of questions for the quizzes and crafting creative activities throughout the whole competition.

The YSN-ASM also served as academic mentors at the later levels of the competition, coaching the students on how to direct their scientific knowledge towards solving given challenges, and then communicate these ideas effectively to an audience.

The Ministry of Science, Technology, and Innovation (MOSTI) and the Ministry of Education Malaysia (MOE) have been instrumental in sustaining the competition's longevity through their support in the competition from the early years.

It is worth mentioning that the respective states' education departments were very much involved on the ground with ASM in coordinating the participation and execution of the National Science Challenge, particularly at the State Level.

Other than the ministry collaborators, industry players have also played an essential role in keeping NSC alive. These industry collaborators have been selected based on the theme of the NSC every year; together with ASM, they have moulded the content for the year's quizzes and projects, while also providing insight into the real-world application of STEM, plus identifying exceptional talents from within the competition for future grooming.

In addition to the above contributors, the Nobel Foundation was also an important link to the National Science Challenge by providing one of the main prizes for NSC: a trip to witness the Nobel Prize Ceremony in Stockholm, Sweden.

The National Science Challenge has withstood the test of time, having successfully evolved in its 38 years to fit the scientific landscape of the era in which it was organised. Throughout the years, NSC has successfully created a generation of STEM-loving students, many of whom have gone on to pursue an academic path and career in STEM-related fields.


25
MALAYSIA'S
GLOBAL
POSITIONING

International Science Organisations

INTRODUCTION

To carry out its role to its best capabilities, ASM requires a strong connection with other organisations worldwide. By building its global network, ASM could position more Malaysian researchers and scientists as experts to represent Malaysia in the international arena. Its global presence would attract strategic partners with shared interests and goals, thus developing bilateral and multilateral STI cooperation. With these connections in place, ASM connects the Malaysian scientific community at the international level; such presence could also showcase the nation's R&D in the global arena.

ASM first expanded its international reach with its collaboration in 1995 with the Royal Swedish Academy of Sciences. This initial collaboration was one of many stepping stones for ASM to carry out horizon scanning on the other international academies and bring them back to be implemented locally.

In 2017, ASM was approached by the International Science Council's Committee on Data for Science and Technology (ISC CODATA) to support the current global movement on Open Science. ASM worked hand-in-hand with ISC Regional Office for Asia and the Pacific to prepare a proposal to bid for funding from Asia-Pacific Economic Cooperation (APEC). Malaysia's realisation that it does not have a shared collaborative platform spurred a two-year study and landscape mapping, leading to the Malaysia Open Science Platform (MOSP) launch in 2019. This digitally connected platform allows for industries to tap into the research space's knowledge to enable open innovation. The MOSP is one of the many examples of how ASM takes what it learnt globally and tailors it to local settings, facilitating its scientific community to pursue excellence in science and technology.

The relationship that ASM fosters in the global arena allows it to create impactful collaborations to elevate Malaysian scientific initiatives to greater heights. The strength of ASM international collaboration lie within the network of 51 science academies and 22 international STI organisations worldwide. This network enriches the nation's capabilities, allowing ASM to fortify Malaysia's scientific agenda to be mainstreamed globally.

ASM is a firm believer in the "build inside, deploy outside" strategy. It entails strategising, positioning, building networks and platforms on home grounds for concerted action. To ensure successful implementation, we need to enhance stakeholders' understanding to increase political will at the national level. Realising its significance, ASM has established a partnership with AAAS and TWAS, two organisations that are leaders in the teaching of science diplomacy. These two organisations are leaders in training young scientists in the region. Science diplomacy efforts will remain sustainable if built to improve at the national level, translating to like-minded regional or global partners.

ASM's active participation in international meetings and conferences has resulted in international declarations and resolutions and the formation of regional platforms. In 2015, ASM embarked on the Envisioning Malaysia 2050: Foresight Initiative, a glance into the future we desire through shared insights and expert knowledge towards building a strategic vision for Malaysia. The initiative was initially carried out with Malaysia as its backdrop; the ASEAN region was targeted next. ASM plans to form the ASEAN Foresight Alliance and ASEAN Network of Young Scientist as part of its regional strategic interventions to build a future-proof region and nurture young scientists. ASM is also leading the STI capacity building among the APEC economies.

