Asia Nano Forum

NEWSLETTER

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Report from Iran

1. Iran to Cooperate in EU nanotechnology Safety Project

By participating in Risk-GONE (Risk Governance of Nanotechnology), an EU H2020 project, Iran Nanotechnology Innovation Council (INIC) cooperates with EU in development of nanotechnology safety instructions and nanomaterial standards.

Risk-GONE is an EU project in the field of nanomaterial safety, which was launched in January 2019, with five-million-dollar budget. Fifteen European countries as well as Iran and the United States are working in this project to provide nanomaterial instructions in order to support development of standards for safe use of nanomaterials.

Given the history of Iran in developing five ISO international nanotechnology standards, Risk-GONE project consortium invited INIC to participate in the project.

The project is divided into six operational packages among which confirmation and optimization of nanomaterial characterization and classification methods (WP4), human risk assessment methods (WP5), and environmental risk assessment tools (WP6) are of special importance.

Iranian experts and scientists are involved in multiple task forces and two prominent Iranian universities are cooperating with INIC in the project implementation.

2. Commercial developments: Export of Iranian Nanotechnology-based Fever Indicating Clothes

An Iranian textile company has produced Nanotechnology-based fever indicating clothes and exported them to international markets. The company has exported children fever indicating clothes containing nanoparticles with antibacterial properties.

"We produced fever indicating Nano shirts, hats and socks, which change color when the body temperature rises" said the CEO of the company.

"The color changes from blue to white in boys' clothes and from pink to white in girls' clothes. Following this change of color, parents immediately become aware of the fever of their children and take appropriate medical measures to control it. Due to the presence of chitosan-silica composites, antibacterial properties have also been created in these clothes." He added.

The company has a variety of products, including antibacterial socks, oleophobic aprons and super-absorbent antibacterial towels.

3. 12th Iran International Nanotechnology Festival: A one stop shop for the latest nanotechnology products and technologies

International Nanotechnology Festival is held annually by Iran Nanotechnology Innovation Council, and it is the largest and most credible exhibition in the field of nanotechnology in Iran. It is also considered as one of the largest nanotechnology festivals in Asia.

Business people, industry managers, and industry experts attended the 12th International Nanotechnology Festival to take the opportunity to get familiar with the latest technological and commercial advancements in the field and meet and negotiate with more than 200 nanotech companies present there. As a part of the event, visitors could attend B2B matchmaking sessions, visited companies, and participated in the arranged workshops and seminars.

4. Development of a Heart Attack Diagnosis Device Prototype

An Iranian company has developed a heart attack diagnosis device prototype. The final device, which uses graphene for signal boosting and sensitivity, will be small and portable. It is expected to reach mass production by next year.

An Iranian company has succeeded in developing a sensor for early detection of heart attacks. This sensor, which is a lab-on-a-chip device, uses graphene to detect heart attack's bio-indicators. "Some heart cells face structural degradation at the time of a heart attack and this produces special compounds that, if detected, can help early diagnosis of the heart attack.

Using graphene sheets, we built a lab-on-a-chip that could detect a heart attack through a small amount of the patient's blood in less than twenty minutes. This device would be portable, accurate, and easy to use", said the CEO of the company. He added, "We have been trying to obtain international certificates for this technology since last year and expect to receive it in the next year. After clinical trials, the mass production of the device will begin"

5. Three New International Standards in Nanotechnology Approved at the latest ISO Meeting

This past November, the international technical committee meetings for nanotechnology standards were held in Hangzhou, China with the participation of 19 countries. Iran actively participated in the meetings and proposed three new standards where they were approved.

At these meetings, two international standards including “Hydrophobic Nanocomposites- Properties and Performance Evaluation Method” as well as “Skin Toxicity of Nanoparticles- Evaluation Method” were presented by INIC Standardization Committee and received primary approvals.

In addition, proposal on "Nano-Suspensions for Heat Transfer - Properties and Measurement Methods", which was presented by the Iranian team 2 years ago, was discussed in a number of expert meetings and was finally approved. Thereafter, the document was sent to the committee for final vote.

As well as the above mentioned proposals, three other international standards, i.e. “Antibacterial Textiles Containing Nanomaterials- Performance Evaluation”, “Polymeric Nanocomposite Coatings for Food Packaging - Properties and Measurement Methods”, and “Evaluation of Nanomaterial Interaction with Proteins Using CD Spectroscopy” are being drafted under Iran’s supervision. These proposals were discussed at numerous meetings by experts and representatives of various countries.

6. Iran’s proposed guidelines on clay nanomaterial has been approved by the International Standardization Organization (ISO)

The standard document was proposed by INIC’s Nanotechnology Standardization committee to the International Standardization Organization (ISO) four years ago. After considerable lengthy discussions and debates in these four years, the document has been finally accepted and it is now available at www.iso.org.

Reports indicate that clay nanomaterials are of particular importance in today's industry and technology all over the world. Clay nanomaterials could be used in various medical and pharmaceutical industries, packaging, paint and coating, automotive, rubber and polymer composites. Measurement methods for various parameters including mechanical stability and properties, chemical resistance, etc. are reported in this document.

This brings the number of Iranian developed international nanotechnology standards to five. Iran as well as China and Germany are currently ranked fourth based on the number of international standards.

Report from Japan

1. TIA appointed Terry Higashi, Chairman Emeritus of Tokyo Electron Ltd., as a new chairman

TIA consists of 5 Universities and institutions, National Institute of Advanced Industrial Science and Technology (AIST), National Institute for Materials Science (NIMS), University of Tsukuba, High Energy Accelerator Research Organization (KEK) and the University of Tokyo and the Japan Economic Federation (Keidanren) with the support of the Cabinet Office, the Ministry of Education, Culture, Sports, Science and Technology, and the Ministry of Economy, Trade and Industry. Mr.Tetsuro Higashi (Tokyo Electron Ltd., Chairman Emeritus) was appointed as the new chairman on July 30 of this year.

Picture: Mr. Higashi

Since its establishment in 2009, TIA has made significant achievements contributing to the practice of open innovation in a number of research fields. Since 2015, it has been working on the second phase of activities with a new vision of building a “continuous innovation mechanism linked to resources”. The pillars of this activity are the creation of new knowledge that fosters the bud of innovation, the bridging of the results to industry, and the development of human resources who will lead the next generation. From 2020, the third term, we will have a deeper vision and work on that activity.

Picture: Tsukuba City

2. TIA 10th Anniversary Symposium-TIA opens up the future by expanding and deepening-

11th TIA Symposium was held as the 10th anniversary symposium of TIA at Iino Hall in Tokyo. The first half was operated as an ordinary symposium, where the activities of TIA for these ten years were shown. In particular, some representative examples of innovations created at the open innovation platform of TIA were shown. Special exhibitions by partner companies were held and the development outputs in cooperation with TIA were shown.

