

2019



NATIONAL SCIENCE AND
TECHNOLOGY MUSEUM
Annual Report

2019



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Letter from the Director-General

The National Science And Technology Museum (NSTM) has upheld the spirit of "Fortifying Our Foundation, Seeking Reasonable Improvement and Pursuing Excellence", as well as the goal of "Friendliness, Professionalism, and Innovation". In 2019, NSTM has achieved outstanding performance and has been repeatedly recognized for service quality, energy saving, research and publishing, exhibition and education, as well as raising revenue and cutting expenditures.

In 2019, NSTM continued to focus on the pursuit of perfection to better services, and applied for "Excellence Management Quality" of the Chinese Society for Quality, and won the Three Star Medal award. NSTM is the only social education organization to have

won the award over the past 55 years, which obviously indicates that NSTM is actively in pursuit of excellence in the hope of providing visitors with "even better" services.

Corresponding to the urgent challenge of "climate change" facing the global community, the NSTM has obtained certification of the ISO 50001 Energy Management System in order to meet the long-term goals of greenhouse gas reduction and the vision of creating a sustainable green museum. NSTM also obtained the 2019 MOEA Energy Efficiency Benchmarking Contest Lock Team Silver Award, and was the only social education organization in Taiwan to have won the award. In addition, NSTM actively promotes various goals to implement the concept of sustainable development and social education of Sustainable Development Goals announced by the UN and Executive Yuan as the basis for the Green Museum project.

2019 is the 10th anniversary of the Morakot disaster and 20th anniversary of the 921 earthquake disaster. As the major social institution for disaster prevention education, NSTM renovated the "Recovery and Reconstruction After Morakot" to "Stories of Recovery and Reconstruction after Morakot", and introduced the "Soil and Water Conservation and Measurement Artifact" exhibition, as well as the "Awakening Technology and Preparedness for Disaster Reduction" and "Soil



and Water Conservation for Disaster Prevention" educational exhibition, systematically showing advanced aspects, new concepts and achievements in disaster prevention in order to enhance public awareness on the knowledge and reduction of disaster risks.

In addition, with the concept of "Education is the soul of the Museum" as stated in the book "Museums For A New Century", NSTM's duty bound to conducting activities related to science and technology according to the MOE's 2019 new curriculum, such as the "2019 1st Robotics Creative Competition", "Creative Maker Education Competition", and "Fun in Technology - Maker and Technology Education Festival", for the advocacy of emerging technologies to elevate knowledge of youths related to STEAM education.

In addition, in order to expand the international horizons of youths, NSTM organized the "2019 Technology Exchanges and STEM Coopetition for Junior High School Students in Malaysia, Thailand and Taiwan", "Bangkok Youth Scientific Exploration Camp" and "Wa-Sci Science-Based Tour of STEAM in Singapore for the Teenagers" to provide opportunities for overseas exchange

and exert influence as an atypical educational institution. NSTM plans to collaborate with more countries and units for overseas learning and exchange in the future, so that youths in Taiwan will have more opportunities to experience foreign cultures to broaden their global reach and horizons.

Since the opening of the Science and Technology Museum Station, visitors are provided with multiple selections of convenient and comfortable transportation. Meanwhile, NSTM provides the special offer "NSTM Train Tour" in cooperation with the Taiwan Railways Administration to encourage the public to visit museum by public transportation and protect the earth together by carbon reduction.

NSTM continues with self-development and transformation, and plans to organize various domestic and international exhibitions and educational activities based on close understanding of visitor needs and the concept of ubiquitous science, enabling visitors to explore science and enjoy science at NSTM!

Director-General

Shiunn-Shyang Chen





Annual Performance and Accolades

2019 NATIONAL SCIENCE AND TECHNOLOGY MUSEUM ANNUAL REPORT



The Story of Taiwan Agriculture

Annual Achievements

■ Exert the function of life learning and social education in conjunction with the national education policy

◎ Seek resources to organize diverse science education activities

NSTM has organized myriads of science education activities, where the experiential learning approach is adopted to let the public enjoy the hands-on experience and establish the concept of incorporating science into everyday life. The aim is to materialize the philosophy of "life with technology, technology for life".

● Science education activities were held in 2019

1,460 activities

295,495 people served



◎ Advocacy of emerging technologies to enhance the influence of science education

Corresponding to the promotion of the new 2019 curriculum from the Ministry of Education(MOE), NSTM has actively conducted science and technology courses and relative activities to improve the youth' s technology-related knowledge in STEAM (Science, Technology, Engineering, Art, and Mathematics).

◎ We uphold the spirit of fair share and social justice to help support the disadvantaged in scientific learning by use of external resources.

The NSTM Lanterns of Love Program has been the 7th successive year in 2019. This year (2019), the program received a subsidy of NT\$3,525,685 to support economically disadvantaged school children from Taiwan and offshore islands to visit NSTM for free.



● 2019 NSTM Lanterns of Love Program served

258 schools

5,441 teachers and students



◎ Facilitate international exchanges in science education

Expand the global perspective of youths, and organize the "2019 Technology Exchanges and STEM Coopetition for Junior High School Students in Malaysia, Thailand and Taiwan", "Bangkok Youth Scientific Exploration Camp" and "Wa-Sci Science-Based Tour of STEAM in Singapore for the Teenagers" to provide overseas students with exchange opportunities and exert influence of the museum as an atypical educational institution.

■ Create diverse features on educational exhibition to foster disaster prevention and popular science in Taiwan

◎ Career aptitude test for the establishment of "My future - Technological and Vocational Paradise"

NSTM has co-organized "My future - Technological and Vocational Paradise" and "Agronomy Wonderland: Intelligent Agricultural Machinery" exhibitions with National Kaohsiung University of Science and Technology and National Pingtung University to support the cultivation of talents that meet requirements of Taiwan's economic and industrial development. NSTM also guided students on their career aptitude test for preparation of future careers and to effectively achieve the function of social education.



In response to the 10th anniversary of the Morakot disaster, NSTM renovated the "Recovery and Reconstruction After Morakot" and renamed it as the "Stories of Recovery and Reconstruction after Morakot" to systematically demonstrate new disaster prevention concepts and achievements in various sectors and effectively improve public awareness on disaster prevention.



© Disaster prevention exhibition curated by NSTM

NSTM has dedicated efforts on cooperation opportunities and subsidies for the cultural relics exhibition "Rain and Rock Developments - Soil and Water Conservation Measures", educational exhibitions including "Awakening Technology and Preparedness for Disaster Reduction DNA" and "Soil and Water Conservation for Disaster Prevention", coupled with the National Disaster Prevention Day, which had led to outstanding achievements on conducting various advocacies for disaster prevention.



Tetris challenge: Taiwan's National Disaster Preparedness Day

■ Expand the budget scale to generate more services and value

◎ Proactive measures to raise revenue and cut expenditure

In 2019, NSTM raised revenue by NT\$188,058,633 and cut expenditures by NT\$59,089,260, totaling NT\$247,147,893.

● Total value of social resources raised

NT\$ **247,147,893**

◎ Development of theme merchandise based on NSTM's collections to increase revenue

Cultural and creative products were developed based on NSTM's collections to highlight their features and significance. We also continue to cooperate with suppliers on introducing cultural and creative products and providing multiple selections for visitors in the aim of increasing NSTM's revenue. In 2019, NSTM increased revenue by NT\$109,960 compared to 2018.

● 2019 Cultural and creative products

NT\$ **2,717,137**



"Pig Shape Puzzle Lock" cultural and creative product

■ In pursuit of perfection to better services and raise more annual revenue

◎ Enhance service quality to serve more people

By improving NSTM's overall environment, service processes, diverse exhibits, science education activities and service quality, we have served a total of 2,804,198 people in 2019.

● The total number of visitors in 2019 was

2,804,198



◎ Management of social media and improvement of customer relationships

Adopted diverse marketing channels to cultivate target customers and attract potential visitors. The information on the platform includes social education such as exhibition, technology education, collections and research, as well as reports on environmental protection and new scientific knowledge. NSTM's Facebook Fans group has the largest number of fans within museums subordinate to the MOE.

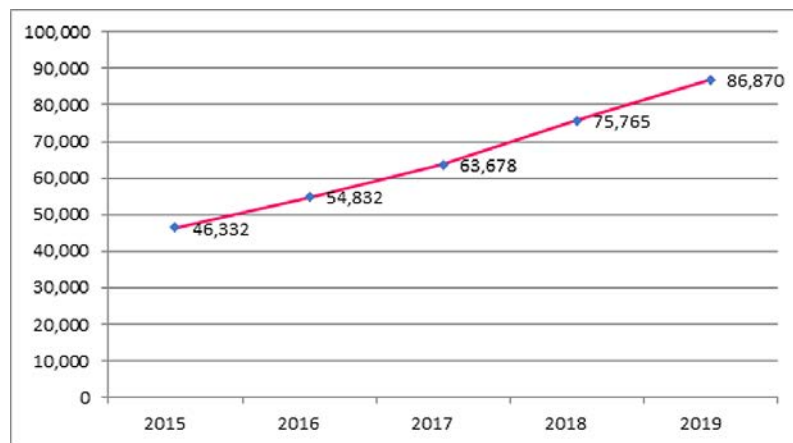


Figure1 Total number of fans on Facebook in the last 5 years

◎ Utilize social manpower resources to improve services

NSTM strives to manage and utilize volunteers, student volunteers, and interns more effectively in facilitating the day to day operation of the museum and offer visitors more comprehensive services. In 2019, a total of 1,207 volunteers were on duty for 205,467 man hours; 993 student volunteers accumulated 4,436 man hours of service; 77 interns accumulated a total of 21,608 man hours. The combined service time rendered by social human resources was 231,511 man hours, equivalent to that of 115 full-time staff at NSTM.

● Social human resources obtained were equivalent to

115 full-time staff



Volunteers provide assistance in experience activities

◎ Active Resource Widening and Implementation of Conservation Measures

With NSTM's business management strategies, coupled with increased revenue and reduced expenditures, raised income from venue rent and creative products development, we made additional revenue for NSTM funds. Self-raised income was NT\$209,866,000 in 2019, an increase of NT\$17,925,000 (up by 8.98%) compared to 2018.

● In 2019, NSTM's self-raised funds were

NT\$ **29,866,000**

growth **↑ 8.98%**

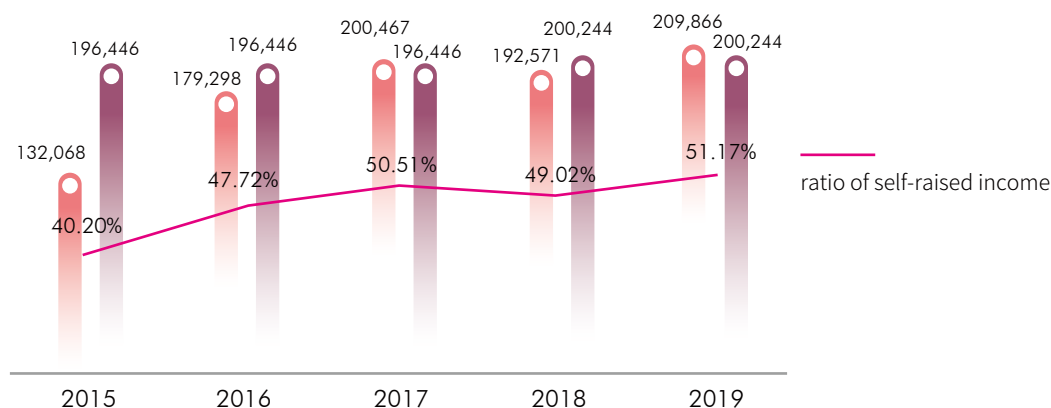


Figure2 Self-raised income in the last 5 years

Honors and Awards

1

NSTM's Taiwanese Journal for Studies of "Science, Technology & Medicine" and the "Technology Museum Review" have won the "Knowledge Impact Award" and "Knowledge Communication Award" in the 2019 Journals of National Central Library.

2

NSTM was awarded in "Excellence Management Quality" developed by the Chinese Society for Quality, and is the only social education organization that has won the award over the past 55 years.



Excellence Management Quality
Three Star Medal award

3

Won the 2019 MOEA Energy Saving Leadership Silver Award. NSTM was the only national museum winner of this award.



2019 Academic Impact Awards ceremony with NSTM's Director-General Shiunn-Shyang Chen (front row, second from right) as representative for receiving the award.



Colleagues led by Deputy Director-General WU Pei-Hsiu (Second from left) received the 2019 MOEA Energy Saving Leadership Silver Award.

4

"2019 Disease Prevention Excellence Official Group Award" of the MOHW



2019 Disease Prevention Excellence Official Group Award

6

NSTM obtained the ISO 27001:2013 International Accreditation and the BS 10012:2017 International Accreditation to ensure information security



ISO 27001:2013 Certification

5

Obtained certification for the "Evaluation of Environmental Education Facilities"



Obtained the certification of 2019 Environmental Education Facilities from the Environmental Training Institute of the Environmental Protection Agency of the Executive Yuan



History

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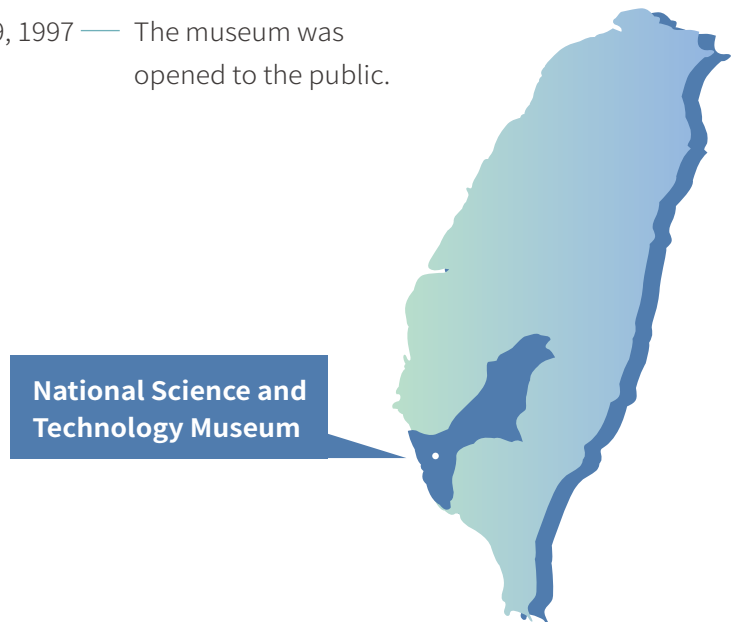
Industrial History of Taiwan

The National Science and Technology Museum (NSTM) was one of the central cultural facilities constructed in the "Project of County/City Cultural Center Construction" in The Twelve Construction Projects announced by the Executive Yuan in 1979. As the first museum of applied science in Taiwan as well as the first national institute of public education in Southern Taiwan, the focus of the museum is to collect and study scientific and technological objects, hold exhibitions related to science and technology and promote education as well as provide the public with a place for leisure and life long learning.

Located on Jiouru 1st Road, Kaohsiung City (originally City Park No. 6), the museum covers 18.35 hectares of land. The buildings contain a total building area of 20,682.83 m² and the floor area is 113,570.66 m² with 36.89 meters of structural height.

Brief Description of the Preparatory Process

- July 1986 — The Planning Council for NSTM was established.
- November 1988 — The Executive Yuan approved the construction plan.
- October 2, 1989 — Construction of the museum commenced.
- January 1, 1997 — The museum was officially established with the approval of the Executive Yuan and the Ministry of Education.
- July 26, 1997 — The south complex was opened.
- September 21, 1997 — The museum park was opened.
- November 9, 1997 — The museum was opened to the public.



North building

The building covers 15,007.55m². It contains the administration center, permanent exhibition galleries, special exhibition galleries, 3D Theater, Open Storage, True Dream Land, NSTM Green Shop and Green Living Exploratorium.

South complex


The building covers 5,412.61m². It contains the Popular Science Library, Popular Science Café, auditorium, lecture rooms, meeting rooms and Collections Storage. The LOHAS Energy Conservation House was set up in 2009 and sits on an architectural dimension of 262.67 m².



A photograph of three Volkswagen Beetles in light blue, lime green, and red, lined up on a track in a museum. The cars are positioned diagonally from the bottom left towards the top right. In the background, there are large, light-colored rock-like structures and a blue-lit tunnel. A metal railing is visible in the foreground on the right.

Development Missions

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 Climate Change

- 1 Establish comprehensive collections policies in order to collect, purchase and maintain relics of technology.**
- 2 Increase channels for utilizing museum collections and digitize relics of technology.**
- 3 Implement exhibit update mechanism to phase out old exhibition themes and revitalize the museum exhibits.**
- 4 Plan science education activities and teaching aids in conjunction with education policies and school resources.**
- 5 Strengthen public service functions, capitalize on media and community resources to formulate diverse marketing strategies and increase NSTM's visitor numbers.**
- 6 Improve NSTM's public safety by creating an outstanding environment and enhancing service quality.**
- 7 Automate administrative tasks and promote an online lifelong learning channel.**
- 8 Reinforce NSTM's digital services and elevate work efficiency.**
- 9 Create a digital library and provide different information through the online database; establish themed libraries on the Museum's research topics.**
- 10 Improve inter-museum exchanges and host academic seminars to improve the standard of research within the Museum.**
- 11 Set up a Museum Mall that combines technology, recreation and education.**
- 12 Boost museum attendance and build a world-class museum.**



Organization Structure

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Adventures in Health Land

■ Organization

Pursuant to the temporary regulations and staffing structure of National Science and Technology Museum as promulgated by the Ministry of Education with the Letter Year (1996)Tsan- Zi 85504426 on December 30, 1996, the National Science and Technology Museum has one director-general and one deputy director-general. Under them, the Museum operates through the Exhibition Division, Technology Education Division, Public Services Division, Secretariat, Personnel Office and Accounting & Statistics Office. Further in the light of the need for development of the Museum, the Information (MIS) Task Force was established on July 16, 1998 and Collection Research Task Force was established on February 1, 2001. Subsequently later on, pursuant to the amendment to the temporary regulations as promulgated by the Ministry of Education with the Letter TaiTsan- Zi - 0920113739A dated August 5, 2003, the Collections and Research Division was additionally established on September 1, 2003 and the establishment was approved by the Examination Yuan with the Letter Kao-Tai-Er-I-Zi 09200079281 dated September 22, 2003.

Besides, the Organizational Act of the National Science and Technology Museum was duly enacted under Order of

the President of the Republic of China, i.e., Hua Tsung-I+ Zi 10100022841 dated February 3, 2012 and was put into enforcement starting from January 1, 2013 under Order YuanShou- Yen-Tsung-Zi 1012260345 of the Executive Yuan (the Cabinet) dated March 8, 2012. Pursuant to the Organizational Act of the National Science and Technology Museum, the Accounting Office was reorganized into the Accounting and Statistics office.

In light of NSTM's development needs, task forces have been formed to promote certain services:

1. The Maintenance Team was established on January 1, 2013. In December 2015, the performance of NSTM's "Maintenance Team" was reviewed; furthermore, in conjunction with the personnel number evaluation, the Maintenance Team was dissolved on January 1, 2016, in order to restore the normal manpower of various departments.
2. In 2015, in response to NSTM's long-term needs in cultural artifact restoration and inspection, and to collect technological cultural artifact in a more systematic manner, science analysis and restoration technical equipment was purchased, and the Technology Cultural Artifact Inspection Center was formed under the Collections and Research Division on April 7. NSTM's organizational structure was shown as Figure 1.

3. A Cross-departmental Cultural and Creative Team was formed on March 26, 2014, in response to the cultural and creative development needs of NSTM, and appointed dedicated staff to form the CCT on March 1, 2019, in turn opening a new chapter in NSTM's cultural and creative development and marketing.

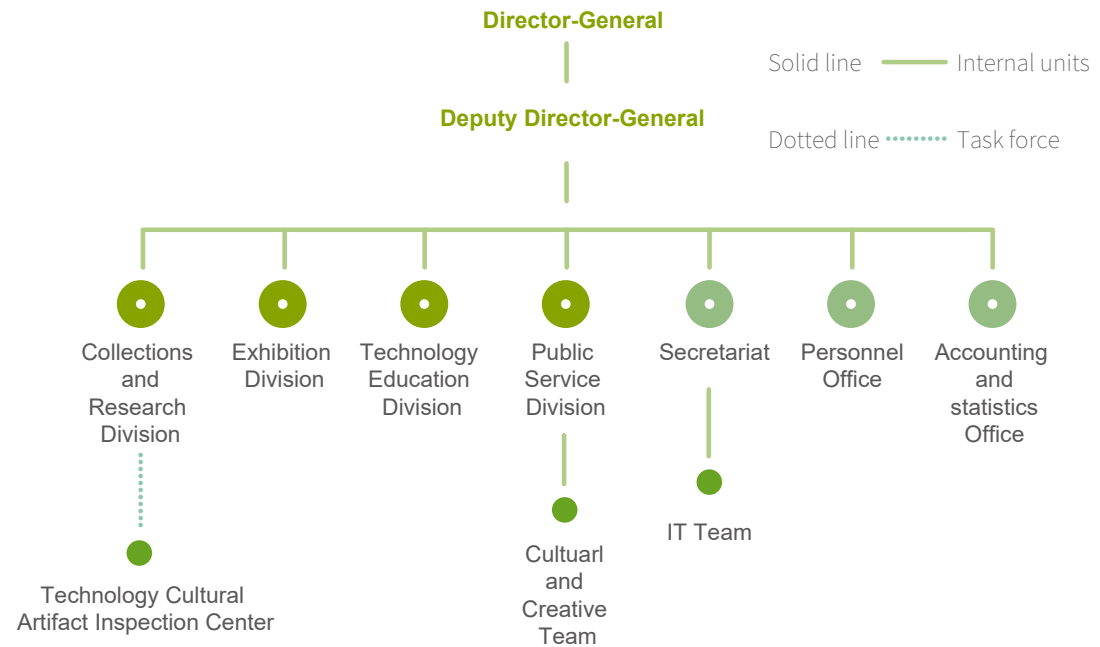


Figure 3 Organization Structure

■ Staffing

Statutory Staff

In accordance with the law, the total number of staff was 84. The museum was allowed to employ 28 professionals, 42 civil servants, 26 Senior Contract Employees, 20 Junior Contract Employees, 7 Technical Workers and 7 Support Workers, with a total of 134 statutory staff. The statutory staff analysis is showed as Figure 4.