ISC ROAP

In 2005, ASM bid to host the International Council for Science's Regional Office for Asia and the Pacific (ICSU ROAP). The ICSU ROAP was launched by Deputy Prime Minister YAB Dato' Sri Najib Tun Abdul Razak in 2006. The mission of the Regional Office is to:

- Identify significant issues of importance to science and society
- Facilitate interaction among scientists across all disciplines and from all countries
- Promote the participation of all scientists in the international scientific endeavour, regardless of race, citizenship, language, political stance or gender
- Provide independent, authoritative advice to stimulate constructive dialogue between the scientific community and governments, civil society and the private sector

International Science Council
Regional Office for Asia and the Pacific

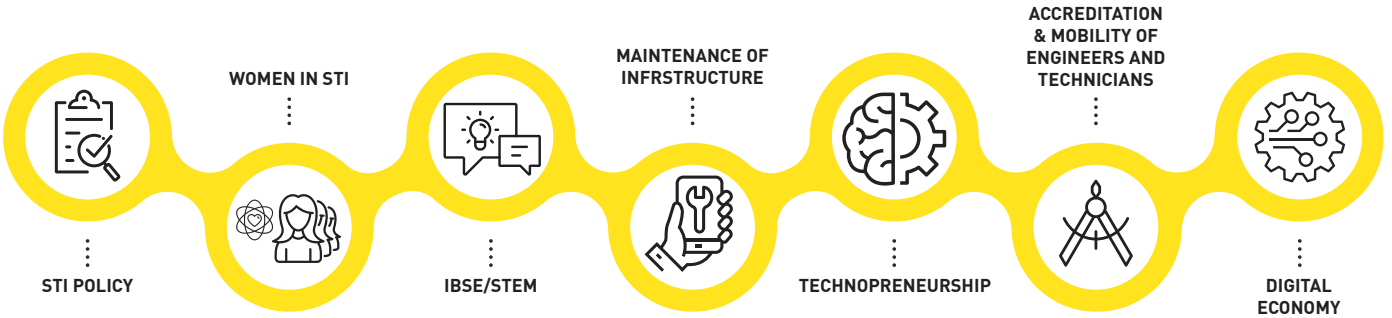
ASM has been actively involved in several InterAcademy Panel (IAP) platforms that touch the important SDG aspects such as Health, Poverty, Education. Apart from that, among 33 member countries, Malaysia has been selected to chair the International Institute of Applied Systems Analysis (IIASA) programme committee from 2018 to 2020, deriving regional collaborative research in addressing transboundary challenges such as haze and biomass.

ASM took international best practices through its horizon scanning exercise and assimilated them to fit local needs. Establishing connections with bodies such as the Nobel Foundation and CERN exposed young scientists to a new world of science beyond Malaysian shores. It introduced them to established scientists who can become their role models. This effort made ASM committed to sending young Malaysian scientists to Lindau Nobel Laureate Meetings and CERN Summer Student Programme every year. It also inspired ASM to establish its prestige award called the Mahathir Science Award Foundation (MSAF).

International Science, Technology and Innovation Centre for South-South Cooperation under the Auspices of UNESCO (ISTIC)

In 2006, UNESCO approached the MOSTI to host ISTIC, to which the Malaysian Government agreed. After due process, UNESCO and the Malaysian Government signed the Malaysia-UNESCO Agreement in UNESCO Head Office in Paris to establish ISTIC in Kuala Lumpur. ISTIC was formally launched on 22 May 2008. The Malaysian Government identified ASM as the most appropriate body to host ISTIC.

7 PRIORITY AGENDAS **HIGHLIGHTS OF PROGRAMMES**



STI = Science, Technology and Innovation
IBSE = Inquiry-based Science Education
STEM = Science, Technology, Engineering and Mathematics

LEADING COLLABORATION IN SCIENCE 1995-2020

International Networks: A Timeline

1995

In September 1995, executive director of ASM Dr Samsudin Tugiman visited the Royal Swedish Academy of Sciences, the Royal Swedish Academy of Engineering and the Royal Swedish Academy of Agriculture and Forestry. The purpose of this visit was to gather information regarding the structures of these Academies, their modes of operation, as well as the programmes and activities which could serve as useful input for the ASM.

1996

In June 1996, Dato' Ir Lee Yee Cheong FASc, secretary general and chairman of international affairs committee, visited the United States National Academy of Sciences (NAS) in Washington DC to discuss the possibilities of bilateral cooperation. He also visited the US Academy of Engineering.

1997

ASM was invited to attend a workshop on "Antarctic Science Beyond 2000" in April in Christchurch, New Zealand. The Academy was represented by Dato Dr Salleh Mohd Nor FaSc. Following the workshop a report ("Malaysia and Antarctica: A Proposal on Malaysia's Involvement in Antarctica") was prepared for submission to the Malaysian government through MOSTI, suggesting that Malaysia should be actively involved in and contribute towards the global knowledge

of understanding Antarctica. This resulted in a trip to the Earth's southernmost continent in November. A three-member delegation comprising Dato' Seri Ling Leong Sik (Minister of Transport), Gulam Hussein Gulam Haniff (from the Ministry of Foreign Affairs) and Dato Dr Salleh (ASM) went on a first official visit to Antarctica.

1999

In 1999, ASM had its first exchange programme with the Chinese Academy of Sciences (CAS) and Engineering, when engineers were sent to the Three Gorges Project in China. Ten scientists and engineers were attached with the Gorges Project to help Malaysia develop the Bakun Dam in Sarawak.