In the latter half, a panel discussion by the heads of four core TIA organizations was held to discuss the role and the mission of TIA in the future.

Total number of visitors was 247: 102 from public research institutions, 70 from private sectors, 42 from universities, 12 from governments, and some from others.

Output presentations

10th anniversary symposium of TIA was started with the opening address by the new chair of TIA managing committee, Mr. Tetsuro Higashi.

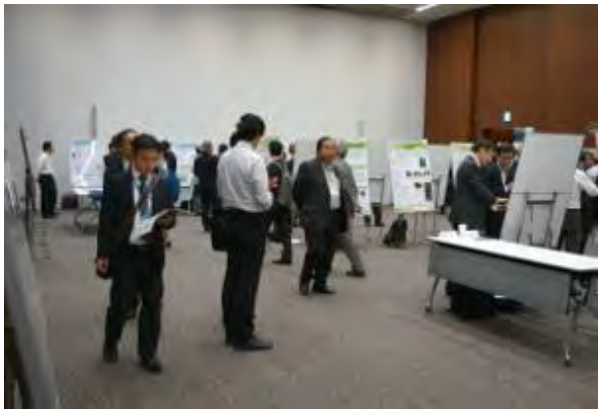
Opening address by the new chair, Tetsuro Higashi.

Invited speech by Dr. Hiroyuki Shindo, JAXA

Invited lecture was given by Dr. Hiroyuki Shindo, JAXA, entitled “Semiconductor Device Technologies Supporting the Advancing Space Moving Bodies”. Then two representative output results of TIA activities were shown: “Towards Understanding and Controlling Interfaces of Solid State Battery Materisal” by Dr. Kazunori Takada, NIMS, and “Development of Tera-Hertz Oscillation Device based on High Tc Superconductors for the Next Generation Radio Wave Industry” by Prof. Takanari Kashiwagi, Tsukuba University.

Poster Session

During the Coffee break time, poster presentations were held on the achievements of each TIA research areas, KAKEHASHI Projects. Eager discussions were held between participants and poster presenters.



Picture: TIA 10th Anniversary Symposium exhibitions

In addition, 10 partner companies gave a special exhibition (posters and products) focusing on the results of cooperation with TIA. Lively discussions were seen between the company exhibitors and participants.

Memorial Ceremony

Celebrating messages were given by Mr. Isamu Takahara from the Cabinet Office, Mr. Shoji Watanebe from METI, and Mt. Hiroki Kurosawa from MEXT. Then Plenary lecture was given by the chair of TIA managing committee, Mr. Tetsuro Higashi. The title of his talk was “Industrial Competitiveness of Japan and Challenges for Open Innovation.”

Panel Discussion

At the end of the symposium, a special panel discussion was held, entitled The Future of Japan Made with TIA.” Heads of the four organizations, AIST, Tsukuba university, NIMS and the University of Tokyo attended. The head of KEK was absent due to a sudden necessity. The panel discussion began with a report on the Vision of TIA for the third phase, followed by the four directors’ presentations on what they would like to achieve in TIA, and the role that TIA should play in promoting open innovations in Japan. Very active and hot discussions were held on those topics.

Panel Discussion

You can see the video of the lecture on the following web page (all in Japanese).

https://www.tia-nano.jp/page/page000035.html#Symposium2019-1

Report from Malaysia (NanoMalaysia Berhad)

1. July 2019 MOU Exchange Ceremony Between NanoMalaysia and Sunway University

NanoMalaysia Berhad and Sunway University inked a strategic Memorandum of Understanding (MOU) to strengthen collaboration in the field of graphene. The MOU was signed by the Vice-Chancellor of Sunway University, Professor Graeme Wilkinson, together with NanoMalaysia's CEO, Dr Rezal Khairi Ahmad during the official launch of Sunway University's Graphene and Advanced 2D Materials Research Lab.

2. July 2019 IGL Coating Distributor Signing Ceremony

NanoMalaysia's CEO Dr Rezal Khairi Ahmad attended the Distributor Signing Ceremony of IGL Coatings at MEEC, Menara MATRADE, Kuala Lumpur. IGL Coatings is a Malaysian manufacturing company pioneering in eco-friendly nanotechnology ceramic coatings which are also verified by NANOVerify. The Distributors Signing Ceremony included distributors from the US, Canada, Australia, Brunei, Thailand, India, Vietnam, Taiwan, Philippines and Mauritius.

3. July 2019 Partnership between Poney Garments Sdn Bhd and Nanotextile

NanoMalaysia Berhad, led by CEO Dr Rezal Khairi Ahmad, attended the launching ceremony of Poney Garments Sdn Bhd's Baby Essential Extra Care held in conjunction with the opening of Poney's new boutique at Central i-City, Shah Alam, Malaysia.

Poney has ventured into nanotechnology and technical textile with NanoTextile Sdn Bhd, an investee company of NanoMalaysia and is the first company in Malaysia to offer a wide span of nanotechnology in the textile industry. This partnership between Poney and NanoTextile represents the first all-Malaysian affair and a step ahead in commercialisation of nanotechnology in Malaysia's textile industry.

Also present at the ceremony were, Albert Tan, founder & CEO of Poney, Dato' Dr. Cheng Kok Leong, chairman of Nanotextile and Dr. Thomas Ong, CEO of NanoTextile Bhd.

4. August 2019 MyNano 2019 and Graphene Malaysia 2019

NanoMalaysia Berhad brought together key players in the graphene industry to further the discourse on revolutionising innovations with graphene in its fourth edition of Graphene Malaysia 2019.

This year Graphene Malaysia 2019 came under the umbrella of NanoSummit Malaysia Conference & Expo (MyNano 2019) – an initiative between NanoMalaysia Berhad (NMB) and Malaysia Nanotechnology Association (MNA). It was inaugurated by the Deputy Minister of Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC), YB Isnaraissah Munirah Majilis.

Other meetings and sessions included the NanoMITe Annual Symposium 2019 (NanoMITe 2019); the Nanotechnology Malaysia Annual Symposium (NanoSym 2019) and the International Symposium on Advanced Materials and Nanotechnology (iSAMN) 2019. There was also a nanotech talk session that explored the potentials of nanotechnology in the Halal Industry supported by the Halal Industry Development Corporation and NANOVerify Sdn Bhd.

MyNano 2-19 and Graphene Malaysia 2019 were held at Putrajaya Marriott Hotel on the 21st and 22nd August 2019.