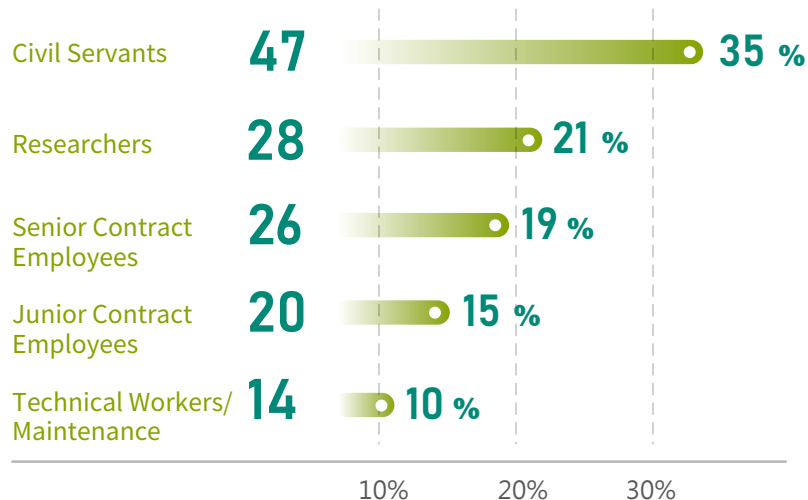


Figure 4 Statutory Staff

Current Staff

Our current staff (excluding volunteers and commissioned service companies) has a total of 134 people. (61 Males, 73 Females). The female ratio is 54%, while the male ratio is 46%. There were 9 managers (including director-general and deputy directorgeneral: 5 males, 4 females). The ratio of female managers is 44%, while the male ratio is 56%. There were 125 non-managers (56 males, 69 females). The ratio of female non-managers is 55%, while the male ratio is 45%. The managers and non-managers gender analysis is as Table 1.

Table 1 NSTM Managers and Non-Managers Gender Analysis

	Existing Number	Males	Male Ratio	Females	Female Ratio
Managers	9	5	56%	4	44%
Non-Managers	125	56	45%	69	55%
Total	134	61	46%	73	54%

Additionally, there were 28 Researchers (12 males, 16 females), 47 Civil Servants (26 males, 21 females), 45 Senior Contract Employees and Junior Contract Employees (14 males, 31 females), 14 Technical Workers and Maintenance Workers (9 males, 5 females). The personnel gender analysis is as Table 2.

Table 2 NSTM Personnel Gender Analysis

	Existing Number	Males	Male Ratio	Females	Female Ratio
Researchers	28	12	44%	16	56%
Civil Servants	47	26	55%	21	45%
Senior/Junior Contract employees	45	14	31%	31	69%
Technical/Maintenance Worker	14	9	60%	5	40%
Total	134	59	45%	72	55%

■ Educational Statistics

We currently have a total of 134 employees, out of which, there are 12 with PhDs, 65 with master's degrees, 57 college graduates or below. Our personnel educational statistics analysis is as Figure 5.

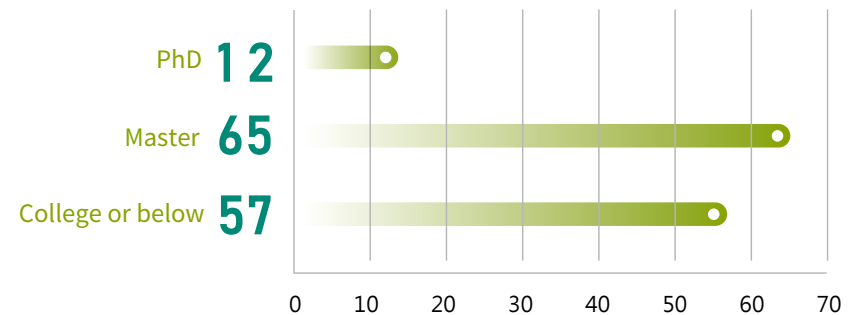


Figure 5 Personnel Educational Statistics

Researcher Backgrounds

Researchers educational statistics

We currently have 28 researchers, out of which, there are 10 with PhDs, and 18 with master's degrees. Our researchers' educational statistics analysis is as Figure 6.

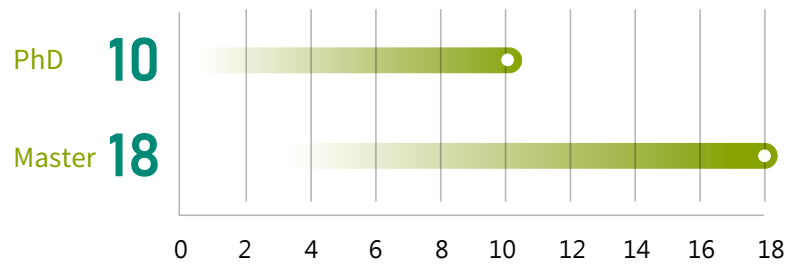


Figure 6 Researchers Educational Statistics

Researchers academic background statistics

We currently have 28 specialized personnel, out of which, 11 are affiliated with Science and Technology, 6 are affiliated with Education, 1 are affiliated with Design, 10 are affiliated with Humanities and Social Sciences. Our researchers' academic background statistics analysis is as Figure 7.

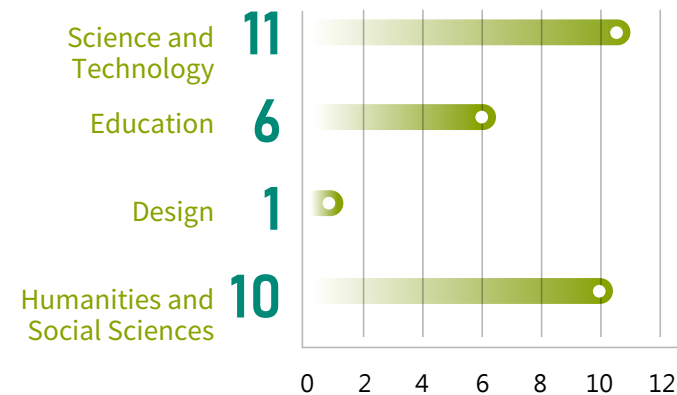



Figure 7 Researchers Academic Background Statistics

Collections and Research

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 Open Storage

Under the principle of sustainable development, and with the mission of preserving or recording technology, science and civilization for the development of domestic and global industries, the Collections and Research Division has brought together the concepts of "integrating science into daily lives and integrating daily lives with science" in promoting our key operations. Furthermore, we have applied the scientific spirit of "pragmatism", "rationalism" and "utilitarianism" to conduct the collection and research of important technological items, and the promotion of related activities. Our goal is to reinforce NSTM's professionalism and elevate operational performance.

The 2019 annual operations on object studies and promotion, collection management and applications, artifacts maintenance and inspections, Open Storage, academic exchanges, research outcomes and publication statistics are as follows:

■ Object Studies and Promotion

In 2019, the NSTM continued the interpretation, research and promotion of our collections and industry objects, including the following themes and fields: measurement artifacts; printing industry; lock study; weaving industry; Taiwan sugar industry; Taipower collections; broadcasting industry; telecom collections; and disaster prevention-related artifacts. The findings of the study were used in academic papers and educational promotions.

In order to utilize NSTM's technological collections to develop "innovative values", we took advantage of new technology and multimedia technology to implement digitization and artifact research. Furthermore, related research was embodied in artifact exhibitions or digital website information based on the museum's collections, such as measurement artifacts, printing antiques, and telecom collections, to elevate their accessibility and benefit.

In terms of measurement artifacts, we took digital 3D photos of 20 artifacts, digitally scanned 1,092 pages of artifacts, carried out 8 interviews with past presidents of the Taipei Measuring Instrument Association. We also developed the "Water Meter Exploration Box" and the "Weights and Measures Movable Teaching Kits" for the

"World Metrology Day" and "Remote Area Inspection" scientific knowledge promotional activity.



Taipei Measuring Instrument Association interview

For printing antiques, the NSTM jointly cooperates with the Print Tech Team of the Department of Graphic Arts and Communications, National Taiwan Normal University, on the research and study of the world's earliest movable mud type printing technology, as well as exhibitions on teaching aids of "Device for simulating Bi Sheng mud type printing" and NSTM's collection of movable type printing artifacts and tools, in order to allow visitors to understand the printing machines and various printing methods of different periods.



Mr Hsu Chao-Fu of National Taiwan Normal University demonstrates the Ceramic movable type Bi Sheng printing

NSTM has passed the Development Enterprise-Academic collaboration project "Creative Design and Commercialization of Traditional Puzzle Locks", which studied the historical development of world locks and locks antiques, analyzed the designs, and performed lock restoration. Meanwhile, NSTM developed the "cultural and creative merchandise of the Six-move Puzzle Lock", and relative research results are published in 2 book chapters.

In addition, it also offered limited sales of the cultural and creative product "Pig Shape Puzzle Lock" with hidden tricks in cooperation with ARNOS Corporation. The charm combines creative ideas of lock antiques with the external design of the Taoyuan pig, a native Taiwan breed, and features collection, gifting, and puzzle games.



"Pig Shape Puzzle Lock" shows the combination of ancient wisdom and modern creativity

Along with the effective "2019 Telecom and Museum Cooperation Plan", NSTM digitized 5,114 pages of the ancient references, finished photo shooting for the 100 objects exhibited in the Telecom Hall, added descriptions for 8 items, and revised 150 items of literature. In addition, 654 items of literature are in temporary custody. At the same time, the NSTM reviewed, expanded, and rectified the website of the Digital Telecom Museum, promoted 5 digital websites, uploaded 10 oral history interviews, published a paper related to the Digital Telecom Museum.



電信推廣
回到1969—走入電信時光隧道
1969年7月20日為人類首次登陸月球，阿姆斯壯在當時講出傳揚國際，並流傳至今的經典之「一大步。」 ("That's one small step for a man, one giant leap for mankind." - Neil Arm.
■ 發佈日期：108-07-25



電信推廣
電信文物金句大賞
【活動簡介】電信數位博物館舉辦「電信文物金句大賞」囉！邀請您用一句話來幫電信文物「話時代」精美書籤，及科工館常態展示廳門票，讓您親自至科工館參觀電信文物！【活動
■ 發佈日期：108-06-26



電信推廣
518博物館日—答題抽獎活動
答題抽獎活動 響應節日，電信數位博物館也在今日舉辦抽獎活動囉！本網站分享民視節目——
■ 發佈日期：108-05-17

Digital Telecom Museum Website Promotion

For the broadcasting industry, by use of the equipment of the fourth studio production control room donated by Taiwan Public Television Service Foundation, it launched the "Behind the Scenes: Inside the Production Control Room" in the Open Storage, and organized 12 sessions of "Kid Reporters" family activities to allow public to gain knowledge and understanding the recording process in TV station.



The equipment in the production control room of the Taiwan Public Television Service (PTS) TV studio 4 has been assembled, restored and exhibited in the Open Storage.

In addition, in order to enhance the value of NSTM, we search for industry cooperation opportunities from various aspects. In 2019, the NSTM has conducted plans such as artifact recondition, inspection and research, cultural and creative designs, product development and marketing in cooperation with the Ministry of Culture, the Ministry of Science and Technology, the Industrial Technology Research Institute, Taiwan Power Co., Ltd., Taiwan Sugar Corp., as well as the textile industry, in the aim to improve the NSTM's service function, social education image, and research power.

■ Collection Management and Applications

Since NSTM was opened 2 decades ago in 1997, we have adjusted various collection management systems over the years, resulting in the comprehensive system of today. In 2019, the collections are temporarily classified, 87 items from 31 batches of artifacts were added to the collection, 2 items from 1 batch of artifacts were added in temporary custody, and 20 letterpress related artifacts were reclassified as a permanent collection.



20 printed artifacts such as the Compositing Room were reclassified as a permanent collection

In 2019, NSTM collected artifacts systematically from organizations with collection theme. Moreover, NSTM promoted collection service hotline (ext. 5200) for individuals by use of Facebook fan page, NSTM Newsletter and the Technology Window to encourage people to donate private property to museum as public property for cultural and educational use.

Table 3 Collection statistics over the last 5 years

Item Year	Total	Collected	Purchased	Donated	Transferred	Other	Annual Accumulated Number	Temporary Custody
2015	341	65	0	243	33	0	40,474	8
2016	919	1	0	326	76	516	41,393	0
2017	405	30	0	329	46	0	41,798	0
2018	2,337	3	2,002	306	26	8,415	52,550	0
2019	412	31	195	166	20	0	52,962	2

Systematically collected from National Invention and Creation Awards with music recorders (music on vinyl and cassette tape), there were 412 pieces of collection recruited in 2019, and the annual accumulated collection has reached 52,926 items. Table 3 illustrates the collection statistics over the last 5 years.



Artifacts collected in 2019

In order to increase the visibility and utilization rate of our collections in 2019, 990 exhibits and telecom artifacts under NSTM's temporary custody were displayed in the permanent exhibition hall (including public space exhibitions), 103 collection items were displayed in NSTM's special exhibitions, 19 exhibits were loaned to other museums, 231 exhibits were displayed in the Open Storage, and 1,410 exhibits were used in the Open Storage's monthly promotional activities. In 2019, NSTM achieved outstanding performance with two themes collections to curate permanent exhibitions in the Open Storage. Table 4 illustrates the utilization statistics of technology artifacts over the last 5 years.

Table 4 The utilization statistics of technology artifacts over the last 5 years.

Item Year	Total	Research	Teaching	Exhibition*	Other**
2015	3,893	250	0	2,201	1,442
2016	3,852	254	0	2,206	1,284
2017	4,101	2,020	0	1,747	340
2018	10,019	6,080	0	1,954	1,985
2019	5,293	150	0	2,753	2,390

*Internal/external exhibitions, including Open Storage exhibits and telecom exhibits under NSTM's temporary custody.

**Including digitization, maintenance, inspection, picture loaning, cultural and creative application.

■ Artifacts Maintenance and Inspection

NSTM has been devoted to artifacts maintenance and inspection, systematic collection of technological antiques, provision of professional advice on the preservation of cultural artifacts, and training of preservation specialists. We have been playing an essential role in South Taiwan's technological cultural asset maintenance.

The NSTM also conducted internal operations such as artifact inspections, packaging, transport, display and exhibition space adjustment to comply with the museum's special exhibition activities, and supported 1 international loan exhibition, 3 domestic loan exhibitions and 4 self-exhibitions, and a total of 197 artifacts were cataloged.

NSTM has launched the Artifact Condition Inspection service since 2015. In 2019, portable X-ray detectors, XRF handheld analyzers and non-destructive instruments were used to support external units on artifact inspections for conservation and maintenance.

In addition, we also take external projects for restoration and research, the Restoration of Chiang Kai-Shek's Chair missioned by the .O.C. Military Academy was one of cases. We invited Ms. Rosie Cock, an Australian fabric repairman, to co-work on the artifact's restoration in Open Storage, and enabled visitors to observe the implementation of artifact restoration on site which will improve public knowledge and understanding of artifact preservation and maintenance of objects.

Meanwhile, there are restoration demonstrations in our Open Storage from Tuesday to Friday, and we have a live show of the restoration process on the TV at the entrance of Open Storage so that visitors can see how our collections are maintained and repaired from outside the Open Storage.



Besides 32 inspections, we conducted 8 charged inspection and maintenance services as well as 5 artifact maintenance workshops in 2019. This not only showed our specialty in the preservation of technological heritage, but also brought in an additional revenue for the museum and promoted the knowledge and technique of the preservation of historic works.



Ms. Rosie Cock, a repairman of Cheng Shiu University of Science and Technology, assists in the restoration of Chiang Kai-Shek's Chair in the Open Storage.

Support Taichung City's Wanhe Temple on artifacts investigation and inspection

■ Open Storage

Open Storage was completed in 2009 and incorporated into NSTM's experience facilities and officially opened to the public in 2010. Unlike storage in the majority of museums that are normally closed to the public, NSTM's Open Storage uses the new display mode of "visible collections" which combines functions on collection, research, display and education. A wide range of experiential activities were also conducted to enhance people's understanding of the scientific principles and applications.



Students were listening to the introduction of 1950's 35mm movie projectors.

Visitors to the Open Storage can view collected items closely and understand related tasks such as museum collection studies, collection management, and cultural artifacts maintenance, thereby conveying the importance of science, industry culture, preservation and maintenance. In 2019, NSTM held 6 collection exhibitions and 12 collection promotion activities, with a total of 12,746 visitors. Table 5 shows the service performance of Open Storage over the last 5 years.

Table 5 Service performance of Open Storage over the last 5 years

Year	Number of visitors	Income generated
2015	16,755	187,655
2016	16,408	107,680
2017	14,786	122,930
2018	10,886	72,370
2019	12,746	128,780



Academic Exchanges

From October 17-18, 2019, NSTM and 5 organizations including the Graduate Institute of Conservation of Cultural Relics and Museology, Tainan National University of the Arts, NCKU Museum, the Department of Theater Arts, National Sun Yat-sen University, and the Chinese Association of Museums jointly held the "2019 International Conference on Contemporary Challenges for Museums". 3 lecturers were invited to attend the conference, and 64 dissertations were published. A total of 337 people took part in the conference which provided participants with a platform for professional discussions to develop further exchanges and learning.

Domestic and foreign museum professionals and scholars attended the conference to deliver keynotes and presentations.

■ Research Outcomes and Publication Statistics

For the research findings in 2019, a total of 33 journal papers, 40 conference papers, 5 book and 10 relevant publications were published. NSTM also participated in 29 research projects. The devotion and effort of the NSTM personnel proved to be beneficial to museology-related fields. Table 6 illustrates the research findings and publications over the past 5 years.

Since the initial publication in March 2001, the Taiwanese Journal for Studies of Science, Technology & Medicine, issued by the NSTM and published by the Taiwan Science, Technology and


Society (STS) Association, has been a major journal in the field of science and technology. Meanwhile, NSTM's Taiwanese Journal for Studies of Science, Technology & Medicine and the Technology Museum Review have won the "Knowledge Communication Award" and "Knowledge Impact Award" of the "Academic Impact Awards" given by the National Central Library in 2019.

Table 6 Research findings and publications over the last 5 years.

Item Year	Journal Papers	Conference Papers	Research Projects		Invited to Academic Lectures	Publications					Sympo- siums	Lectures
			NSTM Personnel as Hosts	NSTM Personnel as Participant		Books	CDs	Text Messages	Folded Leaflets	Journals		
2015	27	41	12	6	12	4	0	1	0	2	9	26
2016	26	35	18	17	23	3	2	7	1	2	2	22
2017	43	47	21	6	24	6	0	0	2	2	4	45
2018	36	42	30	5	5	1	0	0	4	2	11	6
2019	33	40	22	7	19	5	0	1	7	2	2	21

Exhibitions

2019 NATIONAL SCIENCE AND TECHNOLOGY MUSEUM ANNUAL REPORT

 Pavilion of Dream Transport

2009年
國家建設
卓越獎

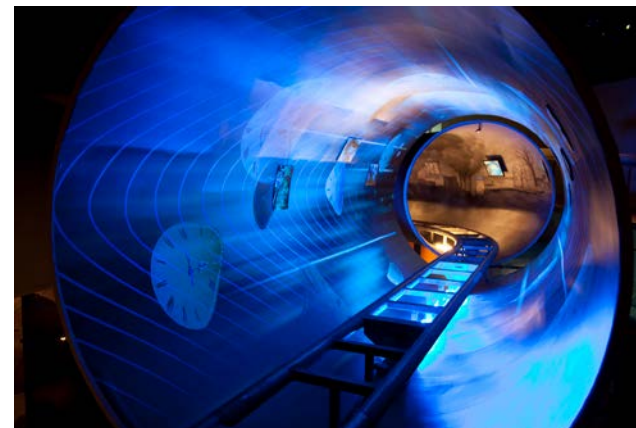
美麗島站第二名

美麗島站



消防栓
HYDRANT

In 2019, the Exhibition Division continued to follow the three main directions of NSTM's "Vision", "Objectives" and the "Spirit of Government Service Award" on promoting related businesses. NSTM introduced a total of 44 exhibitions, performed one large-scale permanent exhibition hall renovation, updated partial exhibition units in 5 permanent exhibition halls, as well as conducted 27 special exhibitions, and 11 exhibitions in the Art Exhibition Area. We also introduced 16 activities in permanent exhibition halls, as well as 3 activities in exhibition halls in conjunction with festivals. A total of 725 activities were launched in 2019. By constantly maintaining the exhibits and expanding the intelligent inspection system, we have achieved a normal exhibit functioning rate of over 98.62%, while the 3D Theater achieved a normal functioning rate of 100%. Refer to Table 7 for the number of exhibitions organized and exhibition hall renovations over the past 5 years.



■ Permanent Exhibit Hall Renovation

The Exhibition Division is facing the challenge of maintaining the attractiveness of each exhibition hall by optimizing creativity and professionalism under limited funding and different conditions of the exhibitions. In 2019, the resources of the MOE's Smart Museum Project support partial renovations of the smart manufacturing area in 3 permanent exhibition halls and 2 R&D Projects for the permanent exhibit hall renovation in 2020. We also bring in resources from the MOST to update exhibitions and encourage curators to held activities within 16 permanent exhibition halls in 2019.