2000

ASM started its first scientific expedition on the Malaysian R&D Project in Antarctica.

2001

In 2001, ASM signed an MoU with the China Yangtze Three Gorges Development Project Corporation (CTGPC). A network with the Antarctica Treaty System (ATS) also kicked-off to a start. The Australian Antarctica Division extended an invitation to two Malaysian scientists to join their expedition at Scott Base in Antarctica. Source

2002

ASM first joined The Third World Academy of Sciences (now known as The World Academy of Sciences) (TWAS) 8th General Conference and 13th General Meeting on 13th October at New Delhi, India.

2003

Resource materials for teaching science in schools were produced by La main à la pâte in the French Academie des sciences in collaboration with the Academy of Sciences Malaysia with the aim of promoting and disseminating the inquiry-based science education programme to countries in the South-East Asian region.

The OIC (Organisation of the Islamic Conference) Summit was hosted in Malaysia and ASM was instrumental in forming the declaration of Vision 1441 for OIC countries

on Socio-Economic Well Being for the Ummah. Vision 1441 was created because the Muslim World needed a vision to rededicate itself to mastering S&T to ensure that it could face the challenges of the new global economy.

2004

ASM joined Network of Academies of Sciences of the Organization of the Islamic Conference (NASIC) together with 15 academies under OIC countries. The NASIC was constituted with the purpose of catalysing the development of S&T programmes among OIC member countries.

2005

ASM joined the other 41 Academies of Sciences worldwide in an IAP Water Programme, led by the Brazilian Academy of Science. The programme focused on coupling surface and ground water research as an essential step towards better management of water resources.

2006

In 2005, ASM bid to host the International Council for Science's Regional Office for Asia and the Pacific (ICSU ROAP). The ICSU ROAP was launched by Deputy Prime Minister YAB Dato' Sri Najib Tun Abdul Razak in 2006. The mission of the Regional Office is to:

- Identify major issues of importance to science and society.
- Facilitate interaction among scientists across all disciplines and from all countries.
- Promote the participation of all scientists in the international scientific endeavour, regardless of race, citizenship, language, political stance or gender.

- Provide independent, authoritative advice to stimulate constructive dialogue between the scientific community and governments, civil society and the private sector.

2007

ASM was elected as the IAP executive committee 2007 to 2008.

ASM initiated the collaboration with Asia Nano Forum (ANF) as the first step towards nanotechnology research in Malaysia.

International Symposium Science, Technology and Innovation, Kuala Lumpur was jointly organised with UNESCO and World Academy of Sciences and, Islamic Education, Scientific and Cultural Organisation, Islamic Development Bank, World Academy of Young Scientists in August.

2008

The International Science, Technology and Innovation Centre for South-South Co-operation under the auspices of UNESCO (ISTIC) was launched on the May 22.

2009

The InterAcademy Panel (IAP) and the World Economic Forum facilitated the participation of 60 outstanding young scientists in the 2nd IAP Conference of Young Scientists at the World Economic Forum's "Annual Meeting of the New Champions 2009" which took place in Dalian, China from 10–13 September 2009. Prof Mohd Basyaruddin Abdul Rahman (Malaysia Genome Institute) and Dr Chan Yoke Fun (University of Malaya) were 2 of the 1500 young scientists from around the world who met to discuss the future of science and its role in society. (Source)

**From this program, ASM mooted the idea of Young Scientist Network.*

ASM became the secretariat of Federation of Asian Scientific Academies and Societies (FASAS).

2011

ASM hosted the 22nd Pacific Science Congress (June 14-17) at the Kuala Lumpur Convention Centre. 48 countries attended the congress with 708 participants. The theme was: "Asia-Pacific Science in the 21st Century: Meeting the Challenges of Climate Change and Globalization."

(Source) Malaysia officially became a member of International Institute of Applied Systems Analysis (IIASA) in 2011 through the Academy of Sciences of Malaysia. Since membership began, a number of research collaborations have been developed with IIASA researchers, including projects focused on improving air quality, sustainable land and forest management,

the changing energy landscape, and projecting demographics in Malaysia.

2012

ASM was successful in its nomination for young Malaysia scientists to attend the IAP Young Scientists Conference. Five Malaysian Young Scientists had participated in the conference since 2010. ASM fellow, Professor Emeritus Dr Mohd Nordin Hj Hassan FASc was elected as President of the Science Council of Asia (2012-2014).

2013

Malaysia bid to join the Compact Muon Solenoid experiment at CERN and succeeded: Through ASM's international collaboration with European Organization for Nuclear Research (CERN), the National Centre for Particle Physics (NCPP is the 2nd National Research Centre established by ASM) embarked on Compact Muon Solenoid (CMS) research. Seven NCPP undergraduate students, seven Masters students, and three PhD students were sent for research attachment at CERN. Moving forward, the scientific collaboration through NCPP would be extended to other international centres of excellence (COEs) and STI organizations in particle physics towards enriching NCPP as a centralised National Research Centre in particle physics and internationalise Malaysian R&D.