5. August 2019 Launch of MNA Energy Sdn Bhd

MNA Energy Sdn Bhd is a joint venture company by NanoMalaysia Berhad and MNA Research Sdn Bhd. It was formed to spearhead the commercialisation activities of Hybrid Energy Storage Systems (HESS) for Electric Vehicles, UPS and Back-Up Applications, and Energy Storage Solutions mainly for Green Energy. The company was launched during the first day of MyNano 2019 and Graphene Malaysia 2019.

6. August 2019 JV between NanoMalaysia & Nanopac

A joint-venture partnership between NanoMalaysia Berhad and NanoPac (M) Sdn Bhd was announced during MyNano 2019 and Graphene Malaysia 2019 at Putrajaya Marriott Hotel on 21 August 2019. NanoMalaysia and NanoPac have both reached an agreement to commercialise Nano Light Energy Panels (NLEP) via a New Joint Venture Company, Nano Commerce Sdn Bhd.

7. September 2019 Graphene Week

The National Graphene Action Plan (NGAP) office of NanoMalaysia Berhad, led by Vice President Ms Murni Ali, attended the 14th edition of Graphene Week held at Helsinki, Finland. The Graphene Flagship organised the event.

The Graphene Flagship is, along with with the Human Brain Project, the first of the European Commission's Future and Emerging Technology (FET) Flagships. It is tasked with bringing together academic and industrial researchers to take graphene from the realm of academic laboratories into European (and the global) society in the space of 10 years.

The event provide a platform for knowledge sharing, networking and the exchanges of ideas to develop the commercialisation of graphene further.

8. October 2019 HyPER at IGEM 2019

NanoMalaysia Berhad and four other strategic partners exchanged a Memorandum of Agreement (MoA) to develop the first fuel cell-powered Electric Vehicle (EV) for use in the motorsports industry in Malaysia at the 10th International Greentech & Eco Products Exhibition & Conference Malaysia (IGEM 2019) in the Kuala Lumpur Convention Centre today. The exchange was witnessed by the Minister of Energy, Science, Technology, Environment and Climate Change (MESTECC), Yeo Bee Yin. The four strategic partners are Pulsar UAV Sdn Bhd, Handal Energy Solutions Sdn Bhd, MNA Energy Sdn Bhd and Wheelspin Motorsport.

The agreement aims to produce a locally developed electric motorsports vehicle called the Hydrogen-Paired Electric Racecar (HyPER). HyPER is to be powered by NanoMalaysia's Hydrogen and Hybrid

Energy Storage System (H2SS). The H2SS is the synergy of a hybrid energy storage system with Li-Ion batteries and graphene-based ultracapacitor, and a Fuel Cell stack with on-board Hydrogen generation system. The system allows for higher power density, and lightning-fast charging compared to conventional Li-Ion based vehicles. September 2018

9. October 2019 GraphChina 2019

The National Graphene Action Plan (NGAP) Office of NanoMalaysia participated in GraphChina 2019 at Xi'an, China.

10. October 2019 The 15th Governing Council Meeting of the Asia Pacific Centre for the Transfer of Technology 2019

NanoMalaysia Berhad participated in the International Conference on Emerging Technologies For Achieving Sustainable Development Goals. The conference was organised by the Asian and Pacific Centre for Transfer of Technology of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). NanoMalaysia's CEO, Dr Rezal Khairi Ahmad, presented the topic of Nanotechnology for achieving Sustainable Development Goals to the delegates.

11. October 2019 Shanghai

NanoMalaysia's CEO, Dr Rezal Khairi Ahmad, attended the signing of an MoU between China Innovation Alliance of the Graphene Industry (CGIA), Shanghai Industrial Technology Centre of Graphene, and NanoMalaysia Berhad at the 2019 China- EU Yangtze River Delta Graphene Innovation Summit in Shanghai, China.

The tripartite partnership aims to promote graphene technologies or products to enter Malaysia and China, to increase communication and mutual exchange, advocate standardisation and certification of graphene-related materials and technologies and support increased investment in the commercialisation of Graphene.

12. October 2019 Graphene Singapore

NanoMalaysia Berhad attended the Graphene & 2DM Singapore Summit held in Singapore. NanoMalaysia's CEO, Dr Rezal Khairi Ahmad, presented on the National Graphene Action Plan and NanoMalaysia's efforts in commercialising graphene applications in Malaysia.

13. October 2019 Industry4WRD Summit

NanoMalaysia Berhad participated at the Industry4WRD Summit. which was held at MITEC, Kuala Lumpur.

14. November 2019 Carbontech 2019

NanoMalaysia Berhad through the National Graphene Action Plan (NGAP) participated at the 4th International Carbon Materials Conference and Exhibition CarbonTech 2019 held in Shanghai, China. During the conference, the Vice President of NGAP, Ms Murni Ali, presented on the National Graphene Action Plan commercialisation efforts and activities in Malaysia.

Report from Philippines

1. • Benchmarking Activity of the Philippines' Nanosafety Team in Taiwan

The Department of Science and Technology Industrial Technology Development Institute (DOST-ITDI) and its collaborators from the academe (University of the Philippines Los Banos (UPLB)), project monitoring agency (DOST Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD)) and government regulating agency (Food and Drug Administration (FDA)) conducted benchmarking activities in Taiwan institutions known for their expertise on Nanotechnology, Nanometrology and Nanosafety. Persia Ada N. De Yro, PhD (DOST-ITDI), Admer Rey C. Dablio, RCh (DOST-ITDI), Marietta M. Valdez (DOST-ITDI), Milagros M. Peralta, PhD (UPLB) and Ma. Christina D. Ledesma (FDA) travelled to Taiwan from June 3 to 7, 2019. They visited Industrial Technology Research Institute (ITRI) Center for Measurement Standards and Precision Instrumentation Division in Hsinchu, Taiwan to discuss about Interlaboratory Comparison; followed by Academia Sinica, Institute of Physics to discuss about Nanomaterial Characterization, Microfluidics and Nanodevices and Long-term Stable Gradient Generator Chip in Nankang, Taipei, Taiwan; and National Cheng Kung University Department of Environmental Engineering in Tainan City, Taiwan to learn about Nanomark Scheme, Nanotechnology in Taiwanm and Environmental Fate of Engineered Nanomaterial.