Table 7 Number of exhibitions organized and permanent exhibition hall renovations over the past 5 years

Item Year	No. of Exhibitions	Permanent exhibit hall renovation		Normal functioning rate of Exhibits
		Complete renovation	Partial renovation	
2015	33	2	5	92.50%
2016	39	2	6	94.32%
2017	34	1	8	96.69%
2018	40	1	10	97.32%
2019	44	1	5	98.62%

1. Wearable e+Clothing

The Textile & Clothing exhibition hall is established based on Taiwan's textile technology. With the development of the smart manufacturing industry, "Wearable e+Clothing" has currently become the focus of R & D in the industry. In 2019, the Wearable e+Clothing Exhibition and Experience Area was established in compliance with the Smart Museum project with the collaboration of textile companies such as Sunstar Taiwan Enterprise Co., Ltd., Ruentex Industries Limited, Taiwan Textile Research Institute, Everest Textile Co., Ltd., and Formosa Taffeta Co., Ltd., introducing the evolution of smart textile factories, materials and technologies, as well as the application of wearable e+clothing in daily life in the "No Ordinary Family" area.



The concept of smart textile factory guides the public in understanding the future development of the textile industry



The evolution of the Wearable e+Clothing Exhibition and Experience Area has introduced smart technology in the advent of the Smart Era

2. Smart Farming

"The Story of Taiwan Agriculture" exhibition hall focuses on the development of quality agriculture in Taiwan, introducing the achievements of Taiwan's development in agricultural diversification in order for the public to understand more about the technology and development vision for the application of smart technology on agricultural management. The exhibition is updated and expanded to introduce smart farming mainly based on livestock farming, including the pig industry, livestock and poultry, and milk industry, in the hope that the public can further understand the connection between smart farming and daily life.

Smart Farming - Milk Industry

3. The "Smart Cooking" Area Planning and R&D Project for the "Science of Cooking" Exhibition Hall

The Department of Industrial Design of National Union University conducted a 6-month preliminary study in order to renew the original story line of the "Science of Cooking" exhibition hall from traditional hand-made cooking to the comparison between tradition and smart technology that brings about significant change in people's diets.

4. The "Smart Healthcare" R&D Project for the "Adventures in Health Land" Exhibition Hall

In order to promote the government vision of smart living, the NSTM has conducted four smart manufacturing experience areas since 2018. The contents of "Smart Healthcare Exhibition" R&D project will be used as the basis for exhibition planning which are mainly classified into four sessions : "what is smart healthcare" introducing its future development ; "smart home", "remote cloud" and "smart hospital" revealing the application environments of smart healthcare. And specially designed apps are used to allow visitors to interact with exhibitions and experience the unlimited future of intelligent automation and Industry 4.0.

5. Partial Renewals in the "Telecom@Taiwan" Exhibition Hall

Obtained NT\$1.3 million funding from Chunghwa Telecom Co., Ltd. and Taiwan Telecom Industry Development Association to continuously update "Telecom@Taiwan" exhibition hall that has been open for 8 years. The renewals included the update of old equipment and three video clips, as well as 15 oral history interviews from senior telecommunications staff which serve as the basis for subsequent exhibit updates.



Mobile communications in disasters and emergencies used the interviewed contents of the senior staffs in 2018.

6. Partial Renewals in the "Magic Land"

By using the funding of MOE's medium-range project, the partial renewals were performed under the premise of maintaining the original exhibition framework to update three thematic areas: "Magic Forest", "Illusion Village" and "Castle of Light". It uses images to highlight the special atmosphere and provide magical, colorful and refreshing visual experiences from the entrance to the internal decoration of the exhibition hall and parts of the original exhibitions were replaced and updated.



The Magic Land

7. Partial Renewals in the "Open Sesame Science Exploration Center"

In 2019, under the topic of "New Innovations in Wound Healing", NSTM updated the original exhibit "Skin Structure and Wound Healing" in the exhibition hall, with 2D animation and cell Membrane Models in combination with the MOST subsidized "2019 Museum-Based Innovative Biomedicine Transformation Project: Biomedicine Innovation Popular Science Promotion Program". The new exhibit "CO₂ to Accelerate Wound Healing?!" used the experimental scene to attract the visitors' attention with an injured mouse in the healing process. By operating the experimental equipment for applying medication to the mouse, followed by the 3D animations to show the reaction of the wound to nanomedicine in microscopic images, visitors can clearly understand the effect of medication on the wound. Finally, the interactive Q&A allows visitors to think about their findings and the wound of the rat on the conveyor belt is also healed after the problem of wound healing is solved by the visitors.



"New Innovations in Wound Healing" Interactive Exhibits



Vice Premier Chen, Chi-Mai of the Executive Yuan and Deputy Minister Fan, Hsun-Lu of the Ministry of Education attended to the opening ceremony of the "Stories of Recovery and Reconstruction after MORAKOT".

8. Stories of Recovery and Reconstruction after MORAKOT

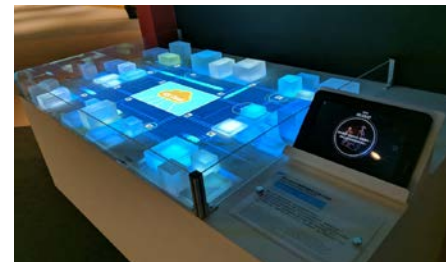
In response to the 20th anniversary of 921 earthquake disaster and the 10th anniversary of the Morakot disaster, the NSTM renovated the "Recovery and Reconstruction After Morakot" that was opened on August 8, 2014 to "Stories of Recovery and Reconstruction after Morakot" with guidance and support from units including the Executive Yuan, MOE, Water Resources Agency of the MOEA, Council of Indigenous Peoples, Soil and Water Conservation Bureau, Central Geological Survey, Central Weather Bureau, Directorate General of Highways, Tourism Bureau, and National Science and Technology Center for Disaster Reduction. In addition to review the history of the disaster and record the

Morakot disaster experience, we also emphasize cutting-edge and advanced technology to systematically exhibit the progress and achievements of disaster prevention and relief in all sectors 10 years after the disaster, and continue to conduct education promotion activities related to the exhibition after its opening.

9. Partial Renewals in the "Innovating A Better Future"

Opened in 2017, "Innovating A Better Future" is a permanent exhibition hall that introduce 34 of ITRI's innovative technologies, which combined modern technology by using "handheld tablets" as the "advanced R&D record book" for visitors to interact with the exhibits and have a deeper understanding of the innovative technologies.

From the end of 2018 to the beginning of 2019, three new innovative technology exhibits were added, including "iRoadsafe", "Handy Smart Vegetables & Fruits Pesticides Detector" and "EleClean".



iRoadsafe and tablet display

10. Nobel Prize Area updated

The Nobel Prize is set up according to Mr. Alfred Nobel's will to award "The Greatest Benefit to Mankind". The Nobel Laureates are announced in October every year. The prizes include Physics, Chemistry, Physiology or Medicine, Literature, Peace and Economic Sciences. NSTM provides an easy to understand introduction of various laureates and their accomplishments. The 2019 Nobel Prize in Physiology or Medicine was awarded jointly to 3 scientists who study the mechanisms of oxygen and physiological effects. The Nobel Prize in Chemistry was awarded to 3 scholars who developed lithium batteries that are indispensable in daily life!



The Nobel Prize area on the first floor is updated on an annual basis

11. Activities in the Permanent Exhibition Halls

In order to make the exhibitions more attractive and enrich visitors' experiences at the NSTM, the curators are encouraged to combine maker spirit and external resources to plan and execute activities in the permanent exhibition halls by using new knowledge, methods and technologies. In 2019, 16 activities were held by resources outside the museum through applied projects or co-organized events, in order to launch the events and the NSTM also conducted corresponding activities in 3 exhibition halls



Introduction of Smart Coffee Maker at the Power and Machines Exhibition Hall

in conjunction with special festivals.



The Story of Taiwan Agriculture

12. The Development of Museum Souvenirs and Teaching Aids

The influence of exhibitions can be expanded through the development of museum souvenirs and teaching aids. The achievements in 2019 are as follows: 2 souvenirs were developed by "KidsFest of 5 Asean countries" special exhibition, a paper automaton material package developed by the "Automaton Exhibition", and a DIY kit for earthquake-resistant constructions was sold over 1,200 DIY material packages. In addition, the NSTM co-organized the "Subsidy for Projects for Digital Humanities with Social Education Institutions as the Base": "Creating an Industry 4.0 Popular Science Learning Platform" program with Shu-Te University and Kaohsiung Industrial High School, and designed

a set of comprehensive multiple teaching plans and materials, which included 24 units of audio e-books, AR Tower Defense games, and board games, and two Maker teaching plans and aids: Autonomous Mobile Vehicle and robotic arms.



2019 Ministry of Education disaster prevention experience activity was conducted by use of the DIY packages for earthquake-resistant constructions



Industry 4.0 educational activity



The disaster prevention education festival in 2019 "National Disaster Prevention Day" was conducted in Pingtung County by use of the DIY material packages for earthquake-resistant constructions

Self-curated Special Exhibitions

The NSTM constantly introduces new special exhibitions as the main attraction to draw visitors. In 2019, the exhibition division used 2 strategies based on the aspects of attracting new visitors and revisitors, improving media exposure and promoting new images. The first strategy is to create special exhibitions by professional curators with years of experiences to attract people to visit the museum. The second strategy is to promote renting and conducting co-exhibitions in exhibition halls via efficient management and proactive approach to raise NSTM's revenue as well as the number of visitors.



Exhibition Corner - Designer Studio

1. Automaton Exhibition

An automaton is self-operating machine designed to perform specific actions by its own power source and transmission mechanism. The automaton exhibition invited Professor Tsung-i Lin, the ancient machinery restoration expert, and Yi-Hsiu Tang and Chi-Chun Yin, the local automaton designer, to jointly exhibit their works, which allow visitors to learn about the application of automaton in daily life by the introduction of relevant knowledge, pictures, film analysis, and practical experience.



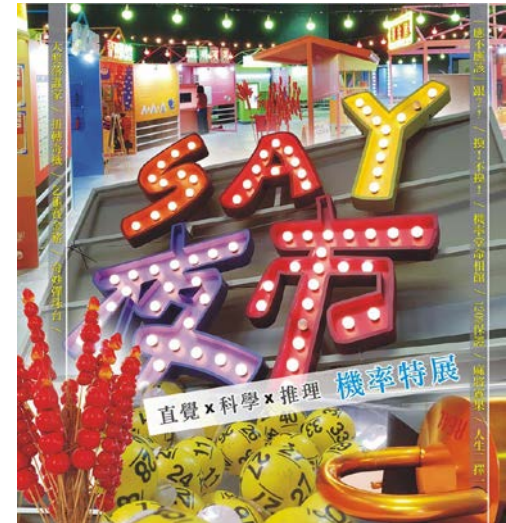
Automaton theaters to demonstrate how to move puppets by the control mechanism

2. KidsFest of 5 ASEAN Countries

This special exhibition focuses on children's favorite "toy and games", "desserts and snacks", "nursery rhymes" and "traditional clothing", which involves the life experience in the stages of children's growth. New residents from the 5 countries including Vietnam, Indonesia, Thailand, Malaysia and Cambodia shared interesting experiences for the public to understand the childhood culture of their countries. It hoped to provide interesting cultural exhibits to share with visitors to achieve the goal of respect for diversity and differences in a harmonious society with diverse ethnic groups.



Traditional Costumes of 5 ASEAN countries



The Probability in Life

3. The Probability in Life

Pinball Machine, Mahjong Bingo, Sausage Gambling ... Which game do you think is most attractive in the night market? Can I win a prize with gaming skills? Or with luck? On December 13, 2019, the hidden secrets of the games were interpreted by "probability" for the first time. We welcome visitors to come to "The Probability in Life" exhibition to challenge themselves on their knowledge of mathematical probability and experience that different choices may have different results. The exhibition continues till May 31, 2020 and brings about different ideas of fun in life for visitors to enjoy the feeling of an unknown future!

■ Intelligent Maintenance and Management: Creating Specialties of Exhibitions

NSTM commissioned the professional manufacturers to improve the intelligent inspection and maintenance system. The achievements include: installation of the intelligent inspection system in all exhibition halls, smooth operation of intelligent agent detection devices, stable detection of computer monitoring software, and maintenance of intelligent reporting buttons. The aforementioned achievements can reduce fault handling time, maintain normal system operation, improve services, accumulate relevant data for analysis via scientific management, as well as inspect and immediately notify repairs with intelligent sensors, mobile networks and other technologies to improve the efficiency of exhibit repairs and service quality.



Sponge City



Understanding the framework of IOT

1. Continuous Improvement on the intelligent inspection system

In 2019, NSTM will continue to install 10 units of intelligent inspection computer monitoring software detection to achieve the goal of installation the intelligent inspection systems in all permanent exhibition halls. We also updated the original detection devices, computer monitoring software detection, and intelligent reporting buttons in order to bring about solutions to problems and improve the exhibition normal rate to provide visitors with a better experience and service quality.

The newly added computer monitoring software is as follows:

- (1). "Power and Machines": Safety system and lathes in the 1950s
- (2). "Stories of Recovery and Reconstruction after Morakot": Taiwan in the face of disaster risks, sponge city, and AR for tides.
- (3). "Industrial History of Taiwan": Hands-on intelligent machinery, understanding the framework of IoT, healthy cycling, and elves.
- (4). "Innovating A Better Future" exhibition: Car navigation system

2. Self-made Exhibits

In 2019, NSTM Exhibition Division's maintenance and design colleagues collaborated to develop 3 exhibits, including "Electromagnetic Generator", "Morse Code Telegraph Transmitter" and "Hand-Cranked Record Player".

- (1). "Electromagnetic Generator": Faraday's law of induction describes the fact that a conductor placed in a magnetic flux will generate electromotive force. Our exhibit uses the electromagnetic interaction from the number of rounds of the conductive loop and the magnetic field to produce an electromotive force.
- (2). "Morse Code Telegraph Transmitter": Morse code is made up of short and long tones to represent English letters and numbers arranged in different sequences. The transmitter controls the tone intervals based on the duration of keystrokes, the Morse code is converted into text in Arduino, and displays the characters on the screen.
- (3). "Hand-Cranked Record Player": The exhibit demonstrates the scientific principles of the persistence of vision, by rotating the rotating shaft, pictures in the shaft will start to flip and create an animation.



Electromagnetic Generator



Hand-Cranked Record Player



Morse Code Telegraph Transmitter

3. Establish the management system for recycling exhibit resources

The system includes recycling exhibition displays and various types of lamps for special exhibitions to actively use professional resources, reorganize exhibits, and achieve asset optimization. A total of 8 resource items have been reused in 2019, and will subsequently be used for special exhibitions and the art and culture exhibition areas.

4. Enhance occupational safety and health in exhibition halls

We support colleagues in improving their knowledge related occupational safety and health to ensure their ability for safe operations during maintenance and repairs, and conducted training courses for colleagues to obtain certification of the "Class-3 manager of occupational safety and health affairs". Maintenance and supervising contractors on construction projects such as the updates performed on exhibits in the future will have more safety and health measures to ensure safety and prevent possible hazards such as falling accidents, collapsing objects,

electric shock and fire disasters. In addition, the occupational safety and health provisions stipulates the prevention potential and common hazards and the use of safe methods.



Safety equipment is required for constructions at heights above 2 meters.

5. Maintenance meeting to improve normal exhibit functioning rate

Maintenance meetings are held on a regular basis to report the maintenance status and discuss reasons of malfunctioning exhibits. We also investigate the common causes of malfunctions and damage of facilities for analysis and improvement, as well as to actively and effectively solve problems.

When abnormal exhibits are regarded as a common problem, we not only try to improve it, but also summarize the problems which can be included in the plan of design colleagues on updating future designs. We hope to effectively solve problems via preventive precautions, and to improve maintenance and problem-solving skills by experience sharing on exhibit maintenance and discussions between colleagues.

6. Review and revision of procedures for exhibitions and commissioned services to safeguard the rights of the NSTM and contractors

The exhibit design contract covers attached documents including the "Procedures for Exhibitions and Commissioned Services" and "Reference Standard for Exhibit Design Construction Project Specifications", which are also part of the exhibit design procurement contract. Since the scope is very vague with difficulties in implementing the provisions, the two documents were amended and consolidated in order to ensure contract implementation as well as to safeguard the rights and interests of both parties. Lastly, all the design and maintenance colleagues participated in the meeting to discuss on the amendments. After the discussions have reached a consensus, NSTM's amended version of the "Procedures for Exhibitions and Commissioned Services" is then confirmed and uploaded to NSTM's EIP exhibit division for internal use.

■ Collaboration Exhibitions

1. MOVE! into the wildlife Exhibition!

NSTM co-organized the "MOVE! into the wildlife Exhibition!" with udnFunLife Co., Ltd., United Digital Culture and Innovation Co., Ltd. at the 4th and 5th exhibition halls from May 21 to September 1, 2019. The latest series "Science x Art Exhibition" of King Records (Japan) was introduced into Taiwan, so that scientific knowledge and biological photos in photographically illustrated books in the past can be presented to visitors in multiple ways. The exhibition covers a total of seven thematic exhibition areas, including the "Biological Drawings & Art Photography", "Little Garden", "Magic Jungle", "Miracle Prairie", "Living Ocean",



MOVE! into the wildlife Exhibition! - Opening ceremony

"Biometrics" and "Large Illustrations", with incredible biological attractions in each exhibition area. The exhibition also to guide the public to experience the biological mysteries with more than 70 biological photography exhibits.



MOVE! into the wildlife Exhibition!

2. Chinese Professional Baseball League - No One's Out

The NSTM and Chinese Professional Baseball League co-organized the Chinese Professional Baseball League 30th Anniversary - No One's Out exhibition at the 1st special exhibition hall from July 13 to December 15, 2019. The three main exhibition areas included "Keep Focused", "Keep Loyal" and "Watching at the Field". It exhibited not only records over the past 30 years in the Chinese Professional Baseball League, but also selected and displayed more exciting baseball reviews in baseball history, precious artifacts and collections of historical O.B. players and active players, the evolution of baseball teams over the past 30 years, as well as the precious collections of die-hard fans since the first year of the Chinese Professional Baseball League.



Chinese Professional Baseball League - No One's Out

3. Wow! Somatosensory Adventure 2.0

Science Experience and Experience Science - NSTM's most attractive Wow! Somatosensory Adventure 2.0 Exhibition has three additional exhibits in the exhibition including the spiral slide, Laser Battlefield, and VR 5D cinema. NSTM continue to work towards its goals in organizing fun, educational exhibitions, and to promote the philosophy of popular science education, so that the public can learn and experience the principles of science amid a joyous atmosphere in the museum, as well as free fall, acceleration of gravity, centrifugal force, action and reaction force! The exhibition has had more than 100,000 visitors since its opening on December 13, 2016, which marked a perfect ending on December 12, 2019.



VR 5D Cinema



Spiral Slide

4. Attracted different customer and collaborated exhibitions through the art and culture exhibition area

NSTM has set up art exhibition areas at the west corridor on the first floor and in the Art Café on the second floor. NSTM conducts its own exhibitions in its venues, while artists can also submit applications to host their exhibitions here. The artwork exhibited includes drawings, Chinese calligraphies, photo collections, sculptures, seal carvings, pottery, crafts and other multi-media materials. In 2019, the NSTM conducted art and craft exhibitions

included: 2 sessions of "Group Love Art Center Charity Collection Exhibition", "2018 Long-Term Care 2.0 Home Assistance Drawing Contest award-winning products touring exhibition", "2019 Cross-Strait Calligraphy Joint Exhibition", and "Photography Exhibition by the Photographic Society of Kaoshiung : Mr. Chen, Chi-Chuan Photography Contribution Award and Kaohsiung Film Festival", "Aesthetics of Science and Technology and the Beauty of Ceramics - Chu, Chin-Min Ceramic Art Exhibition", and the "Summer Metal Creation exhibition" ...etc.



"2018 Long-Term Care 2.0 Home Assistance Drawing Contest" award-winning products touring exhibition



2019 Cross-Strait Calligraphy Joint Exhibition



Summer Metal Creation exhibition



Photography Exhibition by the Photographic Society of Kaoshiung

5. VR Gaming with Integrated 2-Axis Motion Platform

NSTM organized the VR Game with integrated 2-axis motion platform in cooperation with Win Loyal Ltd. and Chang Jung Christian University for the Kaohsiung City FunTech Park Project. The exhibition was on the sixth floor of the corridor outside the Air Navigation and Aerospace Exhibition Hall which was free of charge from July 2 to September 29, 2019.



VR Game with Integrated 2-Axis Motion Platform

3D Theater

In 2019, NSTM's renovation project of 3D Theater audio equipment includes complete replacement of the original Dolby audio system with a new one, combination with Christie power amplifiers and Biamp Digital Mixing Console to improve the audio quality of the original audio system and the sound source of digital video broadcasting. Four quality 3D films were selected by the evaluation team during the meeting in 2019. The evaluation team consists of science and marketing colleagues and volunteers as well as the colleagues in the exhibition division.



■ Museum Outreach Services

1. Soil and Water Conservation for Disaster Prevention

This special touring exhibition has been relocated since May 1, 2016 from the NSTM to over 10 museums in Taiwan. In 2019, the exhibition was relocated at the National Museum of Natural Science: 921 Earthquake Museum of Taiwan and National Taiwan Science Education Center in compliance with the major promotional activity on national disaster prevention, as well as Matsu Library in Lianjiang County for students in remote areas to spread education on disaster prevention. There were a total of 155,194 visitors in 2019.