2015

ASM first joined the Sakura Science Exchange Programme, sponsored by Japan Science and Technology Agency (JST) to embrace the culture of

innovation and promoting advanced scientific. This programme is an international program where Japan's host universities will invite selected universities from ASEAN countries to send their students to participate in selected courses available for the programme. This programme aims to encourage exchanges between the youth of Asia and Japan who will play a crucial role in STI.

ASM joins APEC PPSTI for the first time and was appointed by MOSTI to chair Sub Group A on Science Capacity Building.

2016

The International Conference on Science for Peace themed "More for Peace, Less for War" is premised upon channelling resources and talent to prioritise STI in nurturing and strengthening global peace. His Royal Highness Sultan Nazrin Muizzuddin Shah, Sultan of Perak officiated the conference and delivered the keynote address which set the tone of the conference.

2017

ASM hosted the ASEAN 2050 Forum: Fourth Industrial Revolution, where 13 countries involved and more than 450 participants attended. Forum panels comprising leaders from government sector, industry and academia in ASEAN gathered to share their views on how to strengthen the younger generation of ASEAN to develop a Fourth Industrial Revolution ecosystem based on the STI capabilities of each country.

ASM organised ASEAN SLP 2017 to empower young ASEAN researchers with leadership skills and to promote cohesion and collaboration between them to shape a collective ASEAN research and innovation agenda. ASEAN SLP witnessed the attendance of all 10 ASEAN countries plus Timor Leste.

ASM organised the International Obesity Workshop in partnership with UK's Academy of Medical Sciences, which is the first collaboration with the organization.

2018

The formation of ASEAN Foresight Alliance (AFA) and ASEAN Young Scientists Network (AYSN) were approved during the 10th Informal ASEAN Ministerial Meeting on Science and Technology (IAMMST-10) in the Philippines.

2019

ASM hosted the first Regional Meeting of the Association of Academies and Societies in Asia (AASSA) Working Group on Climate Change and Health from 24 to 25 February in Kuala Lumpur. Academician Professor Dato' Dr Khairul Anuar Abdullah who is the senior fellow of ASM and President Elect of AASSA has been appointed as the Chair of the Working Group.

The ASEAN Foresight Alliance (AFA) Workshop was held on 11 – 13 December 2019. The participants were representatives from all ASEAN Member States (AMS), except from Singapore and Vietnam. The 1st Board of Advisors Meeting for ASEAN Foresight Alliance (AFA) was convened on 13 December 2019 in Kuala Lumpur. Malaysia was appointed as the Chair and co-Chairs are Indonesia and Philippines.

2020

In conjunction with APEC Hosting Year for Malaysia, ASM organised the Open Science Forum for Asia and the Pacific Region on 13 February following the launch of the Malaysia Open Science Platform (MOSP). ASM developed a draft APEC Statement on Open Science.

In conjunction with 16th APEC PPSTI, ASM hosted APEC Open Science Webinar together with The APEC Science Prize for Innovation, Research and Education (ASPIRE) on 21 August. The APEC Statement on Open Science was also approved during the meeting.

25 LEADING COLLABORATION IN SCIENCE 1995-2020

Malaysia Goes To Antarctica

It might seem peculiar that Malaysia, so geographically distant from the poles, would have an interest in Antarctica. But ASM saw an opportunity and went for it.

Just how did Malaysia end up sending its scientists and researchers to the biggest scientific laboratory on a Terra Nullius? That's nobody's land in Latin, for those who aren't familiar with the term, and there's a reason why Antarctica is labelled as such.

Protected from territorial claim, Antarctica is governed by The Antarctic Treaty, which was signed on Dec 1, 1959 by 12 countries whose scientists had been active in and around the region during the International Geophysical Year, 1957-58. The treaty entered into force in 1961 and has since been acceded to by many other nations.

Malaysia's historical journey to this continent of extremes started in 1982, the Question of Antarctica, put forward by then Malaysian Prime Minister Mahathir Mohamed, raised eyebrows amongst the member states of the Antarctic Treaty. The criticism challenged many aspects of the way Antarctica was governed during the time and was accepted as an item on the agenda at the 38th United Nations General Assembly in 1983. The Malaysian position in the United Nations caught the attention of the member countries of the Antarctica Treaty System Consultation Meeting.

Soon after, in 1985, Academy of Sciences Malaysia Founding Fellow Academician Emeritus Professor Tan Sri Datuk Dr Omar Abdul Rahman FASc (Scientific Advisor to the then Prime Minister) and the late Tan Sri Zain Azraai Zainal Abidin (then permanent representative to the United Nations) were invited to attend a workshop on the Antarctic Treaty System (ATS) in South Beardmore Station, Antarctica. Tan Sri Dr Omar saw the potential of Antarctica as a prime platform for internationalising Malaysian research and researchers. And following that workshop, he encouraged Malaysia to establish a research programme in Antarctica.