CMS - ITRI | 03 June 2019

CMS – ITRI Lab | 03 June 2019

Academia Sinica - Institute of Physics | 04 June 2019

Academia Sinica - Institute of Physics, Genomics Research Center | 04 June 2019

Academia Sinica - Institute of Chemistry
04 June 2019

National Cheng Kung University| 06 June 2019

2. The Philippine Nanosafety Team attended the OECD GLP Workshop, Animal Study Training and Ecotoxicity Studies on Nanomaterials

The Philippine Team composed of Araceli M. Monsada, PhD, Engr. Jocelyn P. Reyes and Dr. Zacchari Andrei N. Ochona of the Industrial Technology Development Institute, Department of Science and Technology(ITDI-DOST) ITDI-DOST attended the OECD GLP Workshop, Animal Study Training and Ecotoxicity Studies on Nanomaterials from October 21-30, 2019 in Malaysia.

The Organization for Economic Co-operation and Development (OECD) Good Laboratory Practice (GLP) workshop lecture was given by Dr. Fariza Binti Wan Abdullah of Malaysia. Photos of attendees are shown below).

Photo of the Participants of the OECD/GLP Workshop in Malaysia

The Animal study training held from October 23-25, 2019 encompasses various animal study such as animal intracutaneous (intradermal) reactivity test, dermal sensitization study. The overall objective of the training is to provide participants with a comprehensive understanding of animal studies in line with

OECD (Organisation for Economic Co-operation and Development) in comparison with the ISO 17025. The training course offered intensive lecture topics and hands on training regarding animal testing on rabbits and guinea pig.

The third training which is **the Ecotoxicity Studies on Nanomaterials** was held last October 29-30, 2019. The training was conducted in SIRIM Berhad, formerly known as the Standard and Industrial Research Institute of Malaysia (SIRIM).

Closing and Giving of Certificates at ETRC, SIRIM

3. • Philippine Delegates attended the 22nd Plenary Meeting of ISO/TC229 Nanotechnologies

Dr. Blessie A. Basilia of Industrial Technology Development Institute, Department of Science and Technology(ITDI-DOST) and Dr. Milagros Peralta attended the 22nd Plenary Meeting of ISO/TC229 Nanotechnologies which was held at the Ping-An Financial Center, Hangzhou, China last November 11-15, 2019.

The 22nd plenary meeting of ISO/TC 229 Nanotechnologies was hosted by the Standard Administration of China (SAC) and organized by the National Center for Nanosience and Technology, China.

PHOTOS TAKEN DURING ISO/TC 229 22nd PLENARY MEETING: a)WG meeting: with Malaysia and Thailand Delegates; and b)Philippine delegates (from left : Dr.Milagros Peralta and Dr. Blessie A. Basilia), with Dr. Denis Koltsov and Malaysian Delegates.

In the previous ISO/TC 229 WG interim meetings, held in May 13-17, 2019, hosted by Standards Australia, the Philippines was represented by Dr. Christina Binag of the University of Santo Tomas (UST). The Philippines is a new member of ISO/TC 229, being a P-member only this year (2019)

Report from South Korea

1. Nanotechnology Research Achievements Exhibition

Nanotechnology Research Achievements Exhibition has been held annually since 2016, hosted by Ministry of Science & ICT and Ministry of Trade, Industry and Energy. The purpose of this event is to spread the achievements of nanotechnology R&D and to encourage communication between stakeholders and experts of this field. This year, the event was held on 21st November, 2019 at Hotel Millennium Hilton in Seoul, with about 200 participants from Ministry of Science & ICT, Ministry of Trade, Industry and Energy, National Nanotechnology Policy Center (NNPC), Korea Nano Technology Research Society (KoNTRS), Korea Infrastructure Organization for Nanotechnology (KION), Nano Technology Research Association(NTRS), Nano-Convergence Foundation and many other organizations. The main program consisted of award ceremony, keynote speeches and exhibition. The winners of 'Top 10 Nano Technology' and 'The Nano Young Challenge Competition', respectively selected and hosted by KoNTRS were prized in award ceremony and their achievements were put on display in the exhibition. 'Top 10 Nano Technology' is a project designed to generate public interest in and support of nanotechnology R&D by selecting and awarding the 10 most influential achievements every year. 'The Nano Young Challenge' is the idea competition for undergraduate and graduate students, providing them opportunity to materialize creative ideas of nanotechnology. The final candidates are granted to utilize the national nano infrastructure to verify their ideas.

Top 10 Nano Technology

No.	NAME	AFFILIATION	TECHNOLOGY
1	Jeong-Yun Sun	Seoul National University	Electroactive Soft Photonic Devices for the Synesthetic Perception of Color and Sound
2	Tae-Woo Lee	Seoul National University	Bioinspired artificial nerves using organic nanomaterial
3	Young Min Song	Gwangju Institute of Science and Technology	Development of flexible/colored passive radiative cooler with zero-energy consumption
4	Myung Mo Sung	Hanyang University	Quantum dot/amorphous composite semconducting nanolayers for multi-value logic transistors
5	Il-Doo Kim	Korea Advanced Institute of Science and Technology	Nanofiber based sensing technology for environmental gas detection and exhaled breath gas anslysis
6	Nam-Gyu Park	Sungkyunkwan University	High speed coating technology for large-area perovskite solar cell
7	Junho Jung	Korea Institute of Machinery and Materials	3D nanostructured surface based wide viewing angle full-color hologram fabrication platform technology
8	Sohn Hoseok	SMS Co., Ltd R&D Center	Development of high refractive nano-composite prism coating solution and high brightness prism film
9	Zenith Choi	Advanced Technology Inc.	Femtosecond Laser-based 3D Micro-to-Nano Patterning Technology on 3D Curved Surface
10	Dae Jun Kim	VSI	High speed driven-Field emission digital X-ray sources based on carbon nanotubes

Nano Young Challenge 2019 Awardees

No.	NAME	AFFILIATION	SUBJECT
1	Taesung Park, Ho Kun Woo, Sangyeop Lee	Korea University	Temperature Insensitive Transparent Wearable Strain Sensor Based on Strategically Designed Polymer Substrate
2	So Hee Kim, Byeong Yun Oh, Woo Kungh	Kumoh National Institute of Technology	Development of biomimetic dry adhesive patch of transparent electromagnetic shielding
3	Sunyoung Yoon, Yong Jun Kim	Sungkyunkwan University	Conductive black ink that mixes metal nanowires with conductive polymers
4	Hochan Lee, Hyun jin Lee, Soo yeon Moon, Jinsu Kim, Yeonghun Jeong	Hanyang University	Fabrication and development of EUV pellicle structure to protect mask defect