The press conference at the National Taiwan Science Education Center



The press conference at Matsu Library

2. Awakening Technology and Preparedness for Disaster Reduction

In 2019, NSTM received subsidies from the MOE to co-organize the touring exhibition with Kaohsiung MRT Corporation, Taiwan Tobacco & Liquor Corporation, and Tzu Chi Foundation at Kaohsiung MRT Weiwuying Station from July 9 to August 25, 2019, followed by touring exhibitions at Puli Brewery in Nantou from September 11 to November 3, 2019, and at Jingsi temple of Hualien City from December 1, 2019 to April 26, 2020. This special exhibition was organized based on the idea of disaster prevention, with the curatorial concept of learning science and technology for disaster reduction as well as actions for disaster prevention. The exhibition combined interactive learning modules with the exhibits to raise public awareness on disaster prevention and convey the principles and skills of disaster response in the form of education and entertainment. There were a total of 128,376 visitors in 2019.

3. Explore IoT Exhibition

The "Explore IoT" Exhibition was relocated at the National Taiwan Science Education Center, which not only gained more benefits from the integration of the scientific and technological resources of the museum, but also drew inspiration from daily life to enable more students to easily explore the course of technological development and jointly promote high-quality exhibits. The exhibition was held from October 15 to December 22, 2019.



"Explore IoT" Exhibition at the National Taiwan Science Education Center

4. Nanometer: The Invisible Scale

This special exhibition was held with the support of the Nanotechnology Human Resource Development Program to make nanotechnology more comprehensible and acceptable to visitors and elevate the literacy of nanotechnology to facilitate its promotion as a popular technology. Visitors can easily experience the magic and fun of nanotechnology through a variety of interactive exhibits as well as vivid metaphors and examples! This special exhibition was relocated at Tainan Children's Science Museum from September 22, 2018 to September 1, 2019, with a total of 103,576 people. It was subsequently relocated to Tree Valley Life Science Museum from September 21, 2019 to August 30, 2020.



"Nanometer: The Invisible Scale" at Tainan Children's Science Museum.

5. Eureka! The Fun Science Zone

This special exhibition features interactive exhibits and personal experience based on basic science, and was divided into exhibition areas including electrical science, optics, mechanics, physiology and medicine according to its nature, with the goal of winning the Nobel Prize which symbolizes the highest honor in science to encourage students to persevere in science, in the hope that visitors can easily understand and accept it, so that science will no longer be considered difficult. In addition, in order to narrow the distance between science and the public, representative scientists of each exhibition area are presented in animation so that visitors can explore in a laboratory space inside exhibition areas. This special exhibition was relocated at Songshan Fengtian Temple from January 6 to June 9, 2019, and relocated at the National



"Eureka! The Fun Science Zone" at the Songshan Fengtian Temple

Library of Public Information, Taichung, Taiwan from October 25 to December 29, 2019, with a total of 99,954 visitors.



For children to experience that male mosquitoes do not bite



Visitors place a vote and write down their opinions after visiting the exhibition

6. Wolbachia Project: Special Exhibition of Biological Prevention Strategy for Dengue Fever

Southern Taiwan is often threatened by dengue fever on the arrival of the summer rainy season, but scientists seem to have found a perfect solution to prevent dengue fever in recent years. In order to gain public awareness on the biological prevention strategy, the NSTM co-organized this special exhibition with the National Mosquito-Borne Disease Control Research Center of the National Health Research Institutes, and was relocated at the National Mosquito-Borne Disease Control Research Center of the National Health Research Institutes, Tainan, from April 24 to 26, 2019 and May 2, 2019. The exhibition introduced the biological prevention strategy for dengue fever by using "Wolbachia", a bacteria present in 65% of insect species.

7. Disease Prevention Combat Camp - Dengue Fever and Influenza

Visitors can learn about Dengue Fever and Influenza while enjoying their experience in playing interactive games. The exhibition was relocated at Pingtung Science Education Resource Center (Jian-Guo Elementary School) from September 16 to November 30, 2019.



Interactive game for students to experience the crime scene



Opening ceremony of "Disease Prevention Combat Camp: Dengue Fever and Influenza" touring exhibition

8. Nice to have you! Taiwan Scientists Group Portrait Exhibition

The exhibition was held at 1F circular courtyard of NSTM from March 28 to March 31, 2019. The exhibits were based on the article published on the MOST's website "Sci-Tech Vista". The "Theme of Science Communication" project team, led by professor Kuo Chi-Tung of the Department of Physics, National Sun Yat-sen University, has invited outstanding scholars in Taiwan to write articles about the "Theme of Science Day". The articles introduce the important main masterminds of Taiwan's scientific development. However, only 17 scientists in the article who have made significant contributions to Taiwan's scientific development were introduced at the exhibition.



Nice to have you! Taiwan Scientists Group Portrait Exhibition

9. Flash Mob: 50th Anniversary of the Moon Landing

2019 was the 50th anniversary of the moon landing. The Tourism Bureau of Kaohsiung City Government cooperated with the NSTM and rented the spaceman and rocket special model of the Air Navigation and Aerospace Exhibition Hall to organize a

"Flash Mob : 50th Anniversary of the Moon Landing" in the Moon World from July 21 to July 22, 2019, and has set up a stand-up display by borrowing views, which allow visitors to experience walking on the moon in the magical atmosphere of the Moon World.



10. Teaching aids promotion

To optimize benefits for exhibition halls, NSTM has created two sets of teaching aids to disease prevention and landslide disaster prevention to be provided for elementary and junior high school teachers, with the aim of promoting exhibition and education outside the museum and firmly rooting NSTM's environmental education in elementary and junior high schools.

(1). Mobile teaching aids for soil and water conservation :

Decoding game I & II

The teaching aids were loaned to 90 schools/organizations to benefit 8,423 people, of which 41 schools are in remote townships which benefited 1,325 people. The elementary, junior high and senior high schools in Taiwan are allowed to loan teaching aids by official application to NSTM every semester. In particular, it has strengthened publicity for schools in remote areas for soil and water conservation education, focusing more on schools of remote areas and debris-flow potential areas.

(2). Dengue Fever Prevention Mobile Learning Kit: Exterminator Squad

It was loaned to elementary and junior high schools free of charge in an effort to promote the concept of mosquito-borne disease prevention. Mails were delivered to schools throughout Taiwan to promote the awareness in remote townships, so that students can learn and have fun at the same time using interesting teaching aids. In total, 103 schools and 2 organizations applied to borrow the teaching aid. As of 2019, the teaching aid has benefited 15,767 people, including 27 schools in remote townships.



Exterminator Squad Learning Kit



Obstacle challenge activities in schools to allow students to complete their assigned missions for the Exterminator Squad

■ Social Resource Integration Achievements

In response to the year-by-year reduction of government budgets, the exhibition division continues to dedicate efforts in acquiring social resources in the public and private sectors, in order to expand cooperative partners by actively seeking social resources. In terms of NSTM's achievements by integrating social resources in 2019, it has renovated two permanent exhibition halls, organized two large-scale special exhibitions, and co-organized the Rice is Life exhibition with other countries.

1. Renovation of "Stories of Recovery and Reconstruction after Morakot"

In response to the 20th anniversary of the 921 earthquake disaster and the 10th anniversary of the Morakot disaster, the NSTM renovated the "Recovery and Reconstruction After Morakot" that was opened in August 8, 2014 to "Stories of Recovery and Reconstruction after Morakot" with total support of NT\$16.45 million from the Ministry of Education, Water Resources Agency of

the MOEA, Council of Indigenous Peoples, and the Soil and Water Conservation Bureau of the Council of Agriculture, Executive Yuan. The exhibition hall links the resources of units related to various disaster prevention, demonstrating the prevention of Taiwan's natural disasters to become an important venue for the education of disaster prevention.



The opening ceremony of "Stories of Recovery and Reconstruction after Morakot"

2. Renewal of "Comprehensive Disaster Prevention Education Experience Area"

This year, we received subsidies from the National Disaster Prevention and Rescue Technology Center (NT\$2 million) to handle the "Civil IoT Taiwan: Disaster Prevention Interactive Learning Display Module and Teaching Materials Procurement Project", renovate NSTM's "Comprehensive Disaster Prevention Education Experience Area", and set up a new interactive disaster risk reduction education and promotion. NSTM co-organized the "Report on Disasters: Civil IoT Disaster Reduction Exhibition" from November 22 to December 1, 2019 in cooperation with the National Science and Technology Center for Disaster Reduction, National Fire Agency and the National Center for Research on Earthquake Engineering, and set up an earthquake chamber at the main lobby, with interactive exhibits such as the earthquake quick report and disaster prevention alarm...etc.



Opening ceremony



Earthquake chamber in the main lobby

3. Technological and Vocational Paradise

In order to improve the visibility of vocational education, the NSTM co-organized the "Technical New Paradise" Special Exhibition and relevant activities with National Kaohsiung University of Science and Technology. This mainly highlights the core value of vocational education to promote the understanding (recognition) of vocational education among elementary and junior high school students and their parents, so that students can be certain of their future choices and learning on vocational education. This exhibition transforms enriched and interesting exhibits with overall utilization of video media, VR, object demonstrations and situation simulation. It introduced the features and main field of studies of six learning groups in vocational education via interactive obstacle challenges so that students can learn and have fun at the same time, which enhances



Six Learning Groups in Vocational Education

their willingness to visit the museum. The exhibition was held from September 27, 2019 to December 21, 2021.

4. Agronomy Wonderland: Intelligent Agricultural Machinery and Introduction to the Technical and Vocational Education

In order to raise public awareness of agriculture in technical and vocational education, the professional knowledge of National Pingtung University of Science and Technology was combined with NSTM's design profession to conduct a 3-year experience activity and exhibits on intelligent agricultural machinery and science and technology applied in agriculture. The activity advocated innovative and scientific methods solutions on agricultural production and promoted intelligent agricultural machinery to overturn the concept of traditional agricultural machinery. Visitors



Introduction to Farm Tech

use postcards for obstacle challenges and experience the virtual reality of drone applications in agricultural technology, followed by photos of playing the role of tech farmers. In addition, visitors can also experience related agriculture and agricultural machinery during the exhibition. The exhibition was held from September 27, 2019 to December 31, 2021.



Opening ceremony of “Agronomy Wonderland: Intelligent Agricultural Machinery and Introduction to Technical and Vocational Education”

5. Rice is Life

NSTM co-organized the "Rice is Life" exhibition with the National Science Museum Thailand and Singapore Science Centre. The exhibition was opened to the public from November 29, 2018 to March 3, 2019 at the 2nd exhibition hall, introducing the scientific knowledge of rice in daily life and multiple rice cultures in various countries of ASPAC.



Different Growth Phases of Rice



Cultural Diversity Area

6. MOST subsidized 2018 and 2019 Museum-Based "Innovative Biomedicine Transformation Integrated Project"

In order to transform future cutting-edge technology and R&D achievements into innovative teaching materials of popular science, the MOST has set up the "Scientific and Technological Transformation Project: Transformation of Cutting-Edge Technology and Promotion of Education Application". The NSTM obtained the three-year grant. The first phase of the program was commenced in July 2018, transforming cutting-edge technology "Near-Infrared Light-Induced CO₂ Generation to Accelerate Wound Healing" developed by Professor Yeh, Chen-Sheng from the Department of Chemistry, NCKU. The second phase of the program was commenced in July 2019, transforming Shinya Yamanaka induced pluripotent stem cells (iPSC) in cooperation with Professor Chang, Hsin-Hou of the Department of Molecular Biology and Human Genetics of Tzu Chi University. Popular science manuscripts, animations and exhibits are included in the "Open Sesame Science Exploration Center" and "Science Laureates" permanent exhibition halls. In addition, promotional activities on relevant achievement and touring exhibitions were conducted in cooperation with the MOST.



Visited Professor Chang, Hsin-Hou of Tzu Chi University



Visited Professor Yeh, Chen-Sheng of National Cheng Kung University

7. MOST subsidized the Plan of "Popular Science Education in Peninsula and Islands : Eureka! The Fun Science Zone Exhibition" (ST1)

This project aimed to promote popular science education by organizing the "Eureka! The Fun Science Zone" exhibition with demonstrations and educational activities to remote regions in Taiwan.

The exhibition was relocated to the Kinhu Gymnasium of Kinmen County in January 2020, Howard Beach Resort Kenting and Hengchun Junior High School in April 2020. We hope to integrate social resources to promote science education in different areas to narrow the gap between urban and rural regions.



Site inspections of Howard Beach Resort Kenting



Site inspections of Kinhu Gymnasium of Kinmen County



Technology Education

2019 NATIONAL SCIENCE AND TECHNOLOGY MUSEUM ANNUAL REPORT

Science of Cooking

NSTM hosted a multitude of science-themed educational events to establish the concept of integrating science into life via experiential learning. In 2019, NSTM hosted 1,460 sessions, with a visitor count of 295,495 people. The technology education activities held from 2015 to 2019 are detailed in Table 9.

In order to promote popular science education, NSTM organized winter and summer camps, weekend science courses for students, as well as evening learning courses for adults and the elders. And that also organized science demonstrations for increasing scientific experience and fun. The diverse learning model was adopted to promote popular science such as seminars and lectures. Which held to improve the diversity of the activities and expand the scope and coverage of our services.

NSTM continues actively to promote overseas technology exchange activities in "New Southbound Countries" and "China/Hong Kong /Macau". That is good for expanding the international horizon and collaborations.

Table 8 Table of technology education activities from 2015 to 2019

Type Year	Total		Lecture		Seminar		Study activity		On-site activity		External service		Other	
	Sess- ions	Partic- ipants	Sess- ions	Partic- ipants	Sess- ions	Partic- ipants	Sess- ions	Partic- ipants	Sess- ions	Partic- ipants	Sess- ions	Partic- ipants	Sess- ions	Partic- ipants
2015	1,877	336,798	40	6,593	2	114	765	29,375	906	193,700	157	106,831	7	185
2016	1,596	328,225	36	4,410	9	298	734	26,197	680	197,407	137	99,913	0	0
2017	1,746	328,123	27	4,961	6	308	727	27,370	754	183,507	149	105,858	34	6,119
2018	1,538	291,203	50	6,304	1	150	673	28,582	628	122,193	98	131,955	88	2019
2019	1,460	295,495	36	5,435	3	200	724	32,450	608	228,990	79	27,980	10	460

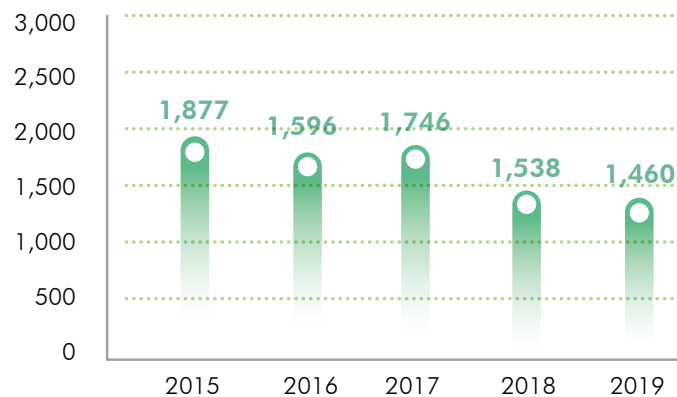


Figure 8 Number of activities from 2015 to 2019

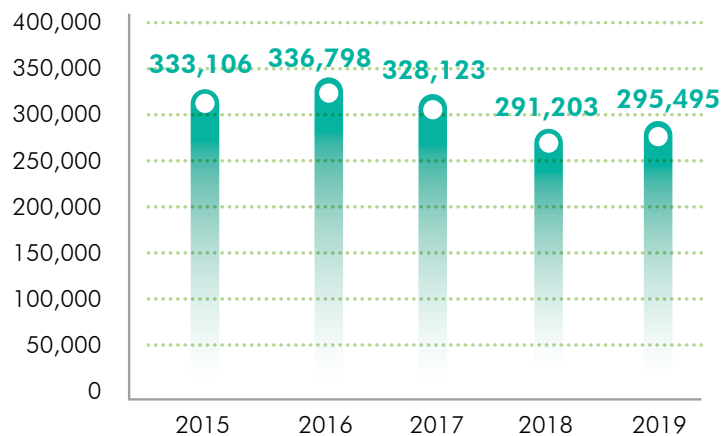


Figure 9 Number of participants from 2015 to 2019

Science Activities

1. MOE subsidizes "Clean Energy Creative Contest"

NSTM and Clean Energy System Integration and Applied Talent Development Office co-organized the "Clean Energy Creative Contest". 500 teachers and students from 170 teams participated in. This year's contest theme included clean energy, green circular economy, energy storage of efficient energy utilization, etc. In particular, the "localized Practice Division" of college encourages students to think about their locality such as residency and studies, while integrating features such as the local ecological environment, regional industry, and technological development for artwork, and emphasizing the local competitiveness of artwork. In addition, the "Micro Film Division" of senior high schools and college participated in video and audio creation and screenwriting competitions. The team's creative expressions and explanations

stirred up resonance of the public on cherishing resource and environmental protection. 42 teams were selected during the final competition on October 6, and awards were presented 204 students.



Golden Award for the "Localized Practice Division" of Clean Energy Creative contest

2. Commissioned by MOE to organize the Project on Creative Maker Education Contest and Exhibition

In order to increase students' interest in maker education and the technology field, the K-12 Education Administration, MOE, organized the "Creative Maker Education Contest", "Technology is So Fun - Maker and Technology Education Carnival", and "Maker Education Teaching Plan Design Contest", which were co-organized by NSTM and NKNUN. The 1st student contest was divided into the elementary school and junior high school category, the contest features major themes including the "Living Technology Assignment", "Digital Design", and "Mechatronics". A total of 57 teams were selected from 478 teams that participated in the contest. The project's achievement exhibition was held on June 1, featuring exhibitions by 71 maker education and technology centers. The activities provide the visitors with an opportunity to experience the joy of DIY and sense of achievement as makers, which attracted roughly 24,500 people. The 3rd teaching plan design contest was expanded to include teachers from public and private elementary and junior high schools nationwide. The

contest features 3 major themes: "Living Technology", "Information Technology", and "Emerging Technology Awareness". In total, about 504 teachers from 284 teams across 6 divisions participated in the contest.



contest awards ceremony



3. The 9th "Hand Launch Glider Flying Contest"

NSTM held the 9th "Hand Launch Glider Flying contest" during December 14-15. The event is classified into two categories of "Straight Flight" and "Endurance Flight", while taking into consideration the creativity and scientific principles of flight in order to train students on the ability for designing, thinking, and solving problems. The event adopted the approach of building and competing on the same day with overall procedures including the functional design, material selection, and method of artwork. The teams must complete the artwork within a specified time. It is hoped that the event can enhance the interests of senior high and junior high school students in aerospace science

in order to achieve the purpose of promoting the education of aerospace science. The event was participated in by 150 senior high school teams, 135 junior high school teams, and a total of 550 students and teachers.



9th Hand Launch Glider Flying Contest awards ceremony - First in junior high school group



9th Hand Launch Glider Flying Contest awards ceremony - First in senior high school group

4. 2019 IPRC International Programing Robot Challenge

In order to elevate the literacy of robot technology as well as cross-industry integration and utilization of scientific knowledge among junior high school students, the scientific creativity and competition serves as a platform for the students to demonstrate their ability in technology application and information integration. The objective is to cultivate their confidence in the field of technology and creativity and increase the students' motivation in learning and participating in robotics to enhance the competitiveness of senior high, junior high and primary school students. The competition was co-organized by NSTM and RoboRobo Co., Ltd., with a total of 550 participants, including 175 contestants from 155 teams in Kaohsiung and 97 contestants from 83 teams in Taipei, including their families and the audience.



Robot competition awards ceremony



5. 2019 1st Robotics Creative Competition

On August 17, 2019, the NSTM "2019 1st Robotics Creative Competition" co-organized the with IOP Pobotic Co., Ltd., with a total of 102 teams and 285 students from 35 senior high, junior high and primary schools. The competition has a variety of creative track arrangements combined with tracking and obstacle avoidance challenges to inspire students on flexible thinking and creativity.

■ Government Grant

1. MOE subsidized 2018-2019 Childhood Memories of Fun in Southern Taiwan Fun Science Project

In order to encourage children to learn about Southeast Asian countries and respect ethnic diversity, as well as to promote the exchange and understanding between new residents and nationals, the MOE subsidized this activity to establish a world view on the respect for diversity among parents and children and develop multicultural literacy through Childhood Memories of Fun special exhibition tours, cultural creation, stories about parent-child relationships, children's toys, and children's clothing on-site activities, with a total of 34 sessions and 1,517 participants.



Childhood Memories of Fun

2. K-12 Education Administration, MOE, commissioned the "2017-2019 Science Education Resource Promotion Program"

Based on the success of the 2016 Science Education Resource Promotion Program, we continued to promote science education with our museum resources from 2017 to 2019, so as to achieve the following three goals of developing and integrating teaching resources, providing students with innovative and convenient learning resources, and enhancing the empowerment and cooperation between teachers. In 2019, NSTM held 20 teacher workshops for a total of 665 participants and offered teaching resource packages for 473 classes. Additionally, we co-organized 16 "Amazing Optics" events with the fellow of SPIE and OSA, National Sun Yat-sen University, with a total of 5,168 participants, and the "2019 Joint Meeting and Workshop of the Physics Education Society of the Republic of China" with a total of 40 teacher participants for designing creative teaching aids. 7 hands-



Amazing Optics

on activities of creative popular science were held for 788 people in rural areas.