In April 1997, Antarctica New Zealand graciously invited ASM to its programme, "Antarctic Program Beyond 2000". It was during this programme, that Dato' Seri Dr Ling Liong Sik (then Minister of Transport Malaysia), Ghulam Hussein Ghulam Haniff (then Principal Assistant Secretary at the Ministry of Foreign Affairs) and Academician Tan Sri Dr Salleh Mohd Nor (ASM Senior Fellow) visited the Scott Base.

To embark on this journey, an ASM Task Force on Antarctic Research was formed to promote, coordinate and fund Malaysia's scientific endeavour in the Antarctic. The first expedition to Scott Base involved four Malaysian

scientists: Professor Dato' Dr Azizan Abu Samah FASc, Professor Dr Noorsaadah Abdul Rahman FASc, Professor Dr Nik Meriam Nik Sulaiman FASc and Professor Dr Mohd Radzi Bin Sheikh Ahmad. Following this, ASM was given the mandate to oversee and coordinate the Malaysia Antarctic Research Programme (MARP).

The establishment of MARP was a big step towards elevating Malaysian science research, and the realisation of becoming a knowledged-based economy and a developed country. Under MARP, a total of 15 projects were carried out in the fields of atmospheric sciences, remote sensing, upper atmospheric and solar terrestrial connection, and biological sciences.

This was followed by the establishment of the National Antarctic Research Centre (NARC)

In cooperation with University of Malaya, with Professor Dato' Dr Azizan Abu Samah FASc at the helm. The core business of NARC were to coordinate MARP's activities researchers around the country and archive Malaysian researcher's data on Antarctic research to comply with Joint Committee on Antarctic Data Management (JCADM) and the Antarctic Treaty System (ATS).

In 2011, the Malaysian Government made a pivotal move for the future of Malaysian Antarctic Research

when it acceded to the Antarctic Treaty System (ATS) and the Madrid Protocol. By acceding to the Treaty, Malaysia would now be able to conduct its own scientific expedition to Antarctica, instead of the current practice of sending its researchers to join other countries' expeditions.

Malaysia would also be able to establish its own research base on the continent, and all findings made by its researchers in Antarctica can be patented. Additionally, Malaysia has been accepted into polar research organisations such as the Scientific Committee on Antarctic Research (SCAR) and the Asian Forum for Polar Sciences (AFoPS).

MARP has had an impressive run: 31 research projects have been completed under the programme; 46 scientific expeditions have been carried out to the Antarctic as well as the Arctic; 107 scientists and 105 graduates and

postgraduates were involved throughout the programme; 151 scientific publications were produced, plus a coffee table book titled Antarctica: Malaysia's Journey to the Ice.

While it may seem peculiar that a country like Malaysia, situated so far away from the poles, would have such an interest in Antarctica. But ASM saw an opportunity to build a network with 13 countries and get an inside look into the research they were carrying out.