Photo


2019 나노융합성과전


2019 나노융합성과전

Report from Taiwan

1. Regions' nanotech activities related to ANF (Collaboration)

TANIDA held NanoBiosensor for Rapid Detection Workshop and Product Display

To explore the nanotechnology development and commercialization, Taiwan Nanotechnology Industry Development Association (TANIDA) has been making efforts to build a partner network between the enterprise and academia and to match the academia-industry-institute cooperation. The workshop organized by TANIDA was held on 25 October 2019 at National Taiwan University in Taipei and specially focused on NanoBiosensor for Rapid Detection. Speakers including Prof. Hongjie Dai of Stanford University, Prof. Jeff Wang of Johns Hopkins University, and domestic experts are invited to share their state-of-the-art achievements and possible market opportunities. There were more than 100 domestic participants from academia, industry and several stakeholders in this workshop followed by a roundtable discussion. By industrial issue collection, experts from academia and industry are also invited to find solutions to critical problems to accelerate commercialization of innovation and application during the roundtable discussion. TANIDA was founded in 2004 and aims to facilitate the integration of R&D efforts at universities, research institutions and industry to accelerate the commercialization of nanotechnology and to meet industries' needs of developing high valued-added products and technology. Dr. Ting-Kuo Lee, current Vice President of ANF, was elected the Chairman at the 2018 TANIDA Plenary Meeting in October 2018. In early 2017 Taiwan’s Nano Mark established in 2003, also the world’s first nano-product certification system, was transferred to TANIDA for the professional and independent functionality after 14-year operation under the auspices of the government.

Pic.1 NanoBiosensor for Rapid Detection Workshop and Product Display

Taiwan participated in ISO/TC229 on behalf of ANF

The ISO/TC229 Nanotechnologies 22nd Plenary Meeting 2019 was held on November 11-15 in Hangzhou, China. Professor Wei-Fang Su and Dr. Tsing-Tang Song from Taiwan participated in this 5-day event on behalf of Asia Nano Forum (ANF), the Liaison member of ISO/TC229. A PWI (Preliminary Work Item) proposal "Nanotechnologies – Performance evaluation of nanosuspensions containing clay nanoplates for quorum quenching" at WG5 proposed by Dr. Tsing-Tang Song has gotten the whole WG5's support. The ISO/TC229 agreed that this proposed PWI shall be registered and led by Dr. Tsing-Tang Song (ANF). A call for experts shall also be made. There are currently 5 Working Groups (WGs) under TC229 which includes JWG1 (Terminology and Nomenclature), JWG2 (Measurement and Characterization), WG3 (Health, Safety and Environmental Aspects of Nanotechnologies), WG4 (Material Specifications), and WG5 (Products and Applications). Among these 5 WGs, WG5 was recently created and aims to describe how nanomaterials are enhancing their capability or functionality and then to develop performance-based standards for nano-enabled or nano-enhanced products and applications. The current convener of WG5 is Dr. Tae Geol Lee from KRISS, Korea who was reappointed by ISO/TC229 as the convener of WG5 for a period of 3 years with effect from 1 January 2020.

Pic.2 Opening speech from ISO/TC229 Chairman, Dr Denis Koltsov

2. Regions' technical development related to nanotech activities

Taiwan's IANTP to the next stage

Initiated in 2015 and under the auspices of the Ministry of Science and Technology (MOST), Taiwan's Innovation and Application of Nanoscience Thematic Program (IANTP) launched the Call for Proposals 2020 recently. The four thematic areas are "Nanomedicine and Biotechnology", "Nanomaterials for Energy and Environment", "Nanoelectronics and Optoelectronics" and "Fabrication, Characterization and Mechanics of Nanostructures". In addition to current funded research from a basic "Concept Development" of Technology Readiness Level (TRL) to a more advanced "Prototype Validation", some added priorities are expected to strengthen IANTP's advantage, including fundamental issues for product

or developing technology and development of crucial equipment or key technology for solving scientific or industrial problems between TRL2 and TRL4. By linking policy programs such as MOST Germination Program and Industrial Value Creation Program for Academia (IVCPA) by Ministry of Economic Affairs (MOEA), it is expected to inspire researchers' in-depth thinking of technology commercialization and to achieve their entrepreneurial ambition. Up to the present, there have been five startups initiated by research teams funded by MOST grants. Major startups fall into medical devices genre, like NaviFUS Co., Ltd, Instant NanoBiosensors Co., Ltd, and TaiCRO Co., Ltd.

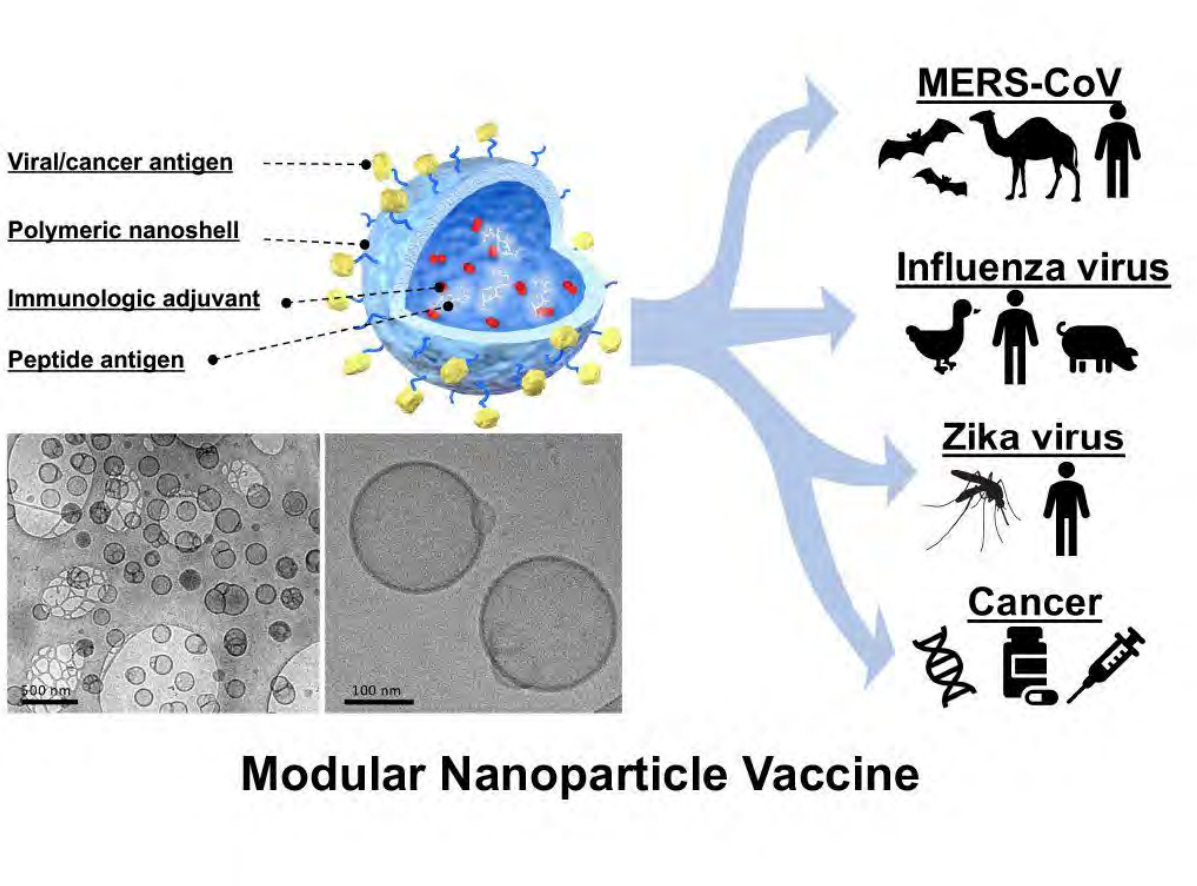
Taiwan continues to participate in the M-ERA.NET