3. K-12 Education Administration of the Ministry of Education subsidizes the project of senior high, junior high and primary school students on the exploration of NSTM's emerging technology awareness

NSTM jointly held the Technology is Fun - Smart Technology Carnival with the Visitor Services at NSTM's east side corridor on June 1-2, 2019. A total of 15 emerging technology R&D institutions and teaching aid suppliers had participated in the event, with a total of 32,918 participants.



Attractive emerging technologies



Teaching aids incorporating emerging technologies

4. Water Resources Agency, MOEA's 2019 "LOHAS Energy Saving Initiative"

NSTM has incorporated local environmental issues and geographic conditions in conjunction with the theme of "Water Environment" to apply for funding from the Water Resources Agency, MOEA, and Southern Taiwan Joint Service Center, Executive Yuan, for the sake of organizing the "Cherish Water" promotional campaign. Through interactive teaching aids and experiments, water environment education is transformed into interesting obstacle challenge games in order to increase awareness of water resources among students and the public. It is hoped that the lively, interactive teaching aid experience in the form of edutainment will be able to raise people's awareness in cherishing our water environment. A total of 17 activities were held and participated in by 4,829 people.



Opening ceremony of the "Cherish Water" promotional campaign



Cherish Water interactive teaching aids

5. MOST subsidized the 2019 "Museum-Based Innovative Biomedicine Transformation Project: Biomedicine Innovation Popular Science Promotion Program (2/3) "

For this program, the "Museum-Based Innovative Biomedicine Transformation Integrated Project" is applied to design innovative popular science teaching materials and teaching aids to expand the influence and benefit of cutting-edge technology on education innovation. The first phase of the program commenced in 2018, and the second phase commenced in 2019, transforming the "Induced Pluripotent Stem Cell, iPS cell" technology developed by the 2012 Nobel Prize winner Shinya Yamanaka to innovative popular science teaching materials and teaching aids.



Induced pluripotent stem cell iPS DIY experience

6. MOST subsidized 2018 "Online Technology Short Films' Influence on the Awareness and Attitude of People/Students Toward AI Project"

By employing situational interest-based strategy, the project has designed an AI short film that was uploaded to the Internet, and surveys were conducted on 224 students in a university in southern Taiwan, with the aim to try and gain insight into university students' awareness and attitude towards AI in contemporary society as well as to explore the online technology short film's influence on the awareness and attitude of university students toward AI, and the factors. Furthermore, practical recommendations will be provided for future online technology films' influence on the viewers' awareness and attitude.



AI video clips

■ Social Resources/Caring About the Disadvantaged

1. The Taiwan Telecommunication Industry Development Association (TTIDA) sponsored the "2019-2020 EM Radiation Dissemination and Experiencing Activities"

NSTM conducted the promotion of EM radiation related popular science knowledge in conjunction with the need to promote EM radiation experience and marketing of the EM radiation experience area at the Telecom@Taiwan exhibition hall. The aim is to let the visitors experiment and explore the basic principles of EM radiation, in turn understanding how it is applied in everyday life and related safety issues. NSTM's achievements include: Held 19 EM radiation lab events - Military Officers and Children (attended by 4,844 people); held 3 teachers' seminars (attended by 139 teachers) and 73 school teaching package classes (attended by 1,573 people). We co-organized eight Inquiry and Practice Science Camps for 735 high school students, and eight volunteer training workshops for 213 volunteers. Additionally, an electromagnetics workshop was held for 164 STU students.



Promotion activity - Military Officers and Children

2. Lam Research Sponsored 2019 "mBot Robot Camp and Smart Technology Experience Project"

In fulfilling their corporate social responsibility, Lam Research sponsored NSTM's robot and smart technology experience activity organized for the benefit of students in remote townships. Apart from the "Robotic Experience & Museum Exploration" for disadvantaged students and students living in remote townships, NSTM also hosted the "Robotic Workshop" in Hsinchu and 10 "Hour of Code" were held in remote townships of Taichung and Kaohsiung in the hope of providing 402 students from remote townships and disadvantaged students with the opportunity to learn about smart technology.



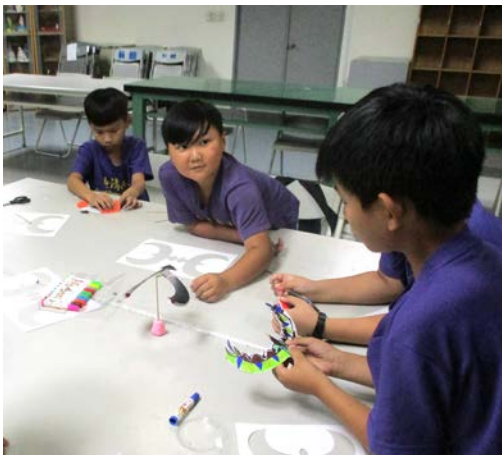
Operation of robotics by students



Robotic Experience & Museum Exploration for students living in remote townships

3. Kinghong Foundation sponsored the "2019 Multicultural education and Multiethnic Science - Southeast Asian Fun Toys" Project

The Kinghong Foundation subsidized the students who are the second-generation of new residents in remote areas on multicultural, ethnic and science education. It also sponsors NSTM's activities, allowing students to cultivate multicultural knowledge and experience, and explore toy science of the new residents' native country by visiting NSTM exhibitions, watching 3D movies, as well as Southeast Asian toy science, with a total of 10 sessions in which 344 people participated.



Southeast Asian Fun Toys

■ Environmental Education

1. Evaluation of environmental education facilities

We obtained the certification of environmental education facilities in 2012. In August 2019, we had been re-evaluated, the process contained briefings, on-site inspections, teaching aids and paperwork inspections, as well as interviews, inquiries and comprehensive discussions of related personnel on environmental education. On November 12, 2019, we passed the evaluation and were certified at the Butterfly Hall of the Flora Expo.



Obtained the certification of environmental education facilities from the Environmental Professionals Training Institute of the Environmental Protection Administration of the Executive Yuan. NSTM Director-general Shiunn-Shyang Chen (second from left) attended the ceremony to accept the praise.

2. 2019 Environmental Learning Center and School Trip Promotion Plan - NSTM Tour

NSTM applied for the MOE's 2019 Environmental Learning Center and School Trip Promotion Plan, aiming to provide priority application for the rural primary schools and junior high schools. The plans include "Green Discovery – LOHAS Energy Conservation House Tour" and "Experience and Discover the Environmental Issues Exhibition". With hands-on courses such as "Nature Feast – Frogs in Taiwan", "Water Vanguard", and "Green Magic - The Flowerpot Clock", we lead students to a better understanding of Taiwan tree frogs and other issues related to ecology, water resource usage, and environmental sustainability. NSTM held 11 events with a total of 553 participants.



"Mother Nature Festival - Frogs in Taiwan" Practice Course

3. The Industrial Technology Research Institute (ITRI) Commissioned NSTM to organize "LOHAS Energy Conservation House Promotion and Volunteer Education and Training Project"

Using NSTM's environmentally certified halls in conjunction with the Bureau of Energy, the MOEA's "Energy-Saving and Carbon-Reduction" movement, as well as a demonstration of "LOHAS Energy Conservation House" exhibit and lecture activities, we have introduced tips for saving energy to the visitors. In 2019, NSTM held "Energy-Saving Partners – Volunteer Alliance Seminars", "Saving Energy with A-Guang – Winter and Summer Camps", "Energy Saving and Environmental Education Courses", and "Saving Energy – LOHAS Energy Conservation House Itinerant



LOHAS Energy Conservation House visits by Yunlin County Kouhu Junior High School students

Exhibition in Remote Townships", and "Energy Conservation Popular Science Challenge Activities", which were attended by 3,500 people.

■ Seminars/Popular Science Lectures

1. 2019 Popular Science Forum

From October 1-2, 2019, NSTM conducted the 2019 Popular Science Forum with the theme of "Towards a Smarter Generation – Science is Fun" and received 73 paper submissions. The forum invited Dr. Hung Lan to present a special speech on the "Reading in the Brain", and invited deputy director Lin Fu-Lai for the speech on "Emotional Consciousness of Popular Science". 13 units have participated in setting up popular science fair to demonstrate various interactive experiences of emerging technologies. In addition, five science museum directors and representatives were also invited to conduct comprehensive discussions to answer inquiries and share their experience. The handover ceremony with the National Museum of Marine Science & Technology was completed, and was participated in by a total of 620 people.

VIP attendees at the "2019 Popular Science Forum – Technology is Fun"



2. MOST sponsored the 2018-2019 "Meeting Master of Science on Sunday" popular science lectures in cooperation with National Cheng Kung University

16 lectures of "Sunday Science Reading Master" were held in the NSTM International Lecture Hall. Online real-time video broadcasting was available for people from Taiwan and abroad who were unable to attend the lectures in person. In total, the lectures were attended by 4,420 people.



"Meeting Master of Science on Sunday" popular science lectures



Lecturer of "Meeting Master of Science on Sunday" popular science lectures

3. 2019 Cross-Strait Urban Education Forum Project

On August 10, 2019, NSTM conducted the "2019 Cross-Strait Urban Education Forum Project" commissioned by the Kaohsiung Education Bureau, in which a total of 160 people from the education sector for the exchange of innovative STEAM education and experience in relative promotions participated. The theme of the forum is "Innovative Education & Interdisciplinary Learning". The agenda focuses on STEAM education, which invited professionals, scholars, and educators to explore and share the creativity, opportunities and possibilities for applying the spirit of makers on STEAM innovative education.



2019 Cross-Strait Urban Education Forum Project



Practical application of STEAM education

4. The Ministry of Science and Technology (MOST) Center for Global Affairs and Science Engagement (GASE)

In 2019, in response to the 10th anniversary of the Morakot disaster and 20th anniversary of the 921 Earthquake, the NSTM with the GASE co-organized the “The Truth Taiwan must face – the wheezing between disasters” lecture promoting risk-awareness and understanding the importance of disaster prevention science. Speakers were Dr. Li Hung-Yuan and Dr. Chen Hung-Yu, who have made contribution on national disaster prevention and control technology for many years. A total of 252 people participated in the seminar.



On November 30, 2019, Dr. Li Hung-Yuan and Dr. Chen Hung-Yu were invited to present their speech

Technology Education Activity

1. 2019 Weekend Science Feast

In order to cultivate basic scientific knowledge and discipline of students, NSTM has integrated applied science resources to develop science courses, including Lego and robotics, aesthetics, toy science, children's creative arts, biological world, physics and chemistry, astronomy, and living science, etc. Furthermore, 5%

of the vacancies were reserved for specific student groups. NSTM held 96 sessions and served 1,497 participants in total.

活動名稱	日期	時間	對象	報名費
生活智慧王(吸塵器)	10/6	1400-1630	小三至小六	250
搖一搖就發電製作	10/12	0930-1100	小三至小六	250
LED燈鎖匙圈製作	10/12	1400-1530	小三至小六	200
YOUNG MAKER創客任務-寶特瓶吸塵器	10/20	1400-1530	小四至國中	200
傳動機械-飛天馬	10/20	0930-1130	小三以上	300
金屬工藝-超細微銀鑄手創	10/10	1000-1500	國中至成人	950

Weekend Science Feast poster

2. 2019 Summer and Winter Camp

In order to enrich the lives of students during summer and winter vacations, NSTM promoted a diversity of science education courses to improve the scientific knowledge and discipline of our national students via a variety of science experiences. These activities include software applications, robotics, aesthetic works, life sciences, astronomy, toy science, physics, chemistry and mathematics, children's creative arts, biological exploration, creative building blocks, food science, power machines, and other courses for students to enjoy the experience of learning science. NSTM held 181 sessions and served 5,079 participants in total.



2019 Summer Camp

3. Science demonstrations

In March-September 2019, NSTM held 56 science demonstrations which were attended by 1,400 participants in total. The demonstration named "Where does wind come from?" organized scientific games which use wind as the theme such as "Air Cannons" and "Soar with the Wind" to explain the physical knowledge of wind, make science more fun, and improve the knowledge of audiences through good interactions. In addition, the demonstration combined with the popular science teacher training program, and a total of 22 "Teen Science Storyteller" from Kaohsiung Wenhua primary school and Xinzhuang primary School were trained, which not only allows students to gain scientific knowledge, improves stage presence and oral abilities, but also provides the audience with a special audiovisual experience.



Weekend science demonstrations

■ The Popular Science Library/Popular Science Communication Center

1. Library Service Statistics

The Popular Science Library is located on 1F of the South Complex. With a space of 1,350 m², it is divided into general reading area and general book storage. Periodicals, videos and general reading materials are available in the general reading area. There are also 9 major popular science themes, and 5 major themes and theme exhibits were held in conjunction with the museum exhibitions in the library. The lobby outside the reading room has a book and newspaper reading area, while the reading room also features a periodic journals area, children's area, popular science comic area and video area. In 2019, display lighting at the entrance of the library was improved, new books were added to shelves, and various popular science theme books were displayed to achieve a bright and comfortable environment.



The Popular Science Library – General Reading Area

The Popular Science Library allows technology to firmly take root via readings on popular sciences, which can also broaden the scope of educational learning of the visitors. The library currently houses a collection of 48,291 books, while activities and lectures are held to promote the reading of popular science materials among all age groups. For example, summer and winter camps, science story time with scientific experiments or hands-on activities lectures, and book club.

Table 9 Number of visitors to the Popular Science Library in the last 5 years

Year	Number of people served
2015	19,323
2016	27,831
2017	28,111
2018	30,270
2019	31,182

2. Popular Science Communication Center

Popular science communication center is a lifelong learning institute for the public. The popular science communication center provide popular science education service and help people judge the correctness of the science news and message. NSTM used the Popular Science Library as the base to build the popular science communication center. In 2019, the Popular Science Communication Center collected 352 popular science videos and held 47 science activities with a total of 22,400 participants.

Children can experience being reporters, study science stories, and hands-on scientific games in "Behind the Scenes: Inside the Production Control Room" experience activity. This experience activity introduced the equipment for TV studio and production control room, and related collections with a total of 471

participants in 12 sessions.



"Behind the Scenes: Inside the Production Control Room" experience activity

Overseas Technology Education Exchange Activity

1. New Southbound

(1). Wa-Sci Science-Based Tour of STEAM in Singapore for the Teenagers

The camp was hosted for the first time on July 6-13, 2019, mainly for junior high school students; the journey includes cultural exploration, maker courses, overseas museum tours, university visits, and sightseeing tours. The business collaborators include Science Center Singapore, Singapore Polytechnic, National University of Singapore, and Art Science Museum. Through the overseas youth science camp, we hope to promote mutual exchanges, mutual assistance and cooperation with more overseas public and private institutions, and bring about more



Wa-Sci Science-Based Overseas Tour (SBOT) in Singapore, 2019

opportunities on co-organization of science education promotion in order to develop the learning environment for science education promotion in the future.

(2). 2019 Technology Exchange and STEM Coopetition for junior high school students in Malaysia, Thailand, and Taiwan

NSTM has organized youth technological exchanges and competitions in rotations with Thailand, Malaysia and two other countries since 2019. The first event named the International STEM Coopetition 2019 took place on August 11-17, 2019, in which 33 junior high school students from Malaysia, Thailand and Taiwan participated. The event encourages "Coopetition", which is the act of cooperation between competing contestants with the spirit of competition between separate teams and cooperation within the teams.



Junior high school students in STEM exchanges

2. China, Hong Kong, and Macau

(1). 2019 Guangzhou Science and Technology Week

Since 2015, the special lectures and science demonstrations in which NSTM participated have been well-recognized by the Guangdong Science Center and local alliances. In 2019, NSTM was invited to participate by the Guangzhou Popular Science Alliance which took place on May 16-21, 2019, and organized the special lecture "Fun & Educational – In the Advent of New Technologies" as well as the science demonstration "Where Does Wind Come From? ", with a total of 3,500 participants.



"Where Does Wind Come From? " science demonstration



Cross-Strait Science Carnival

(2). 2019 Cross-Strait Science Carnival

NSTM co-organized the promotion of popular science activities with the Fujian Science & Technology Museum, from May 30 to June 4, 2019. The events included "Science Demonstration – Minds Think Alike" as well as two hands-on activities "Clear-Air Turbulence" and "Where Does Wind Come From – Vortex Wind" and other on-site challenges of science booth bazars, in which a total of 3,600 people participated.

Visitor Services

2019 NATIONAL SCIENCE AND TECHNOLOGY MUSEUM ANNUAL REPORT



Telecom@Taiwan

■ Visitor Services

1. Enhancement of marketing and services to improve the visiting rate

The number of visitors is one of the key performance indicator of the museum, as well as a demonstration of the performance goals. Faced with the changing environment, in addition to continuing to update and innovate our merchandise, the NSTM also adopted diverse marketing channels and combined social/civil resources, to actively develop potential visitors and disadvantaged groups. In terms of visitor services, NSTM has provided a diversity of guided tour services and activities, improved service quality and well established interactive mechanism. Approximately 2,257,683 people visited the museum this year. The number of visitors served over the past 5 years is shown in Table 10.

Table 10 Number of visitors served over the past 5 years

Unit: Person

Item \ Person Item		2015	2016	2017	2018	2019
Exhibition Hall	Permanent Exhibition	609,597	870,923	811,766	770,247	925,338
	Paid Special Exhibition	36,286	132,264	62,654	43,160	39,213
3D Theater		86,300	119,579	127,373	96,771	116,659
2nd and 3rd Special Exhibition Halls		284,324	316,632	481,412	82,382	98,018
Experience Activity		170,175	157,466	145,767	179,263	205,779
LOHAS Energy Conservation House		5,578	5,287	3,122	21,278	24,682
Open Storage		16,755	18,214	14,786	10,886	12,746
Popular Science Library		60,479	77,964	78,239	84,615	85,237
Leased Area		127,501	106,205	114,700	109,921	113,428
Outdoor Plaza		574,584	475,734	494,611	530,507	437,891
Total in Museum		1,971,579	2,280,268	2,334,430	1,929,030	2,058,991
External services (Taiwan)		437,754	424,639	572,126	574,375	719,435
External services (Overseas)		195,079	454,598	59,960	557,737	25,772
Total (Overseas and in Taiwan)		2,604,412	3,159,505	2,966,516	3,061,142	2,804,198

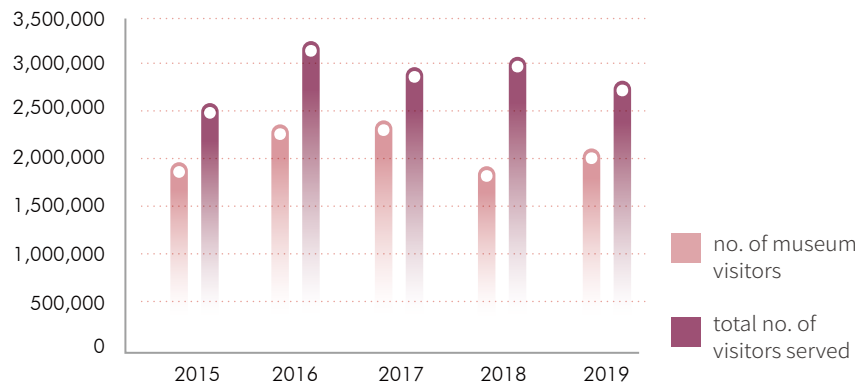


Figure 10 Number of visitors over the last 5 years

2. Excellence Management Quality

In July 2019, NSTM applied for the "Excellence Management Quality Award" presented by the Chinese Society for Quality, and won Three Star Award after a written work review and on-site inspections. The society's evaluation uses the "Total Quality Management-Business Excellence Model" as the criteria, and is divided into seven major assessment items. NSTM's evaluation score was more than 800 points and was in top position in at least

three items. This indicates that the NSTM has obviously reached a certain level of performance and has been highly recognized in all aspects of customer relationship and market management organizational culture shaping, social responsibility achievements, strategic planning, and innovation.



NSTM won the Excellence Management Quality Award presented by the Chinese Society for Quality

Public Relations and Marketing

1. Utilize media resources, develop marketing channels

In 2019, over 43 advertising media procurements and promotions were conducted, resulting in media exposure in the China Times, United Daily News, The Commons Daily, Taiwan Times, Life Times, Mandarin Daily News, Comment News Website, CHN, Fengmin Radio, FM Hit Radio, KISS Radio, CNA, SuperFM98.5, China Daily News, Happy Radio and other NSTM-friendly media, etc. In addition, 26 special exhibition opening ceremonies and

marketing activities were held in 2019.



Integrated marketing campaigns of "Cool Summer 2019: NSTM Homerun" in the summer vacation

2. Enhance the "Holiday Marketing" project to be deeply rooted in holiday traveling

We continue to dedicate efforts to the "Holiday Marketing" project and launched two major marketing projects: "2019 SCI Golden Pig" and "Cool Summer 2019: NSTM Homerun" in winter and summer vacations respectively. Among them, we used packages for the "SCI Golden Pig" project in conjunction with our zodiac cultural creative product Golden Pig Lock, whereas the marketing for "Cool Summer 2019: NSTM Homerun" project is combined with the NSTM's Special Exhibition for the

30th Anniversary of Taiwan's Professional Baseball League. Both projects achieved outstanding results on encouraging the public to visit important permanent exhibition and experience new special facilities in the museum by using stamps and prizes.



"SCI Golden Pig" event in conjunction with the year of the Golden Pig

3. Utilize social media to update information

Due to the generalization of social media, the NSTM established a Facebook fan page in October 2009 (website : <https://www.facebook.com/ilovenstm>). As of 2019, the fan page had 86,870 members, an increase of 14.66% over 2018 (75,765 members). The NSTM continues to transmit information to our Internet fans through NSTM's Facebook fan page, which includes pictures, texts, and videos related to permanent exhibition, special exhibition, science education events, selected collections, seminars, as well as science, environmental education, and science education news. We wish to bring forth applied science and the vision of a green museum in both educational and entertaining manner.