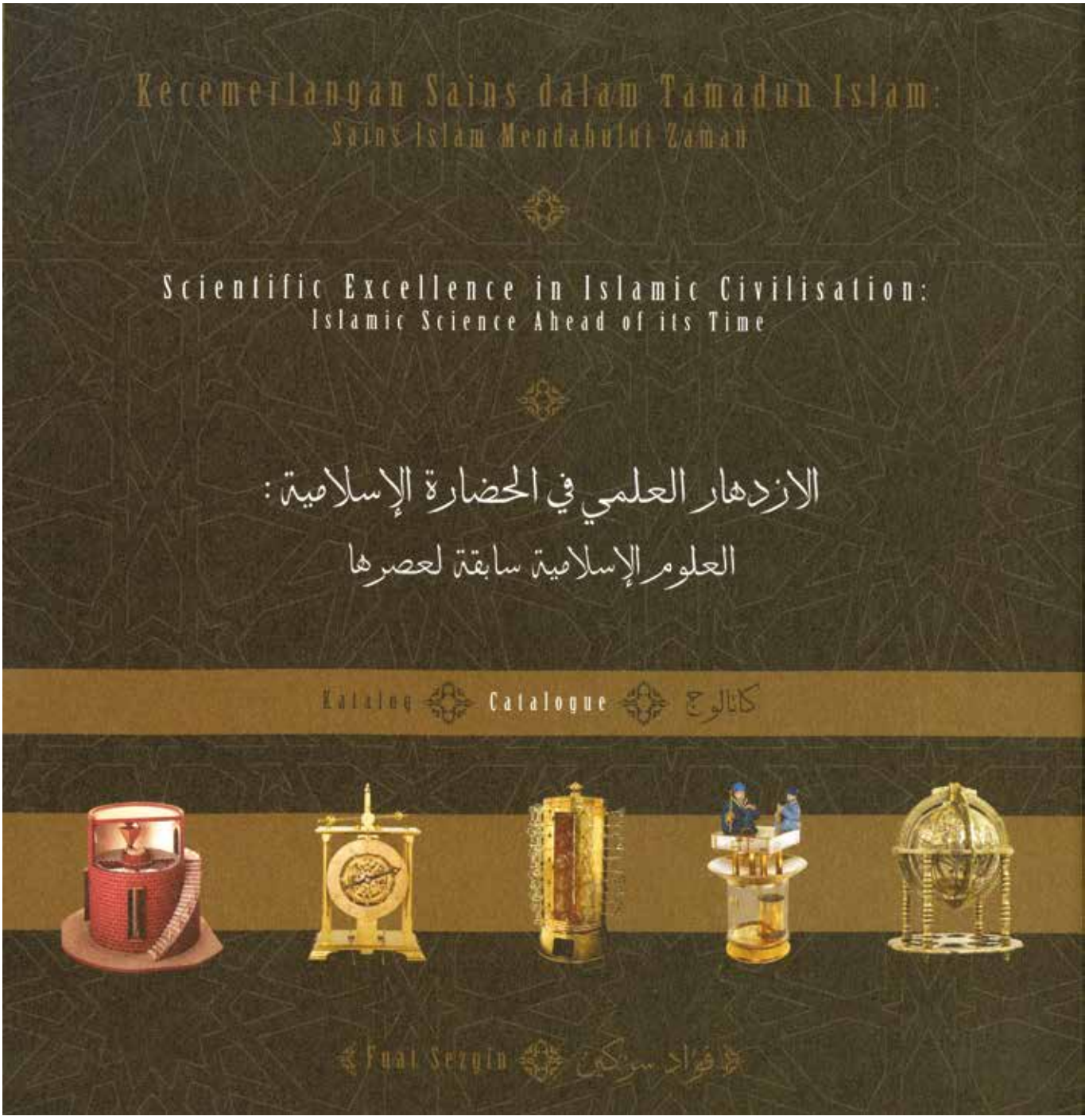
Following the success of MARP, in 2012, the establishment of the Sultan Mizan Antarctic Research Foundation or the Yayasan Penyelidikan Antartika Sultan Mizan (YPASM) was approved by the Cabinet. The foundation took over the function of MARP and aimed to get more Malaysian scientists involved in Antarctic research and to sustain Malaysia's presence in Antarctica, and came under the purview of the Ministry of Environment and Water (KASA).

Recognising the need to sustain Malaysia's involvement in polar research, YPASM introduced the YPASM Smart Partnership Initiative in collaboration with eight local universities – International Medical University, Universiti Malaysia Sabah, Universiti Kebangsaan Malaysia, Universiti Malaya, Universiti Teknologi MARA, Universiti Sains Malaysia, Universiti Putra Malaysia and Universiti Malaysia Terengganu.


25
VALUING OUR
HERITAGE

Ahead Of Its Time

A catalogue released by ASM in conjunction with *Scientific Excellence in Islamic Civilization* exhibition in 2007 highlighted how Islamic science was ahead of its time.



Since its foundation, the objectives of Academy of Sciences Malaysia (ASM) have been the pursuit, encouragement and maintenance of excellence in the fields of science, engineering, and technology (SET). The objectives would advance the art and practice of SET for the nation's development and benefit humankind.

Aside from those noteworthy objectives, ASM is a believer in preserving and valuing one's heritage. Thus, in 2007, ASM played a significant role in an exhibition that highlighted scientific excellence in Islamic civilization.

During his tenure, Prime Minister Dato' Seri Abdullah Badawi (2004-2009) launched the Islam Hadhari initiative. It was promoted as a progressive, democratic and tolerant approach to Islam. Malaysian leaders and

scholars understood Islam not only in terms of Malaysian national politics and culture but also within the context of international relations. Abdullah Badawi also wanted people to reflect on the achievements of Muslim scholars during the earliest glory days of the Islamic civilisation.

With that mission statement in mind, ASM - together with Ministry of Science, Technology and Innovation (MOSTI) and National Science Centre - initiated a visit and networking trip to Institute for the History of Arabic-Islamic Science at the Johann Wolfgang Geothe University in Frankfurt, Germany and Institute Du Monde Arabe (Arab World) in Paris. This collaborative trip resulted in an exhibition in Malaysia that showcased all the achievements of Muslim scholars.

Titled Scientific Excellence in Islamic Civilization, it was organised from 8 January to 31 March 2007, attracting more than half a million visitors to the KLCC exhibition. The exhibition aimed to be a science awareness programme targeted at the young generation and Malaysian citizens.