Dr. Jason Chang, representative of National/Regional funding organization of Taiwan, the Ministry of Science and Technology (MOST), continued to participate in the M-ERA.NET Call 2019 Selection Meeting and Steering Board Meeting held in Riga, Latvia on 19-20 September 2019. About 30 participants from Germany, France, Austria, Belgium, Italy, Spain, Iceland, Sweden, Norway, Finland, Czech, Slovenia, Estonia, Lithuania, Latvia, Romania, South Africa, and Taiwan gathered to determine the result of pre-proposal evaluation. The rule is that the proposal must have at least three partners from two EU and associated countries, and funding support from two funding agencies. This year 124 pre-proposals including 6 pre-proposals with Taiwan teams' participation from 233 applications are recommended to submit full proposals. Six thematic areas of Call 2019 are "Modeling for materials engineering and processing", "Innovative surfaces, coatings and interfaces", "High performance composites", "Functional materials", "New strategies for advanced material-based technologies in health applications", and "Materials for additive manufacturing". All representatives at the Steering Board Meeting the next day also reached consensus on discussions about budget, progress of working groups, achievement review in the recent 5 years, and topics for Call 2020. M-ERA.NET is an EU funded network which has been established in 2012 to support and increase the coordination of European research and innovation programs and related funding in materials science and engineering. M-ERA.NET aims to develop a long-term cooperation between funding organizations from countries and regions across Europe and beyond. Taiwan's MOST jointed in the program in the same year as EU setup the M-ERA.NET program in 2012. For the past years, participation in M-ERA.NET has significantly raised the visibility of Taiwanese academia and also conduces to some successful cases.

Modular Polymeric Nanoshells for Precision AntiviralAnticancer Vaccination

Effectively inducing cytotoxic T cell expansion has been a critical challenge in vaccine development. To address this challenge, a research team led by Dr. Che-Ming Hu（胡哲銘）from Academia Sinica invented an entirely biodegradable polymeric nanoshell to couple antigensadjuvants for safepotent immune potentiation. The invention has been adopted for precision anticancer vaccine, broadly reactive influenza vaccine, an effective vaccine MERS-CoV. The nanoshell-based vaccine is highly adaptable for vaccine preparation, enabling facile preparation of safeeffective vaccine formulations. It also addresses a fundamental challenge in the development of customizable anticancer vaccine, thereby paving ways to effective anticancer treatments. The polymeric nanoshells are also amendable to other nanomedicne development for drugbiologics delivery. This technology was awarded the "2019 Future Technology (FUTEX) Award" from the Ministry of Science and Technology (MOST) and will be on show at FUTEX

Taipei 2019 on December 5-8, 2019 at the Taipei World Trade Center. FUTEX organized by MOST was first held in 2017.



Pic.3 Modular Nanoparticle Vaccine

Report from Thailand (NANOTEC)

1. Regions' nanotech activities related to ANF (Collaboration)

NANOTEC attended the ISO TC229 Plenary Meeting in Hangzhou, China

Standardization Administration of China (SAC) hosted the 22nd ISO/TC 229 Plenary Meeting in Qiangjiang New City (CBD area), Hangzhou, China from 11-15 November 2019. The meeting was organized by National Center for Nanoscience and Technology (NCNST). Dr. Sasitorn Aueviriyavit, Team Leader of Nano Environmental and Health Safety Research Team and Mr. Ramjitti Indaraprasirt, Manager of Nanosafety Alliance Section from NANOTEC, Thailand, joined the meeting as representatives of Thai Industrial Standards Institute (TISI). Dr. Sasitorn presented a New Work (NW) item related to "Development of 3D-intestinal model for nanosafety evaluation" to the ISO/TC 229/WG 3: Health, Safety and Environmental Aspects of Nanotechnologies. Participating members of WG3 will review, discuss, and consider whether to support the NW item. A total of 6 NW items were presented at the meeting. In addition, Mr. Ramjitti Indaraprasirt was invited to give a presentation on "Nanosafety and Standards Initiatives at NANOTEC" to the WG5: Products and Applications.

2. Regions' technical development related to nanotech activities

NANOTEC-COSMAX Collaboration on Cosmeceuticals Research and Innovation

On 26 August 2019, NANOTEC and COSMAX signed the Memorandum of Understanding (MOU) on cosmeceutical research collaboration at Thailand Science Park, Pathum Thani, Thailand. The NANOTEC-COSMAX Research Collaboration focused on nano encapsulation of tropical herbal extracts from Thailand and Korea for production of innovation cosmetic products from natural ingredients.