Information transmitted to fans through Facebook fan page

4. Issuance of "VIP e-ticket" to invite school principals in the nation to visit free of charge

The NSTM's VIP ticket has now been switched to the form of electronic online application. Through NSTM's "QR Code ticketing system", the school principals can log in to the system with the unique account number and easily download the "School VIP Ticket", and immediately obtain an exclusive QR Code VIP ticket from the system to save money, so that NSTM can invite VIPs to visit the museum in a technological way. We have already issued VIP e-tickets for permanent exhibition, 3D Theater, the "Chinese Professional Baseball League 30th Anniversary" special exhibition, as well as our self-organized especial exhibition "The Probability in Life".



School VIP e-ticket

5. Concessionary offers to encourage the public to visit the museum by public transportation and materialize the spirit of Green Museum

Apart from buses and trains, we also launched the special offer of "Visit the NSTM by the MRT" for MRT passengers, and coupons are available at MRT stations including the Wukuaicuo Station, Houyi Station, Formosa Boulevard Station, Kaohsiung Main Station, Sinyi Elementary School Station, Cultural Center Station, and Martial Arts Stadium Station. In order to encourage the public to visit the NSTM using public transportation, we promoted the special offer via MRT promotion and broadcast channels. In addition, in order to increase the effectiveness of the special offer, we also provided one coupon for each MenGo card or Kaohsiung MRT children's card holder.

In 2019, the special offer benefited a total of 4,589 people, with a reduction of 9337.45kg of CO₂ emissions to materialize the spirit of Green Museum.



Special offer of "Visit the NSTM by the MRT" promoted at MRT Houyi Station (R12)

■ Guided Tour

1. Provide quality guided tours to enrich the visit experience

In correspondence with our exhibitions, we provide the public with a variety of guided tours, which include group tours, active tours, robot shows and selected exhibits tours. This year we provided group guide tours, walking tours, selective exhibits tours of permanent and special exhibitions. In addition, guided tour service was rendered in 7 permanent exhibitions and special exhibitions in 2019, including "Vanguards for Foreign Relations Science and Technology International Cooperation", "Automaton exhibition", "Telecom@Taiwan", "Chinese Professional Baseball League 30th Anniversary - No One's Out", "Technological and Vocational Paradise", and "Agronomy Wonderland, Intelligent Agricultural Machinery, Introduction to Technical and Vocational Education" and "The Probability in Life". A total of 2,898 guided tour services were rendered to 37,057 visitors, 1,681 of which were selective exhibits tours.



Exhibition guided tour

2. Robot Show

Since 2019, we innovatively modified the domestic robot ZENBO to become the 3rd generation robot for robot show in conjunction with the renewal of the robot demonstration area. We hope that the emotional expression, speech ability, and music and dance performances of the 3rd generation robot, coupled with the collaboration of the IT department of educational institutions, can further enhance the visiting experience for the public and make a deep and positive lasting impression.



The interesting look of the 3rd generation robot is very popular with children

3. Guided tour for the visually impaired

The NSTM conducts one-to-one training for volunteer interpreters. Regarding guided tour for the visually impaired, we have trained a total of 56 guides for the visually impaired in 2019. The final target is that all of the NSTM's volunteer interpreters have the ability to guide the visually impaired, as well as establishing a tour guide team for the visually impaired to provide them a comfortable for recreation, education and technology learning.

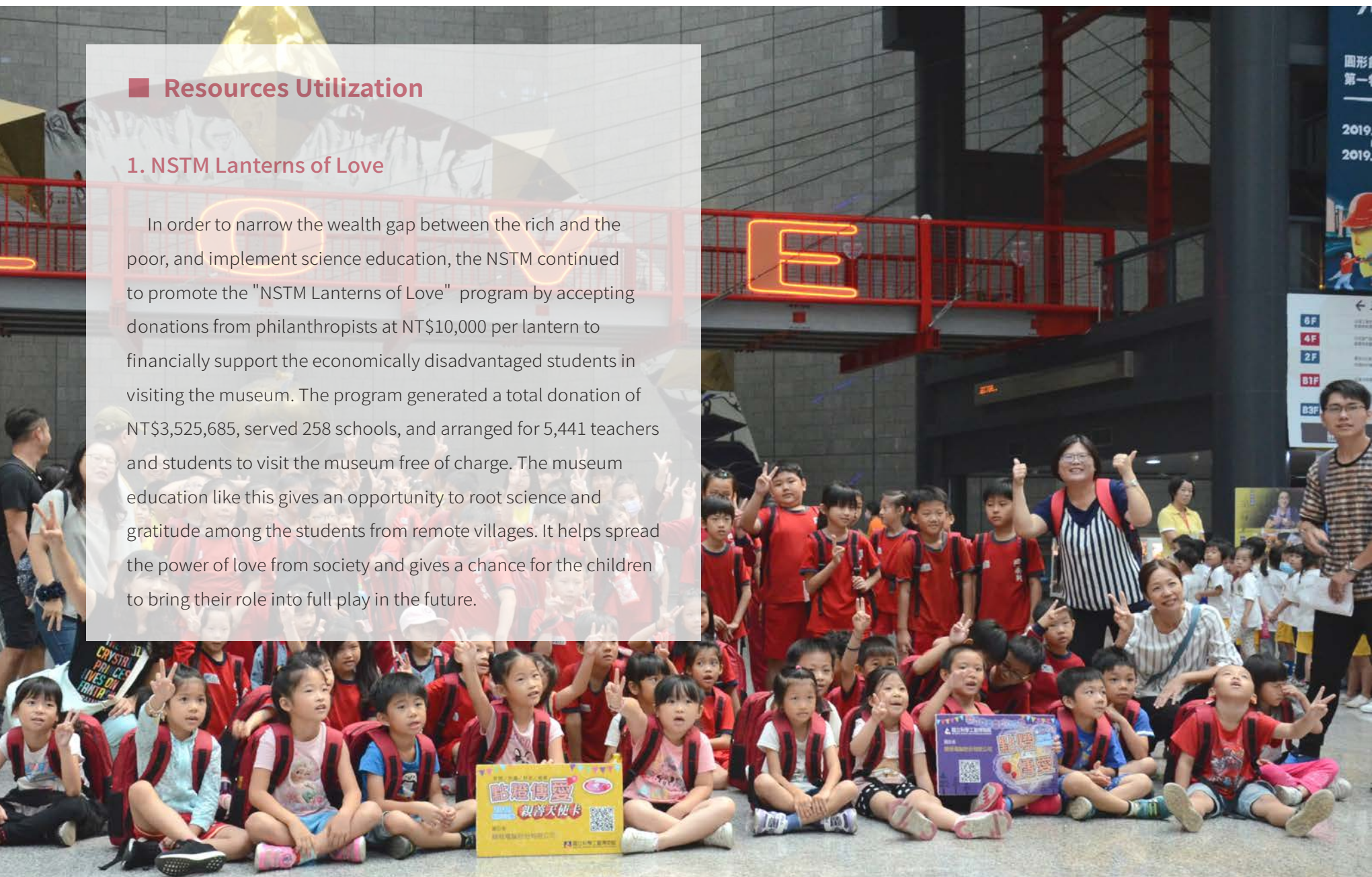


Friendly service - guided tour for the visually impaired

Resources Utilization

1. NSTM Lanterns of Love

In order to narrow the wealth gap between the rich and the poor, and implement science education, the NSTM continued to promote the "NSTM Lanterns of Love" program by accepting donations from philanthropists at NT\$10,000 per lantern to financially support the economically disadvantaged students in visiting the museum. The program generated a total donation of NT\$3,525,685, served 258 schools, and arranged for 5,441 teachers and students to visit the museum free of charge. The museum education like this gives an opportunity to root science and gratitude among the students from remote villages. It helps spread the power of love from society and gives a chance for the children to bring their role into full play in the future.



Financially support the economically disadvantaged students in visiting the museum via the NSTM Lanterns of Love

2. Adequately utilize social resources to aid disadvantaged groups

To help students from remote villages share the resources of the museum, Chunghwa Telecom, the Taiwan Telecommunication Industry Development Association, and the NSTM jointly initiated a program of "Love and Care for Disadvantaged Students from Remote Villages" to help them have a day of vitality and knowledge and make their dreams come true by fully subsidizing their visit to the museum. Two visits were provided in 2019, where 500 teachers and students from 7 schools participated in the event.



Love and Care for Disadvantaged Students from Remote Villages Event

3. Utilize social manpower resources to improve overall performance

NSTM is the first applied science museum in Taiwan and the center of science education promotion in South Taiwan. Facing limited manpower, we ask for social human resources for provision of service according to the Volunteer Service Act. The scope of service includes reader services, collection maintenance, collection management, maintenance services, educational activities, exhibition services, Chunghwa Telecom exhibition services, theater services, audience services, volunteer administration, guided tours, nursing, information desk, promotion, group cafeteria, energy-saving house projects, general affairs, and gardening. A total of 1,207 volunteers (with an accumulated 205,467 service hours) rendered services for the museum by the end of 2019. Three discussion meetings of 260 volunteer team leaders and one Volunteer Commendation Ceremony and Dinner Party with 1,025 participants were held.

NSTM helped to establish the "NSTM Volunteer Foundation" in 2012. The source of the fund primarily comes from volunteer donations, and flea market charity events held at our gift shop halls on the first Sunday afternoon of each month. The funds were used for volunteer gift money, consolations, as well as charity donations in accordance with the annual balance. The fund balance for 2019 was NT\$ 553,535.



2019 Volunteer commendation ceremony

4. Provide service opportunities to encourage students to engage in volunteer services

In encouraging students to commit to volunteer services, the NSTM amended the "Rules of Student Social Services of the National Science and Technology Museum" in 2019, which was formulated in 2012. In 2019, NSTM has conducted 12 sessions of educational training, and 993 students participated in social services with a total service time of 4,436 hours.



Service opportunities provided to encourage students' volunteer services engagement

5. Conduct community events to build good community relations

The NSTM holds related community activities every year. The activities combine social resources to cater to the needs of the community and maintain good public relationships with local residents. The plan also engages in community development by incorporating community residents as an integral part of the NSTM's support resources, in turn generating excellent interaction with local communities and enhancing NSTM's favorable image.

Free movie screening for the residents of the neighborhood during the first half of 2019 was a 6-day event from January 25 to 30, 2019, with a total of 1,928 participants. The Automaton exhibition was also free of charge for the residents from January 25 to January 30, 2019, with a total of 747 visitors. Free movie screening for the residents of the neighborhood during the second half of 2019 was a 6-day event from August 20 to 25, 2019, with a total of 2,336 participants, creating a new high in the number of residents for free movie screenings since 2014. The residents were in good order during the event, indicating that after years of publicity and promotion, residents have fully understood the operation of the event and can comply with NSTM's relevant policies.

Table 11 Summary of the number of participants in community events over the past 5 years

Events	Annual	2015	2016	2017	2018	2019
Free Movie Screening in the first half of the year		1,508	1,210	3,125	1,709	1,928
Free Movie Screening in the second half of the year		2,341	2,326	1,884	2,271	2,336
Special exhibition visit		884	1320	990	1,337	747
Total		4,733	4,856	5,999	5,317	5,011

6. Join International Museum Organizations to expand international exchanges

The NSTM attended the 2019 ASPAC Annual Conference held at the Queensland Museum, where our colleagues presented papers to promote the exhibitions, educational events and research accomplishments as well as discussed the existing and future collaborative projects between the NSTM and ASPAC members, and investigated the plans of overseas science camps in Australia as well as scientific activities in cooperation with Australian museums.



NSTM Director-general Shiunn-Shyang Chen (second from right) has led a team to the Queensland Museum of Australia to attend the ASPAC 2019 conference

7. Invited to attend the Turkish Airline Science Expo

Our colleagues Lo Szu Yi and Lin Chien-Liang traveled to Bursa in Turkey from April 30 to May 7, 2019 to attend the 8th Turkish Airline Science Expo, and set up 16 workshops focusing on NSTM's cultural and creative products and the Automaton exhibition, coupled with scientific principles and DIY as well as 4 themes including the kaleidoscope, automata, flying seeds, and straw rockets. In addition, 16 science demonstrations have been performed with cultural and creative products such as ancient locks antiques and secret boxes, as well as traditional Taiwanese toys such as spinning tops, Diabolos, and malt drums. The kaleidoscope workshop incorporates Turkish local cultural elements and characteristics of Kaohsiung in particular to design mirror images such as the "Cappadocia Hot Air Balloon", "Bursa Revolve Dancer", "Blue Mosque of Istanbul" and "The Dome of Light in Kaohsiung MRT Formosa Boulevard Station", which attracted the organizer and Mayor Alinur Aktas of Bursa, Turkey to visit our exhibition booth to understand the scientific principles, design and creativity of this cultural and creative product. In addition, the theme of the workshop is to explain the scientific principles and production processes by use of English

posters, as well as to provide English bibliography of relevant scientific principles for the Bursa Science and Technology Center in Turkey, in the hope of showing the NSTM's efforts in science communication and providing alternative scientific learning scenarios and experiences to Turkish People.



Our colleagues at the 8th Turkish Airline Science Expo with the Mayor of Bursa, Turkey (right)

■ Promoting Cultural Creativity

1. Integrate the resources of True Dreamland for various educational activities

The purpose of True Dreamland is to implement maker education, internalize the maker spirit, and build an ecosphere of the maker. Based on sufficient space and equipment, we develop multiple activities, including courses, workshops, lectures, and exhibitions, to guide people experiencing the process of the maker. By the practice of maker activities, we can cultivate the innovation, creativity, and hand capabilities of students for the global trend of education. In 2019, True Dreamland held 12 workshops, 3 exhibitions, 153 courses, and 5 lectures to promote maker education. On August 10-11, we hosted the "2019 NSTM Maker Party" that invited 31 external units, the exhibition division, and the technology education division for 35 display booths in total. There were 1200 participants at this party.

Furthermore, we provided several external activities this year. We held two teaching activities at the opening ceremony for the Indigenous Education Resource Center of the Education Bureau of Kaohsiung City Government. Internationally, we held

two workshops at Fuzhou Science and Technology Museum, 32 workshops at the 8th Turkish Airline Science Expo in the Bursa Science and Technology Centre in Turkey, as well as one science demonstration in the ICOM Kyoto 2019.



2. Create an online store of cultural and creative products

In recent years, the museum actively developed cultural and creative products based on its collections, as well as the products of science education and the teaching aids combined science demonstrations. The purpose is to promote science education and enhance the image of the museum. The museum can benefit from cultural and creative business. Except for the physical store in the 1F lobby, the museum set up a "Cultural and Creative Online Store" for providing a cloud platform for sales and display on August 31, 2019. The online store satisfies the needs of shopping without the constraints of time and space. Also, it provides an innovative service, and a convenient purchase procedure with

Table12 Sales figures of cultural & creative products over the last 5 years

Year	Sales
2015	1,145,601
2016	1,567,907
2017	1,639,784
2018	2,607,177
2019	2,717,137

diversified payments.

Table 12 shows the sales record of cultural and creative products over the last five years.

3. Establish the Cultural and Creative Team for the business

The NSTM organized a cross-departmental Cultural and Creative Team in 2014. On March 1, 2019, the museum officially established the team to be responsible for the cultural and creative business.

The museum positively develops various types of cultural and creative products. In 2019, the museum presented six self-designed products, including "Multi-function mobile phone holder", "Armillary badges", "Automaton exhibition - sweatshirts", "Automaton exhibition - mugs", "Telephone-shaped metallic bookmark", and "DIY material package - earthquake-resistant architecture". The museum cooperated with ARNOS Corporation to develop the "Pig-shaped puzzle lock" and with the Finelink International Co., Ltd to develop "Yoga straps" and "Name card holder". In addition to the development of diversified products, the NSTM cooperates with the suppliers of cultural and creative products for providing various selections for the public.



True Dreamland Workshop



Maker Education Lectures



Science demonstration in the ICOM Kyoto 2019 General Conference

國立科學工藝博物館
NATIONAL SCIENCE & TECHNOLOGY MUSEUM

Green Museum

2019 NATIONAL SCIENCE AND TECHNOLOGY MUSEUM ANNUAL REPORT



North Park

In 2019, NSTM continued to strive toward the ideal and vision of being a green museum by upholding our sustainable development philosophy, with reference to the United Nations Sustainable Development Goals established by the United Nations (UN) in 2015 and Taiwan's Sustainable Development Goals set up by the Executive Yuan in 2017, in order to carry out the function of educating the public about technology and actively promoting various goals. Achievements in 2019 include:

1. Improving the care for social and economic conditions of the disadvantaged

NSTM has long been engaged in conducting neighborly community care activities, such as movie screenings and special exhibition visits, with a total of 5,011 participants in 2019.

2. Ensuring food security and promoting sustainable agriculture

We have renovated the "Story of Taiwan Agriculture" exhibition hall to promote smart agricultural machinery and sustainable agriculture from the perspective of education, with a total of 16,254 visitors in 2019.

3. Ensuring healthy lives and promoting the well-being at all ages

Apart from the Adventures in Health Land Hall, we also introduce the Defeat Myopia to Save Vision exhibition area in cooperation with Kaohsiung Chang Gung Memorial Hospital in order to promote education on health care at all ages, and 6 myopic-related lectures were held inside the exhibition hall.

4. Ensure equal access to comprehensive and high-quality education, and promote lifelong learning

The NSTM has conducted 4 hours of environmental education and training for colleagues to comply with the responsibility of Social Education Institutions. It also organized 25 education and training courses related to sustainable development to achieve lifelong learning through multiple methods, including the Clean Energy Creative Competition, field trips, camps, lectures and teaching aid experience, with a total of 132 sessions and 42,218 participants.

5. Achieving gender equality and women's rights

The NSTM currently has 131 staff, of which 72 are women, accounting for 55% of the total staff, and 4 among the 9 top managers are women.

6. Ensure environmental quality and sustainable management of environmental resources

The NSTM continues to work towards the objective of green building concept, monitoring the indoor air quality and remediation of water and soil to achieve water permeability and water retention. As a result, the NSTM has improved the environmental quality of an area of 200sqm in 2019.

7. Ensure affordability, stability, reliability and sustainability of modern energy

In 2019, the NSTM effectively saved electricity of 720,000 kWh by improving lighting and air-conditioning, as well as constructing leak-proof buildings with the use of sustainable modern equipment.

8. Promote care and sustainable economic growth, improve labor productivity, and ensure employment opportunities

The NSTM has hired 5 disabled people as staff, conducted 4 employee education and training courses.

9. Constructing affordable, safe, environmentally friendly, resilient and sustainable transport

In 2019, the NSTM offered promotional activities for the MRT, trains, or buses, with a carbon reduction of 9337.45kg of CO₂ emissions. We also established the Smart Manufacturing exhibition hall to let visitors gain deeper insight into the structure of smart vehicles, as well as the Pavilion of Dream Transport to enable visitors to experience various sustainable transports.

10. Reducing inequality in Taiwan and with other countries

The "2019 NSTM Lanterns of Love" program generated a total donation of NT\$3,525,685 for economically disadvantaged students. In addition, NSTM cooperated with foundations, hospitals, Chunghwa Telecom, and the private sector to take care of disadvantaged children or children in the remote areas.

11. Establish a caring and sustainable museum

The NSTM has set up facilities for the disabled, nursing rooms, strollers, and wheelchairs for the public, provided 111 guided tours for the visually impaired in 2019, and continued on the education and training of guides for the visually impaired. There are currently 50 people who can support guided tours for the visually impaired.

12. Promote the green economy and ensure the model of sustainable consumption and production

The NSTM implements measures to open up new sources and cut expenditures to steadily increase revenue by NT\$188,058,633 and reduce expenditures by NT\$59,089,260. We also develop cultural and creative products for sustainable consumption and production in order to improve the sustainability of collection services.

13. Complete adaptation actions in response to climate change and its impact

The NSTM has permanent exhibition halls including "Climate Change" and "Stories of Recovery and Reconstruction after MORAKOT" and performs educational tasks in Social Education Institutions. 2019 is the 10th anniversary of the Morakot disaster, and the "Stories of Recovery and Reconstruction after MORAKOT" was renovated to emphasize the new concept of disaster prevention and relief a decade after the disaster, enhancing the risk-awareness of disasters and promoting a safe and resilient disaster prevention culture in response to climate change.

14. Conservation and sustainable use of ecosystems to ensure biodiversity and environmental degradation

The NSTM continues to improve planting, greening and eco-friendly constructions, and has set up the 2019 environmental education instruction boards in outdoor park environments, which includes the history of dragonflies, as well as the brief history and prevention of venomous snakes, fall armyworms and rove beetles. In addition, the NSTM also develop teaching aids and teaching materials for environmental education science activities in the museum, in order for educational advocacy on the concept of environmental conservation and sustainable development.

15. Promote a peaceful and diverse society to ensure a responsible and service-oriented system

The NSTM provides a single-window service and public inquiry of government information in order to service all residents. It also continues to develop in the new social media community to narrow the distance between the public and the NSTM; with 86,870 Facebook fans, we showed an increase of 14% compared with 11,105 fans in 2018.

16. Establish diversified partnership to work together on sustainable development

In 2019, NSTM's diversified partners included 14 companies from the public sector, schools, and private sectors, such as hotels and hospitals. Apart from the various resources invested in education, all the units also work together to gain the power of achieving sustainable development.