The Scientific Excellence in Islamic Civilization exhibit featured significant achievements of Muslim scientists in the development of civilization through science and technology. Throughout its duration, almost all cabinet ministers, royalties and governors of states paid a visit.

In conjunction with this exhibit, ASM published Scientific Excellence in Islamic Civilization: Islamic

Science Ahead of its Time Catalogue in three languages: English, Arab and Bahasa Malaysia - and sold more than forty thousand copies.

The objective of publishing the catalogue was to ensure the continuity of the dissemination of facts regarding scientific achievements during the Islamic Renaissance and it did not end with the exhibition.

The exhibition showcased historic items and rebuilt more than 800 models on astronomy and medicine which were invented by Muslim scientists. During the exhibition, we highlighted 148 items in (i) Islamic astronomy, geography and navigation; (ii) Discoveries and medical Creations; (iii) Mathematics, Arts and Architecture; and (iv) Technology and Creations.

In May 2007, ASM and National Science Centre organised a traveling exhibition throughout Malaysia to reach out to rural areas, attracting about 200,000 Malaysians. This exhibition provided an opportunity to Malaysians, especially Muslims, to appreciate science and technology that has changed the quality of life. Not only that, it provided positive impact to the society, namely in medical, engineering, Mathematics, architecture and other areas.

The long-term effect of Scientific Excellence in Islamic Civilization was the confidence that we can advocate to people that science and technology is not exclusive to developed countries, but instead it is open to anybody to excel in it. It also introduced Muslim scientists as role models to the young generations, to motivate them in their ambitions to become scientists and innovators.

Due to its unique, educational nature, the Scientific Excellence in Islamic Civilization received extensive coverage in local and regional media. As a result of this initiative, several key Malaysian media started writing about the Muslim scholars' achievements, even creating dedicated columns in Utusan Malaysia, Estidotmy and Berita Harian.


25
COMMUNICATING
SCIENCE

Communicating Science

FAScinate Talk

The ASM Fellow's Lecture commenced in 2003 following the obligation of all its newly appointed Fellows to deliver a public lecture to stimulate public's interest in their respective field of expertise and the application of their scientific work in daily life. Throughout 16 years of the lectures until 2018, it has attracted many academia, university students and scientific community in participating in the lectures.

To broaden its reach and to attract more public participation in the lecture towards increasing public knowledge in science as well as in conjunction with ASM's 25th Anniversary, the Fellow's Lecture was re-branded to 'FAScinate Talk' and the inaugural talk commenced in 2019.

FAScinate is a play on the word "fascinate" combined with "FASc", the abbreviation for Fellow of the Academy of Sciences Malaysia. Befitting the title itself,

this programme features ASM Fellows who are expected to fascinate and educate audience with insights into the Fellow's expertise and experience.

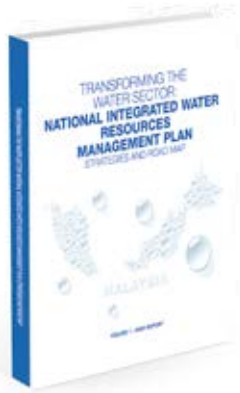
FAScinate features a renewed format, transitioning from a formal lecture style into a more casual engagement that is hoped to garner more public interest in science.

"Open Mind, Sparks Ideas" is the tagline of FAScinate. These series aim to inspire public to open their minds to the width and breadth of science and technology, brought on by the captivating presentations of ASM Fellows.

The inaugural FAScinate in 2019 and 2020 attracted over than 9,000 viewers through physical and virtual attendance through YouTube and ASM social media platforms.

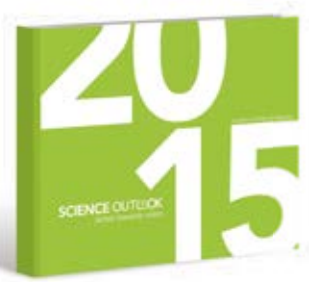
Communicating Science - Publications

Transforming The Water Sector:
National Integrated Water Resources Management Plan Strategies and Roadmap



Science & Technology Foresight Malaysia 2050
Emerging Science, Engineering & Technology (ESET) Study

Envisioning Malaysia 2050
A Foresight Narrative



Science Outlook 2015
Action towards Vision

New Economic Opportunities
in STI-based Industries to serve Emerging Markets

The Blueprint For Fuel Cell Industries In Malaysia

Sustainable Mining:
Case Study for Bauxite Mining in Pahang

10-10 *My*STIE Framework
Trailblazing the Way for
Prosperity, Soietal Well-Being
& Global Competitiveness

Asm Position Paper On
Precision
Medicine Initiative
In Malaysia

Science Outlook 2017
Conversing Towards
Progressive Malaysia
2050

ASM Local &
Transboundary Haze
Study
HAZE: Help Action
Toward Zero Emissions

Science Outlook 2020
Unlocking The Future

For more publications, please visit akademisains.gov.my/publication/

25

FUTUREPROOFING MALAYSIA

Malaysia Open Science Platform (MOSP) is a transformative initiative to strengthen the research ecosystem in Malaysia and to foster collaboration through a raw research data-sharing platform. This pilot project focuses on the key elements in making Open Science a reality which are the landscape and guidelines of open science, capacity building and awareness and infrastructure. It is an initiative by the Ministry of Science, Technology and Innovation (MOSTI, realised through ASM and Malaysia Open Science Alliance. MOSP will encourage a research ecosystem that is "as open as possible, and as closed as necessary".