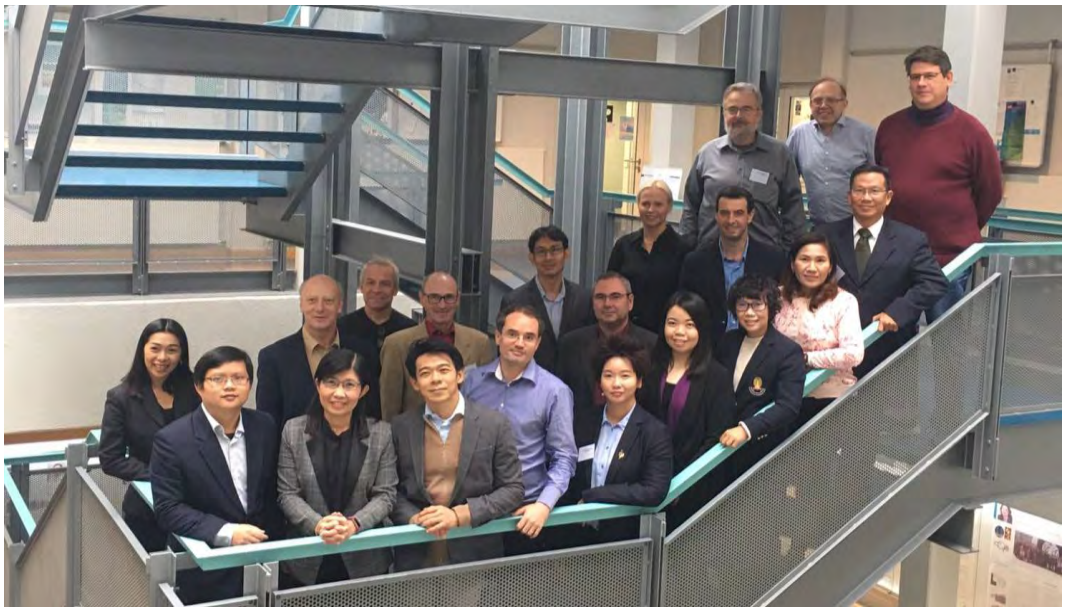
Herbal extracts and nutraceuticals are the fast-growing fields in nano research. Reports have shown that utilising nano encapsulation provides remarkable advantages over conventional formulations of extracts which include enhancement of solubility, bioavailability, expansion of stability, sustained delivery, protection from toxicity, and protection from physical and chemical degradation.

The 9th NANOTEC-NMRI Joint Research Meeting

On 29 August 2019, NANOTEC organized the 9th NANOTEC-NMRI Joint Research Meeting on 29 August 2019 at Thailand Science Park, Pathum Thani, Thailand. The aim of the meeting is to report the progress of existing collaborations and expand more collaborations on Smart Glass, Perovskite Solar Cells and Bacterial CNC-CNT Nanohybrids.

NANOTEC, NSTDA (Thailand) and NMRI, AIST (Japan) have established research collaboration since 2012. Both institutes have signed in LOI on Nanobiotechnology (2012-2014) and on Nanomaterials and related fields (2017-2020) and conducted annual joint research meeting for human resource development.

The 2nd Workshop on Nanostructured and Responsive Soft Materials: Molecular Design, Synthesis, Characterization



NANOTEC and Petroleum and Petrochemical Collage (PPC), Chulalongkorn University attended the 2nd Workshop on Nanostructured and Responsive Soft Materials: Molecular Design, Synthesis, Characterization during 7-8 October 2019 organized by Max Planck Institute for Polymer Research (MPIP) at MPIP, Mainz, Germany. The aim of the workshop is to promote research collaboration and knowledge sharing opportunities in areas related to “building block molecular engineering” and “surface nano-architecture”. The 1st workshop was held in Thailand co-organized by NANOTEC and PPC during 16-18 January 2018.

Inter-Lab Comparison 2019 (Gold Nanoparticles size measurement)

The call for the first comparison initiative was issued on 6 September 2017 for 3 types of Polystyrene latex and TiO2 nanoparticles. A total of 17 labs (13 overseas labs and 4 Thai labs). The measurement result was submitted to National Institute of Metrology Thailand (NIMT), Thailand on 31 May 2018 and a workshop to discuss the result was organized on 24 September 2018 at NANOTEC. This is the 2nd comparison initiated by NANOTEC. Results have all been submitted and is being analyse by National Institute of

Metrology Thailand (NIMT) who will certify the results after the proposed Workshop/Result Discussion Session on 6 January 2020 at NANOTEC.

Participating Laboratories (13 Labs and 4 Nations: Philippines, Iran, Malaysia, and Thailand)

1. Industrial Technology Development Institute, Department of Science and Technology (DOST-ITDI), Philippines
2. Sharif Central Lab Services, Iran
3. Paretavous Institute, Iran
4. Institute of Materials and Energy (MERC), Iran
5. Chemistry & Chemical Engineering Research Center of Iran (CCERCI), Iran
6. Central Research Laboratories of Shahid Beheshti University, Iran
7. Mashhad University of Medical Sciences, Iran
8. University of Tehran, Iran
9. MIMOS Semiconductor (M) Sdn. Bhd, Malaysia
10. SIRIM Berhad, Malaysia
11. Universiti Teknologi PETRONAS, Malaysia
12. National Characterization and Testing Service Center (NCTC), Thailand
13. National Nanotechnology Center (NANOTEC), Thailand

The comparison results will serve as a harmonization of measurement capability for nanoparticle size among the participating laboratories, and a base for further calibration consideration.

Report from Thailand (Nanoscience and Nanotechnology at King Mongkut's University of Technology Thonburi (KMUTT))

1. Working Group Report - Organize Nanothailand 2020 held by KMUTT.

KMUTT and Nanotechnology Association of Thailand have worked together to manage Nanothailand 2020 conference, where will be held in Bangkok between December 2-4, 2020. We decided to use the theme of "Nanotechnology in Times of Disruptive Transformation". The objectives of this event are to apply nanotechnology in a wide range of industrial and academic applications. In order to fulfill the objectives of this conference, we would like to invite all outstanding keynote speakers, guest speakers, researchers, and graduate students to share significant progress which has been worked through the areas of their expertise. Below, it is our Nanothailand 2020 banner for the conference. We welcome you all.

Report from Vietnam

National Nanotechnology Centre (NNC), an agency under the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) is responsible for the coordination of research, development and all related activities of nanotechnology such as awareness programme in Malaysia.

NNC has conducted a few prominent programmes in 2019, such as:

1. NANOTECHNOLOGY AWARENESS PROGRAMME

- ESTECC in School

Earlier this year, MESTECC Minister has announced a list of 73 MESTECC's Initiatives. These initiatives are the goals and targets that has to be achieved before the year ends. One of the initiatives that is mandated to NNC MESTECC is Energy, Science, Technology, Environment and Climate Change (ESTECC) in School. The outcome of the ESTECC in School initiative by the Ministry is to reach 1 million engagements with school students. Out of 1 million, NNC only obliged to conduct 25 programmes and to reach 7,500 students.

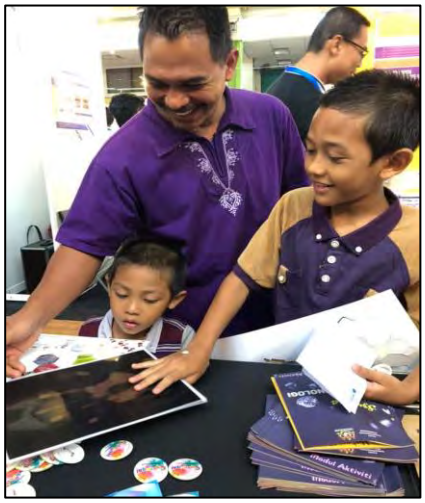
To achieve the initiative, NNC MESTECC has carried out 26 programmes in school that encompass around 11,820 students throughout Malaysia.