Establish the Green Pavilion based on the 17 sustainable development goals set by the UN

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General Affairs Management

2019 NATIONAL SCIENCE AND TECHNOLOGY MUSEUM ANNUAL REPORT



Multiple Measurement Square

■ General Affairs Management

1. Public Procurement to Conserve Public Funds

For procurement contracts and 75 tender award cases over NT\$100,000, the accumulated tender budget was NT\$177,660,003, and the awarded amount was NT\$165,986,452. NT\$11,673,551 was conserved in total, with a conservation achievement rate of 6.57%. There were 646 procurement cases between NT\$10,000 and NT\$100,000 totaling NT\$28,827,954; the amount reported was NT\$28,391,061, saving a total of NT\$436,893, equivalent to 1.52%.

2. Interest Income Resource Widening

In order to increase interest income and utilize fixed deposits more flexibly, in addition to the existing 401 NSTM account of operational funds in a fixed deposit with the Agent Institutions of the National Treasury (Taiwan Business Bank, Eastern Kaohsiung Branch), NSTM also has fixed deposits at Chunghwa Post. The total amount of fixed deposits in 2019, including deposits in the Taiwan Business Bank and Chunghwa Post is NT\$192.5 million. The interest generated in 2019 was NT\$2,113,629. In 2019, NT\$1,650,000 in rent income was generated from base stations

established by 5 telecom companies. Furthermore, NT\$171,000 was generated by auctioning scrapped products to actively increase income by widening resources.

3. Improve Archive Management Quality

In order to improve the operational quality related to archives management, Secretariat Director Cheng Tian-Yi of the National Museum of Natural Science led 7 colleagues to visit the NSTM to conduct archiving and benchmarking studies on May 9, 2019. On the day of the visit, NSTM's Secretariat Director Chou Wan-Rong chaired the meeting which was attended by archives team members. The schedule was planned for archives storage and warehouse facilities, archives application, and golden awards.



Secretariat Director Cheng Tian-Yi of the National Museum of Natural Science led 7 colleagues to visit "Time Traveling the NSTM" exhibition.

4. Emphasis on the performance of internal control

NSTM continued internal control in 2019 and signed the 2019 Internal Control Effectiveness Statement and announced it on our website. Other achievements include the establishment of the 2019 self-evaluation and internal audit plans, execution of self-evaluation and audit, and proposition of 10 deficiencies and reform suggestions. NSTM also upgraded our internal control system to version 8.0 according to the "Regulations on the Internal Control and Monitoring in the Government" amended by Letter Yuan-Shou-Zhu-Zong-Gui-Zi No. 1050600776A and the "Sample Making Principles for the Commonality of the Internal Control (Incl. Cross-Functional Integration) in the Government" established by Letter Yuan-Shou-Zhu-Zong-Gui-Zi No. 1050600786, December 30, 2016, of the Executive Yuan.

■ Electromechanical Operations

1. Saving energy to fulfill the Green Expo's concept

(1) Replacement of equipment to enhance energy efficiency

In 2019, NSTM's replacement of electrical equipment covers 1 piece of ice storage air-conditioning equipment, 3 energy-saving elevators, and 4,178 units of LED energy-saving lights in the South and North buildings (including underground parking). Compared to 2018, NSTM saved 5.5% of electricity (637,000 kWh) in 2019. The power consumption statistics analysis over the last 10 years are shown in figure 11.

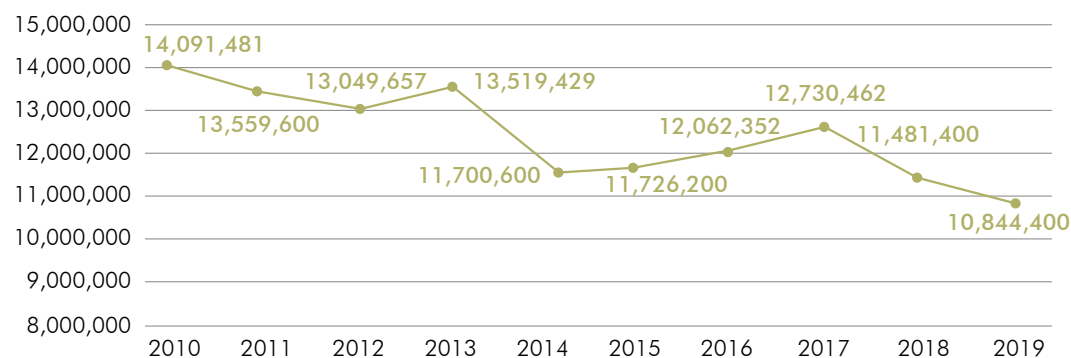


Figure 11 Power consumption over the last 10 years

(2) Introduction of ISO 50001 Energy Management System

Through teamwork and regular review by the cross-divisional and office energy team, they revised documents and forms, inspected the meters, reviewed the energy baseline and regression formula used for estimating power consumption (figure 12), proposed action plans for saving energy (such as updating elevators with permanent magnet motors, updating lighting with LED lights, and replacing ice storage air-conditioning equipment). In addition, key

data has been collected, while a power consumption audit and internal audit were conducted along with an energy audit and external audit. In 2019, NSTM commissioned SGS to implement the museum's ISO50001:2011 energy management system accreditation on September 5 (second round). Based on the conclusions of the external audit in 2018, NSTM also conducts energy consumption review for each unit on a quarterly basis for key factors.

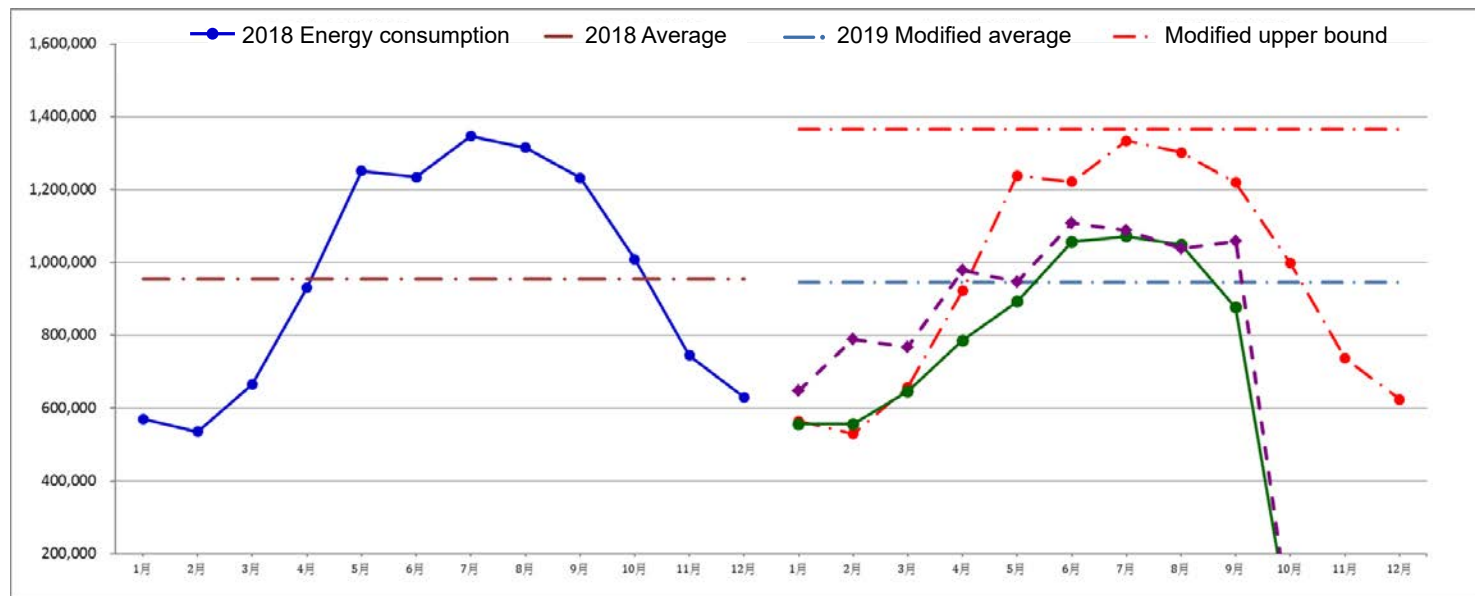


Figure 12 2019 energy baseline and regression formula

(3) Won the 2019 MOEA Energy Saving Leadership Silver Award

NSTM participated in the 2019 Energy Saving Leadership Award organized by the MOEA, and was the only national museum in Taiwan that won the silver award regarding its energy efficiency performance positioning in Taiwan from 2016 to 2019.



2019 MOEA Energy Saving Leadership Award review meeting

2. Occupational disaster prevention preparedness

NSTM conducted the NSTM Occupational Safety and Health Meeting for the First Half of 2019 on June 27. During the meeting, occupational safety and health-related problems encountered during the first half of 2019 were discussed, and audits were also arranged for the items specified in the annual Occupational Safety and Health Self-inspection List of various divisions and offices. The Occupational Safety and Health Meeting for the Second Half of 2019 was held on December 26.



3. Improve the efficiency of public facilities

(1) Set up modern family restrooms

The first phase of family restrooms was completed (the overall improvement on Jiuru Road, South Building, and fourth floor toilet in area D on the west side of the North Building) to provide barrier free access and meet the requirements of single-stall family restrooms in order to achieve a modern toilet with educational meaning as well as bring about the sense of science and technology.



Provide family friendly toilets

(2) Renovation of elevator equipment

In 2019, the NSTM also replaced D4, D5, and D6 elevators in area D of the North Building in order to improve equipment reliability and reduce energy consumption of motor systems by 40%. The NSTM tested and repaired a total of 24 escalators, and replaced a total of 2,688 step wheels and 8,064 chain wheels, which significantly reduced the number of incident reports.



Inspection and replacement of escalator step wheels

(3) Repair and maintenance of roller shutters in exhibition halls

Since professional techniques are required for the maintenance of roller shutters, the NSTM appointed an independent contractor for the inspection and maintenance of roller shutters of exhibition halls to collectively keep track of the operation of roller shutters.

(4) Build flood gates in the North Building

In 2019, the NSTM set up new flood gates at the side entrance of the Green Living Exploratorium, the side entrance of its restaurants, the restaurant kitchen to the exit of the parking lot in order to optimize the effectiveness of flood control in the museum.

(5) Outdoor gardening and maintenance of surrounding facilities

Continued outdoor gardening and maintenance of surrounding facilities, including trimming and replanting of shrubs, replanting of lantana, maintenance of nursery grounds, reconstruction of

public toilets in bus parking areas, improvement of drainage facilities in underground parking areas, car park markings in the parks and parking lots, renovation of the surface and curbstones of the pedestrian walkway, setting up sprinkler irrigation systems in the Outdoor Energy exhibition area, updating the automatic sliding glass door in the Green Living Exploratorium, improvement of the Sun Courtyard glass floor lamp cover, as well as maintenance and repair of facilities for outdoor grounds, advertisements and notices, and drainage systems.

■ Cross-Field Value-Adding Project

In order to innovate and re-create social education institutions in terms of management philosophy and form, in turn transforming national museums in Taiwan into a contributing force during the "social innovation" process, the MOE proposed the "Cross-Field Experience, Learning for Life: Project for Cross-Field Value-Adding in National Social Education Institutes Development", which was implemented from 2014 to 2017. NSTM's "Southern Taiwan Technology Education Green Expo Park Project" is also proposed based on goals including environment, culture, economy and sustainable social development. The 3 subprojects of "Happy Green Park", "Happy Taiwan Industry" and "Telecom & Innovative Digital Value (Incl. Bridging to New Generation)" were set up and opened to the public in 2017. In regards to the development of accessways in supporting the Kaohsiung underground railway system and the integration and beautification of the South Building, due to the delayed construction schedule of the underground railway and changes made to the integrated design, the original plan no longer cater to the needs of the current circumstances, therefore adjustments made to the budget and date extension were approved by the

MOE. In 2019, the Cross-Field Value-Adding Project was completed to comply with the completion of accessways in supporting the Kaohsiung underground railway system and the integration and beautification of the South Building.



Development of accessways in supporting the Kaohsiung underground railway system and the integration and beautification of the South Building

■ IT Operations

1. The official website and themed website are in compliance with the 2019 Governmental Website Operation Testing Plan and Performance Indicators

Test on the official websites for third-level (including fourth-level) agencies of the Executive Yuan in accordance with the 2019 Governmental Website Operation Testing Plan and Performance Indicators of the National Development Council. NSTM's Chinese website was tested with the Governmental Website Operation Testing Plan and Performance Indicators, and a summary of previous testing results are as follows:

Testing date	108/4/3	108/4/23	108/4/29	108/5
Testing score	58points	74points	81points	99 points

In addition, the following table shows the testing score for NSTM's 3 websites: Cultural and creative product, QR Code Ticketing System, Artifacts of Standards, Metrology and Inspection.

Business website	Cultural and creative product	QR Code ticketing system	Artifacts of Standards, Metrology and Inspection
Weighted sum	100 points	100 points	100 points

2. Development of the "QR Code ticketing system"

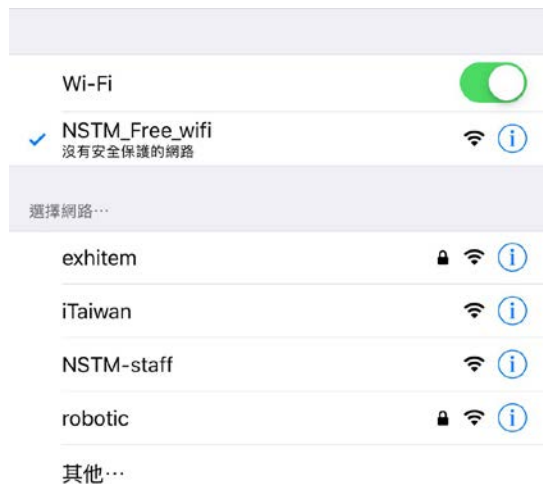
In the past, the traditional method of coupons for public relations and marketing inevitably required tedious procedures such as a large quantity of printing and paper (including publicity materials), sorting and packaging by laborers, and bulk posting (including postage and schedules) which is a waste of money and labor. Nowadays, electronic online applications for the "School VIP ticket" is provided for schools that are willing to apply for it, and the system will send the exclusive QR Code VIP ticket to the schools by email, which saves public money and labor to improve service quality.



Self-developed the "QR Code ticketing system"

3. Provide auto login wireless network services free of charge

NSTM has launched the SSID of "NSTM-Free-wifi" in order for all visitors to use NSTM's wireless network and to enhance the convenience to visitors. Identity authentication is not required for the public's mobile devices, and visitors can use NSTM's wireless network to go online.



List of SSIDs

4. Implementing the ISMS (Information Safety Management System) and reapplication of the ISO 27001:2013 international accreditation

NSTM continues to implement the Information Security Management System (ISMS) and reapplied for the ISO 27001:2013 international accreditation as it is about to expire in 2019. The ticketing system, official document integration system and online service were included in the accreditation. SGS Certification and Business Enhancement Division was commissioned to conduct document review and external audit at NSTM, and the museum successfully obtained ISO 27001:2013 international accreditation in June to maintain the validity of the certificate.

5. The NSTM APP passed the Industrial Development Bureau's Mobile Application Basic Security Inspection Standard and received a medium rating.

In 2019, the NSTM App has continuously entrusted qualified laboratories to conduct information security rating based on the "Mobile App Basic Information Security Rating V3.0" in accordance with the "Mobile Services Development Principle of the Executive Yuan and Subordinated Agencies" to comply with the Personal Data Protection Act and regulations related to government information security management which are stipulated by the Executive Yuan, as well as to pass the mobile application software testing set by the Industrial Development Bureau of the Ministry of Economic Affairs. NSTM has successfully obtained a medium information security rating in October and received the certification in November, thereby significantly improving the app's security.



行動應用資安聯盟 Mobile Application Security Alliance			
App名稱	國家科學技術博物館	證書編號	MAAS-2019-10800137
App系統	Android	程式版本	v1.3.22
作業系統	iOS	其他資訊欄位：	
安全等級	L2	檢驗標準版本	V3.0
證書類別	乙種		
證書日期	2019/10/16	證書效期	2020/10/16
檢驗機構名稱	國家科學技術博物館	檢驗日期	2019/10/16
檢驗實驗室名稱	國家科學技術博物館	實驗室認證標準	TAF認證實驗室
App類別	其他	其他(請註明)	無
發布狀態	已發布	行動應用程式網址	無

The NSTM APP passed the Industrial Development Bureau's Mobile Application Basic Security Inspection Standard and received a medium rating.

6. Passed the BS10012:2017 personal information management system re-examination

In an effort to ensure NSTM's PIMS complies with international standards, in 2019 we continued to incorporate the re-examination of "Personal Information Management Related to Registration of the Continuing Education Organized by the Technology Education Division and the Membership Card Application to the Visitor Services Division" in the scope of the certification to maintain the validity of the certificate.

7. NSTM was selected as an outstanding organization for the MOE's Open Government Data Operations Evaluation

The NSTM has 38 existing open government data. In 2019, NSTM and the Department of International and Cross-strait Education were jointly awarded as the top in the Open Government Data Operations Evaluation. The table shows NSTM's evaluation results in the MOE's Open Government Data Platform

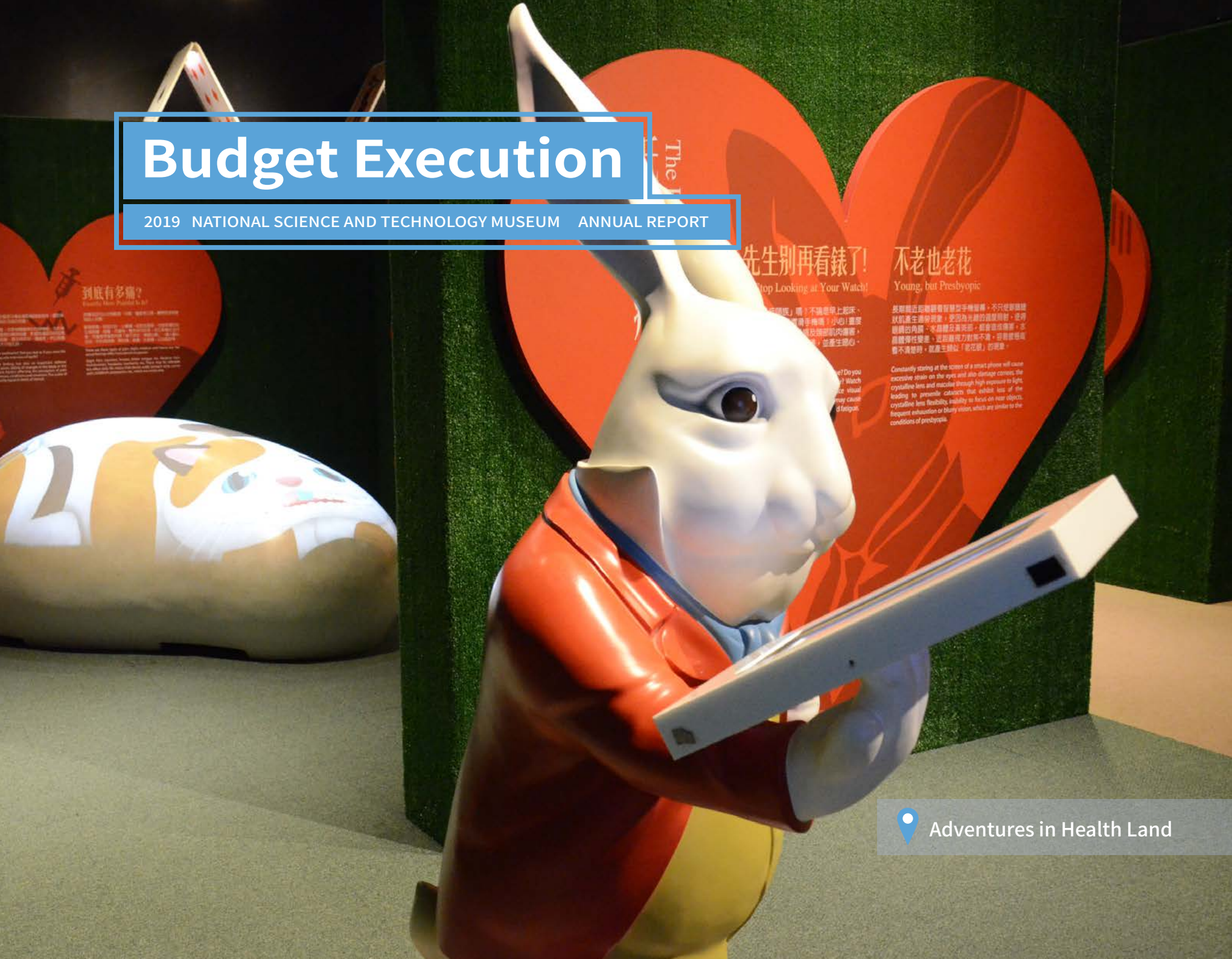
Organization (Institute)	Total number of open dataset	Bronze labels (0.3 points)	Silver labels (0.6 points)	Gold labels (1 points)	Open dataset Score	Total score
National Science and Technology Museum	37	0	0	37	37	100

NSTM's 2019 Open Dataset Gold Awards given by the National Development Council are listed in the following table, with a total of 28 open datasets (excluding the open datasets before February 1, 2015). NSTM has won a total of 28 gold labels.

Organization (Institute)	Total number of open datasets	Open dataset Number of testing	Gold label	Silver label	Bronze label	No label	Total score for open dataset	Total score
National Science and Technology Museum	38	28	28	0	0	0	28	100

Budget Execution

2019 NATIONAL SCIENCE AND TECHNOLOGY MUSEUM ANNUAL REPORT



先生別再看錶了!
Stop Looking at Your Watch!