MOSP is a strategic transformative initiative to strengthen Malaysia's STI Collaborative Ecosystem towards achieving Shared Prosperity Vision 2030 and addressing the United Nations Sustainable Development Goals. After its launch on 7 November 2019, the pilot project looks into the following three main areas:

- Landscape studies and Guidelines for Open Science in Malaysia
- Capacity Building and Awareness
- Infrastructure

TARGETS:

- To develop one Landscape Study on Open Science in Malaysia by end of 2020
- To develop one National Guidelines on Open Science by end of 2020
- To train 200 data stewards by July 2021
- To reach 500,000 people and raise awareness about Open Science
- To develop and execute one Platform for raw research data sharing by 2021

RATIONALES FOR OPEN SCIENCE

Responsible Science	• Reinforces open scientific inquiry • Promotes research quality and integrity through reproducibility, transparency and accountability for verification and avoid fraud	**Benefits of MOSP** • Researchers in developing countries can see research work from Malaysia • Increase research visibility • Higher citation rates • Policy decision will be evidence-based • Research findings accessible to public • Taxpayers get value for money
Democratise Science	• Publicly funded researchers are accountable to society • Increases the return on public investments in scientific research • Promotes equitable use of data and enables citizen science participation • Business enterprises benefit in producing new products and services through open innovation • Science-informed policy-making	
Research Management	• Maximise data utility • Minimise costs of unnecessary duplication of research • Better planning in research management and funding	
Scientific Progress	• Finding solution to local and global challenges through Big Data Analytics • Fostering collaborations and research beyond disciplinary boundary • Internationalising our local research	

iConnect

Malaysian Collaborative Network for Innovation

The global economy is rapidly transforming and now moves towards the new economy that is knowledge-intensive and greater in innovation fuelled by the digital revolution and rapid technological advancement. Therefore, countries in the world are now looking into gaining competitive advantage by being innovative through the knowledge-intensive, high value-added, technology-enabled and adaptable industries.

Being a country that aims to become a developed and high-income nation, Malaysia has potential to leverage on new economic opportunities and enter the global markets through science, technology and innovation (STI)-based industries, collaboration and open innovation.

In relation to this, the Ministry of Science, Technology and Innovation (MOSTI) and the Academy of Sciences Malaysia (ASM) embarked on Malaysian Collaborative Network Platform for Disruptive Innovation initiative known as i-Connect. i-Connect is an industry-led collaborative network that involving Quadruple Helix (industry, research community, government and civil society).

Goal

The main goal of i-Connect is to facilitate Malaysian industries to leverage on science and technology to develop innovative home-grown products and solutions to pursue new economic opportunities in emerging global markets while nurturing the growth of conducive innovations ecosystems based on collaborative networks

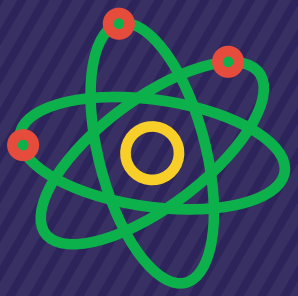
Objectives

The objectives of i-Connect are:

- Establish a collaborative network for disruptive innovation (new products/ service/ business models) in strategic industry sectors for Malaysia to leverage new economic opportunities to serve emerging markets and expand global reach;
- Develop knowledge clusters and talent hub that Malaysian industries can engage towards becoming an innovation-led economy; and
- Enable demand-driven R&D and market-driven delivery system towards enhancing Malaysia's innovation capacity.

e-estidotmy

Enriching Minds Through STEM



e-estidotmy is an initiative to bring science and maths closer to the society. It is a portal aimed at creating innovative and inquisitive minds among students by learning and appreciating science and maths, and all things STEM. We hope to democratise science and make it part of everyone's lifestyle and culture.

The portal is home to the latest STEM information and breakthroughs to students, teachers and the general public in an engaging and fun manner that will spark the interest in fields that are thought to be complicated and boring.

For more information scan here to contribute

@e-EstiDotMy

Laying the Foundation

Mainstreaming Science, Technology and Innovation

Fortifying the Sustainability Frontier

Forging a Culture of Science Excellence

Nurturing & Recognising Talent

Malaysia's Global Positioning

Valuing Our Heritage

Communicating Science

Futureproofing Malaysia