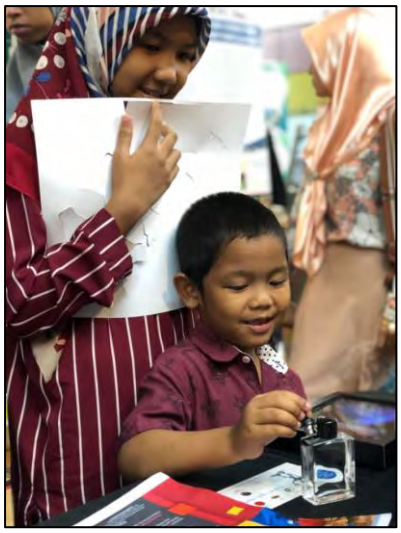
- **National Science Week**

Apart from ESTECC in School initiative, MESTECC also planned to have 2 consecutive events called National Science Week. The theme for the National Science Week was ‘Science for Peace’. NNC MESTECC participated the first phase of the National Science Week on the 1st – 7th April 2019 at the National Science Centre.

The second phase of the National Science Week was held in several states, and NNC MESTECC joined the exhibition on the 15th – 19th August, 2019 in the Kota Bahru, Kelantan.

The objective of having The National Science Week was to promote that Sciece is Fun. The activities carried out involved interactive learning, science show, and science applications that are being used in daily lives. NNC MESTECC’s exhibition offered interesting activities such as Playing wih Liquid Crystal, Ferrofluid and Making Buckyball Papercraft.





2. THE NATIONAL SURVEY OF NATIONAL NANOTECHNOLOGY'S RECENT CAPABILITIES 2019

The National Survey of National Nanotechnology's Recent Capabilities were conducted in 2019 by NNC to identify the capabilities and capacity of existing nanotechnology laboratories at all institutions, agencies and universities in Malaysia. This capability will be measured from four aspects namely Institutional Expertise, Capability, Human Resource, Finance and Research. In addition, the survey also seeks information and to promote co-sharing and access to critical equipment, facilities and expertise for rapid prototype development as well as to research and identify new technology development to a higher degree of Technology Readiness (TRL). The survey was also conducted by NNC to update the current national nanotechnology capabilities, and also to fulfil its mandate as the national reference centre. The survey also will provide NNC with the key information in preparing the nanotechnology strategic paper for the upcoming 12th Malaysia Plan 2021-2025. The survey were conducted in three (3) zones from April to October 2019, which involved the laboratories of 15 institutions of higher learnings and government research institutes.

3. WORKSHOP FOR UPDATING THE NANOTECHNOLOGY THEORITICAL EXAMINATION QUESTIONS FOR OLYMPIAD NANOTECHNOLOGY MALAYSIA 2019 COMPETITION

Two (2) workshops were conducted in July 2019 to update the nanotechnology theoretical examination questions. These workshops were conducted with The Association of Solid State Science and Technology Malaysia as the Scientific Committee for the Olympiad Nanotechnology Malaysia 2019 Competition. 15 academicians from various fields of nanoscience and nanotechnology were involved. A total of 416 questions were updated from the previous batch of questions created in 2017. The workshops were held in the Ministry Of Energy, Science, Technology, Environment and Climate Change hall and in the NNC meeting room in Putrajaya, the Federal Government Administration Centre.

4. NANOTECHNOLOGY COLLOQUIUM ON GaN, TERAHERTZ AND FLEXIBLE ELECTRONICS 2019

The Nanotechnology Colloquium on Gallium Nitride (GaN), Terahertz and Flexible Electronics was organised by the National Nanotechnology Centre NNC), Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) on 22nd August 2019 at Putrajaya Marriot Hotel. 40 participants were involved in this 1 day event. The main objective of organizing the colloquium is to bring together stakeholders in these technologies to present and discuss current and international scenarios and issues, and to provide a strategic plan for the formation of a focus group for research and technology development, focusing on the production of viable prototypes for commercialization. These technologies are the focus technology identified in Strategic Paper 21: Science, Technology and Innovation Sector, 11th Malaysia Plan, which has the potential to boost the national economy in the Communication, IoT and Electronics sectors related to the Industrial Revolution 4.0.

5. NANO KEBANGSAAN (NANOKEB) 2019 PROGRAMME

The NanoKEB 2019 Program was held on October 8-10, 2019 at the Malaysian Global Innovation & Creativity Center (MaGIC), Cyberjaya. It is the annual NNC MESTECC event which serves as a platform for stakeholders in the field of nanotechnology to interact and discuss the development of nanotechnology. NanoKEB 2019 includes activities such as:

(i) Interactive Program and hands-on Exhibition for students; and

(ii) Technical Workshop in collaboration with Strategic Partner as follows:

a. Workshop on Advanced Characterization of Nanomaterials 2019 - (Malaysian Nuclear Agency);

b. National Symposium on Micro-Nano Technology 2019 (NaSMiNT 2019) - SIRIM Berhad;

c. International Workshop on Recent Trend of Nanotechnology –Nanotechnology and Catalysis Research Center (NANOCAT), University of Malaya (UM);

d. National Electrospinning Workshop 2019 (NEW2019) - Center of Advanced Materials, University of Malaya (UM)

e. National Nanoelectronics Workshop 2019: Towards Industry4WRD - (MIMOS Berhad);

f. Workshop on Advanced Semiconductors and Nanotechnology (WASN 2019) - Institute of Nano Optoelectronics Research and Technology (INOR), University of Science Malaysia (USM); and

g. Nanotechnology in Forestry and Natural Resources Seminar 2019 (Nano-ForNaRes 2019) - Forest Research Institute of Malaysia (FRIM).

The NanoKEB 2019 Opening Ceremony was held on October 9, 2019 and was officiated by the Secretary-General of MESTECC, YBhg. Datuk Seri Dr. Mohd Azhar bin Hj Yahaya For the NNC-sponsored tournaments, the winning prizes were presented at the event. The competition is as follows:

a. Adiwira Nano (Nano Superheroes Short Video)

b. Nanotechnology Essay Writing (PENT);

c. Malaysian Nanotechnology Olympiad (ONM); and

d. Nanotechnology Innovation Research Project (PIN)


MAJLIS PERASMIAN
nano
KEBANGSAAN
2019
9 Oktober 2019
Malaysian Global Innovation & Creativity Centre (MaGIC)
Cyberjaya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TEMPAT PERTAMA


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