不老也老花
Young, but Presbyopic

長期關注螢幕會導致眼肌疲勞，不只使眼睛處於過度調節狀態，更因為光線的過度照射，使得眼睛的角質、水晶體及黃斑部，都會造成傷害。水晶體彈性變差，近距離視力對焦不準，近視眼患者會不清楚時，就產生類似「老花眼」的現象。

Constantly staring at the screen of a smart phone will cause excessive strain on the eyes and also damage corneas, the crystalline lens and macula through high exposure to light, leading to presbyopia, cataracts that inhibit loss of the crystalline lens flexibility, inability to focus on near objects, frequent exhaustion or blurry vision, which are similar to the conditions of presbyopia.



Adventures in Health Land

Annual Balance

The total revenue from execution results of NSTM in 2019 was NT\$410,110,000. The main source was the social education institution development grant of NT\$200,244,000, which occupied 48.83% of the total revenue. Self-raised funds was NT\$209,866,000, occupying 51.17% of the total revenue. Out of which, Other Subsidy Income of NT\$53,038,000 took the top, occupying 12.93% of the total revenue. The second highest was the income from Service Income of NT\$50,402,000, occupying 12.29% of the total revenue. The rest in order were: Cooperative Education Income of NT\$49,991,000, occupying 12.19% of the total revenue; Asset-use and Royalties Income of NT\$30,771,000, occupying 7.50% of the total revenue; Educational Promotion Income of NT\$15,699,000 occupying 3.83% of the total revenue; Donation Income of NT\$4,267,000, occupying 1.04% of the total revenue; Other Income of NT\$5,698,000, occupying 1.39% of the total revenue.

Business Costs and Expenses of NT\$502,967,000, occupy 122.64% of the total revenue; Other Business Expenses of NT\$2,211,000 occupy 0.54% of the total revenue. Our annual shortage amount was NT\$95,068,000, this was attributed to the fact that operational funds must be depreciated and amortized. On the income side, the self-raised ratio of NSTM in 2019 was 51.17%.

Table 13 2019 Income Statement

Unit: thousand NT\$

Item	2019 Budget Amount	2019 Final Accounts Amount	2018 Final Accounts Amount
Business Income	291,639	369,374	352,696
Service Income	46,475	50,402	41,284
Exhibition Halls	18,870	23,571	20,667
Special Exhibitions	14,705	13,724	9,194
Theater	8,700	6,863	6,052
Experience Facilities	4,200	6,244	5,371
Cooperative Education Income	25,814	49,991	57,104
Educational Promotion Income	10,021	15,699	15,720
Social Education Institution Development Grant (A)	200,244	200,244	200,244
Other Subsidy Income	9,085	53,038	38,344
Other Business Income	32,707	40,736	40,119
Interest Income	1,600	2,308	1,968
Gains on Exchange	0	0	24
Asset-use and Royalties Income	29,585	30,771	31,720
Donation Income	0	4,267	3,040
Breach and Fine Income (including reparations)	60	503	415
Miscellaneous Income	1,462	2,887	2,952
Total Income (B)	324,346	410,110	392,815
Business Costs and Expenses	423,477	502,967	470,650
Service Costs	239,581	283,912	261,342
Cooperative Education Costs	20,385	48,984	52,551
Educational Promotion Costs	7,128	10,735	8,966
Management Costs and General Expenses	156,383	159,336	147,791
Other Business Expenses	320	2,211	1,882
Losses on Exchange	0	352	203
Miscellaneous Expenses	320	1,859	1,679
Total Expenses	423,797	505,178	472,532
Yearly Surplus (Shortage-)	-99,451	-95,068	-79,717
Government Current Grants Ratio(A)/(B)	61.74%	48.83%	50.98%
Agency Current Self-Raised Ratio 1-(A)/(B)	38.26%	51.17%	49.02%
Self-Raised Income	124,102	209,866	192,571

Source: Annual Budgets, Financial Accounts

■ Annual Capital Expenditure

The total amount of annual capital expenditure budget in the fixed asset was NT\$81,597,000, which included NT\$41,815,000 from government support, NT\$39,782,000 from self-raised funds.

Table 14 2019 Fixed Asset Facility Improvement
/ Expansion Balance Sheet

Unit: thousand NT\$

Projects	Available Budgets	Yearly Accounts
Fixed Asset Additions		
Government Support	41,942	41,815
Self-Raised Funds	39,956	39,782
Total	81,898	81,597

■ Past Revenues, Expenditures, Budgets and Final Accounts

Table 15 Past Revenues, Budgets and Final Accounts

Unit: thousand NT\$

Item Year	Budgets					Financial Accounts				
	Total	Social Education Total Institution Development Grant	%	Self-Raised	%	Total	Social Education Total Institution Development Grant	%	Self-Raised	%
2015	283,867	196,446	69.20	87,421	30.80	328,514	196,446	59.80	132,068	40.20
2016	278,857	196,446	70.45	82,411	29.55	375,744	196,446	52.28	179,298	47.72
2017	302,100	196,446	65.03	105,654	34.97	396,913	196,446	49.49	200,467	50.51
2018	328,754	200,244	60.91	128,510	39.09	392,815	200,244	50.98	192,571	49.02
2019	324,346	200,244	61.74	124,102	38.26	410,110	200,244	48.83	209,866	51.17

Source: Annual Budgets, Financial Accounts

Table 16 Past Expenditures, Budgets and Final Accounts

Unit: thousand NT\$


Item Year	Budgets					Financial Accounts					
	Total	Recurrent Expenditures	%	Capital Expenditures	%	Total	Recurrent Expenditures Staff Costs	Recurrent Costs	%	Capital Expenditures	%
2015	418,331	377,443	90.23	40,888	9.77	422,780	124,285	258,304	90.49	40,191	9.51
2016	476,782	371,511	77.92	105,271	22.08	537,399	126,819	305,792	80.50	104,788	19.50
2017	503,526	385,669	76.59	117,857	23.41	570,062	128,863	325,381	79.68	115,818	20.32
2018	489,074	426,560	87.22	62,514	12.78	534,857	134,166	338,366	88.35	62,325	11.65
2019	505,695	423,797	83.80	81,898	16.20	586,775	134,679	370,499	86.09	81,597	13.91

Source: Annual Budgets, Financial Accounts



Chronicle of Events

2019 NATIONAL SCIENCE AND TECHNOLOGY MUSEUM ANNUAL REPORT

 Power and Machines

Date	Summary	Proposing Unit
2018/10/30- 2019/1/29	"3rd Tang Prize Award and Certification Exhibition" at the gallery on 4F.	Exhibition Division
2018/12/14- 2019/4/7	NSTM organized the "Vanguards for Foreign Relations Science and Technology International Cooperation: An Exhibition of Achievements (Kaohsiung)" commissioned by the Ministry of Foreign Affairs at the 3rd exhibition hall on 2F, with a total of 26,778 visitors. Touring exhibitions were held in the National Taiwan Science Education Center, Taichung City Hall and the NSTM from June 26, 2018, attended by 52,345 visitors. Exhibition Division	Exhibition Division
2018/12/7- 2019/3/21	"Sung Kuan-Yi Clay Art Exhibition" at the Art Cafe on 2F.	Visitor Services Division
01/01- 01/31	Former legislator Yu Hung's "Yu's Oil Painting" was exhibited at the art and culture exhibition area on B1F.	Exhibition Division
01/01/- 06/30	Screening of 2 films at the 3D Theater: "Wild Africa" and "Robinson Crusoe".	Exhibition Division
01/06- 06/09	NSTM co-organized the "Eureka! The Fun Science Zone" exhibition in cooperation with Songshan Feng Tian Temple and conducted the opening ceremony of the exhibition on January 6, 2019, with various news media to jointly interview Chairman Lin Hsien-Ping of Songshan Feng Tian Temple and NSTM Director-general Shiunn-Shyang Chen.	Exhibition Division
01/18	The first Preparation Committee Meeting for the Popular Science Forum was participated by chiefs and representatives of various affiliated museums to report on the preparation of the 2019 Popular Science Forum which is planned to be held on October 1, 2019, on the resolution of the meeting.	Technology Education Division

Date	Summary	Proposing Unit
01/19-04/23	Shih Chien University Department of Fashion Styling and Design Communication held the ANG-AH-MI-YA exhibition at the Textile & Clothing exhibition hall.	Exhibition Division
02/02-05/30	"Group Love Art Center Charity Collection Exhibition" at the art and culture exhibition area on B1F.	Exhibition Division
02/15	"2019 NSTM Lanterns of Love" which invited VIPs and sponsors from all sectors, with a total of 300 participants, including 89 VIPs, 107 sponsors, 27 volunteers, and 77 colleagues. As of the end of 2018, the NSTM had received funding of NT\$17,260,916 and the event was attended by 32,946 teachers and students from 1,620 schools.	Visitor Services Division
02/23-02/24	Co-organized the "2019 Taiwan Robot Tryouts" including 3 challenges "FTC, FLL and FLL JR. " with ESUN ROBOT ASSOCIATION under the theme of "Astronomy".	Technology Education Division
03/01	NSTM's "Cultural and Creative Team" was officially established on March 1, 2019, to be responsible for cultural and creative development and marketing. Established the "Cultural and Creative Team" to be responsible for cultural and creative businesses. Before the official establishment of the "Cultural and Creative Team", a small cultural and creative task force was set up (included in the public service division before its official establishment) to be responsible for NSTM's cultural and creative business and development to fully display cultural creativity.	Visitor Services Division
03/06-04/09	"2018 Long-Term Care 2.0 Home Assistance Drawing Contest" award-winning products touring exhibition (Kaohsiung) at the art and culture exhibition area on 1F. Exhibition Division	Exhibition Division
03/08-06/30	Relocation of "Soil and Water Conservation for Disaster Prevention" exhibition at the National Museum of Natural Science - 921 Earthquake Museum of Taiwan. The opening ceremony was held on March 8, 2019, and was hosted by NSTM's Director-general Shiunn-Shyang Chen and Director-general Sun Wei-hsin as well as the Section Chief Hsu Sen-Yen of the Planning Division of the Soil and Water Conservation Bureau.	Exhibition Division

Date	Summary	Proposing Unit
03/11-03/25	"Pure Plant Drawing Group Exhibition by Lin Yueh-Hua, Huang Chao-Ying, Yeh Wen-Ching and Tsai Chi-Chang" at the art and culture exhibition area on 1F.	Exhibition Division
03/29-03/31	National Sun Yat-sen University rented the circular courtyard of NSTM on B1F to organize the "Nice to have you! Taiwan Scientists Group Portrait Exhibition", which was attended by a total of 854 people.	Exhibition Division
03/30-06/30	The launch of "Behind the Scenes: Inside the Production Control Room" in the Open Storage.	Collections and Research Division
04/02-04/21	Co-organized the "Love Water Conservation Children's Festival" with the Water Resources Agency of the MOEA, the Environmental Protection Bureau of Kaohsiung City Government, and Southern Taiwan Joint Services Center of the Executive Yuan.	Technology Education Division
04/03-12/31	MOE subsidized NSTM's "Childhood Memories of Fun in Southern Taiwan" exhibition at B1F, Fantasy exhibition hall.	Exhibition Division
04/11	NSTM signed the memorandum of understanding (MOU) with Bais Robot Co., Ltd. at the Bais New World in Ciaotou Sugar Refinery. The MOU was signed for collaboration in robot competitions, robot exhibition, as well as cultural and creative products in the future.	Technology Education Division
04/11-05/30	"Group Love Art Center Charity Collection Exhibition II" at the art and culture exhibition area on 1F.	Exhibition Division
04/13-04/14	In 2019, the 1st Project on Creative Maker Education Competition was participated in by elementary and junior high schools; the competition features major themes including the "Creative Maker Mission", "Digital Creative Maker", and "Mechatronics" Awareness. The first competition invited Director Wu Hsiao-Hsia of the K-12 Education Administration to present awards to the winners of the competition.	Technology Education Division

Date	Summary	Proposing Unit
04/15	Since April 2019, the NSTM has innovatively developed the "QR Code ticketing system" in the hope of providing a convenient mechanism for primary and junior high school principals to use the online application platform, support schools on the investigation of outdoor education facilities, popular science, and transportation routes, in order to promote school booking and plan applicable popular science education and learning activities.	Visitor Services Division
04/18	Invited Ms Chong Phit Lian, Chairman of the Board of Singapore Science Centre, to visit the NSTM.	Technology Education Division
04/21	NSTM co-organized the "2019 Environment, Health and Safety and Fire Protection Engineering Seminar" of the Department of Safety, Health and Environmental Engineering of National Kaohsiung University of Science and Technology at the lecture room in the South complex.	Technology Education Division
04/23-05/06	Organized the 2019 Bangkok Youth Scientific Exploration Camp in which 24 students and teachers from Thailand participated.	Technology Education Division
04/30-05/07	Our colleagues Lo Ssu-Yi and Lin Chien-Liang attended the 8th Turkish Airline Science Expo and conducted science demonstrations such as NSTM's cultural and creative products, science DIY, and traditional Taiwanese toys, and designed the kaleidoscope based on local cultural elements to be especially recommended to the Mayor of Bursa, Turkey, by the organizer.	Visitor Services Division
05/01	The Changhua Disaster Prevention Education Team was led by Hu Su-Tzu of the Department of Education of Changhua County Government to visit the NSTM, with a total of 31 principals and directors of schools in Changhua County.	Visitor Services Division
05/04-05/25	Co-organized 8 World Metrology Day metrology scientific knowledge promotion activities with the Bureau of Standards, Metrology and Inspection (BSMI), MOEA, and National Measurement Laboratory (NML).	Collections and Research Division

Date	Summary	Proposing Unit
05/09	In order to improve the operational quality related to archives management, Secretariat Director Cheng Tien-Yi of the National Museum of Natural Science has led 7 colleagues to visit the NSTM, and NSTM's Secretariat Director Chou Wan-jung chaired the meeting which was attended by archives team members. The schedule was planned for archives storage and warehouse facilities, archives application, and experience sharing of golden awards.	Secretariat
05/16-05/21	Participated in the 2019 Guangzhou Science and Technology Week, conducting 5 popular science demonstrations at the Guangdong Science Center. Director General Shiunn-Shyang Chen was also invited to lead colleagues to attend the popular science education promotion and achievement exhibition.	Technology Education Division
05/21-09/01	udnFunLife Co., Ltd. organized the "MOVE! into the wildlife Exhibition!" at the 4th and 5th exhibition hall.	Exhibition Division
05/24-05/25	NSTM participated in the achievement exhibition and forum of the "Smart Service Learning - National Social Education Institutions Technology Innovation Service Project" - the Smart and Comprehensive Learning Achievement organized by the Ministry of Education.	Exhibition Division
05/26	Co-organized the "2019 IPRC International Programing Robot Challenge" with Bais Robot Co., Ltd.	Technology Education Division
06/01-07/15	Partial relocation of "Vanguards for Foreign Relations Science and Technology International Cooperation: An Exhibition of Achievements" at the Institute of Diplomacy and International Affairs of the Ministry of Foreign Affairs.	Exhibition Division
06/01-06/02	NSTM was commissioned by the MOE to organize the Project on Creative Maker Education Competition and Exhibition, including exhibitions of 70 science and technology centers, 6 exhibits that have won gold medals in hands-on competitions, 10 obstacle games, and 6 stage exhibition activities.	Technology Education Division

Date	Summary	Proposing Unit
06/03-07/29	NSTM invited artist Tsai, Hsuen-ping's sister Tsai Lien-chu to conduct the "Cotton Paper Tearing Drawings - Tsai, Hsuen-ping Joint Exhibition for Teachers and Students" at the art and culture exhibition area on 1F. During the exhibition, the total funding of NT\$207,000 from exhibit donations will all be used for the Lanterns of Love exhibition.	Exhibition Division
06/03	NSTM signed the cooperative agreement for the relocation of "Nanometer: The Invisible Scale" with the Tree Valley Life Science Museum. The duration of cooperation begins on September 21, 2019, and ends on August 30, 2020.	Exhibition Division
06/04-06/09	The Taiwan Development Institute organized the "2019 Cross-Strait Calligraphy Joint Exhibition" at NSTM's art and culture exhibition area on B1F.	Exhibition Division
06/14	Passed the BS 10012 personal information management system re-examination.	Information Technology Team
06/20	Director Peter Liu of Grand China Air Ltd. has led a group of 4 VIPs to visit the NSTM.	Visitor Services Division
06/22-06/23	Organized the "2019 Agricultural Industries and Technology Arts Promotion Expo" and signed the Cooperative Agreement with the Agricultural Bureau of Kaohsiung City Government.	Exhibition Division
06/24-09/16	NSTM collaborated with the Taiwan Metal Creation Museum to host the "Summer Metal Creation Exhibition" at the Art Cafe on 2F.	Exhibition Division
06/26	NSTM reapplied for the ISO 27001:2013 international accreditation as it is about to expire on June 26, 2019, and has obtained the accreditation in 2019.	Information Technology Team

Date	Summary	Proposing Unit
07/01-12/31	Screening of 2 films at the 3D Theater: "Superpower Dogs" and "Leo DaVinci, Mission Mona Lisa".	Exhibition Division
07/01-07/02	The NSTM co-organized the "Subsidy for Project for Digital Humanities with Social Education Institutions as the Base - Creating an Industry 4.0 Popular Science Learning Platform" program with Shu-Te University and Kaohsiung Industrial High School to conduct two teaching materials development and trial teaching activities.	Exhibition Division
07/02-09/29	NSTM organized the "VR Gaming Engine Integrated 2-Axis Motion Platform" experience activity at the 6F gallery in cooperation with Win Loyal Ltd. and Chang Jung Christian University for the FunTech Park Project promoted by the Economic Development Bureau of Kaohsiung City Government.	Exhibition Division
07/04-09/29	NSTM jointly cooperates with the Print Tech Team of National Taiwan Normal University for the "Bi Sheng Mud Type Printing" exhibition and held a press conference at Open Storage.	Collections and Research Division
07/05-09/29	Relocation of the "Soil and Water Conservation for Disaster Prevention" exhibition at the National Taiwan Science Education Center.	Exhibition Division
07/06	NSTM participated in the "2019 Kaohsiung Fun Arts Summer Festival" of the art and makers market to exhibit creative achievements of True Dream Land over the past years, conduct courses and activities to actively market True Dream Land, and dedicate efforts to the spreading of information. The event served a total of 500 people outside the museum.	Visitor Services Division
07/06-07/13	Conducted the "Wa-Su Science-Based Tour of STEAM in Singapore for the Teenagers" Summer Camp with a total of 18 participants.	Technology Education Division

Date	Summary	Proposing Unit
07/09-08/25	NSTM received a subsidy from the MOE to co-organize the "Awakening Disaster Prevention DNA" touring exhibition with Kaohsiung MRT Corporation at Kaohsiung MRT Weiwuying Station for the "20th Anniversary of the 921 Earthquake Disaster and 10th Anniversary of the Morakot Disaster", followed by touring exhibitions at Puli Brewery and Tzu Chi Foundation's Jingsi temple in Hualien City.	Exhibition Division
07/09-09/29	The NSTM co-organized the "Rain and Rock Developments - Soil and Water Conservation Measures" cultural relic exhibition at Open Storage with the Soil and Water Conservation Bureau of the Council of Agriculture of the Executive Yuan, and conducted the holiday demonstration of "Keep On Track - Small Monitoring Station" as well as the "E-systems - Environment interaction; hands-on monitoring" study activity on disaster prevention technology.	Collections and Research Division
07/10	Chang Chi-Tsung, Chairman of the Mingdao Charity Association, has led a group of 10 VIPs to visit the NSTM.	Visitor Services Division
07/11	"Wow! Somatosensory Adventure 2.0 Exhibition" to launch the new unit "VR 5D cinema" in B1F, Star of the Universe exhibition hall.	Exhibition Division
07/13-12/15	Chinese Professional Baseball League (CPBL) organized the "Chinese Professional Baseball League 30th Anniversary - No One's Out" at the 1st exhibition hall.	Exhibition Division
07/15	In order to celebrate the 50th anniversary of the Apollo 11 moon landing, the Director Ou Yu-Hsiu of the American Institute in Taiwan (AIT) specially selected to record the introduction of aerospace cooperation between the US and Taiwan at the Aerospace exhibition hall, and relevant edited videos are disclosed on AIT's official website fan page.	Exhibition Division
07/17-07/19	This group of interns and apprentices co-organized the stamp collection event of the Moon Landing 50th Anniversary, with a total of 1,274 participants in the three-day event.	Exhibition Division

Date	Summary	Proposing Unit
07/20-07/21	The Tourism Bureau of Kaohsiung City Government jointly cooperated with the NSTM and rented the spaceman and rocket model of the Aerospace Exhibition Hall to organize the "Moon Landing 50th Anniversary" of the Moon Exhibition.	Exhibition Division
07/23-07/28	The 59th Primary and Junior High School Science Exhibition and Science Expo was held at the Kaohsiung Exhibition Hall, which was co-organized by the National Taiwan Science Education Center and Kaohsiung City Government. True Dream Land participated in the exhibition booths for exhibiting workshop achievements and courses. External services which served a total of 1,300 people.	Visitor Services Division
07/25-07/28	Co-organized the "7th Sony Creative Science Exhibition" with Sony Taiwan.	Technology Education Division
07/29-07/31	NSTM was invited to attend the 2019 International Conference on Future Education organized by Changwon city government, Gyeongsang-nam do Province, South Korea to make a speech on "How to Achieve the Practice in which No One is Forgotten in the Field of Non-standard Science Education".	Technology Education Division
07/29-09/01	"Joint Exhibition by Chu Mei-Chen, Lin Na & Tsai Jui-Chin" was conducted at the art and culture exhibition area on 1F.	Technology Education Division
08/01	Director-general Tsai Pi-Chen of the National Taxation Bureau of Kaohsiung, Ministry of Finance, has led a group of 35 VIPs to visit the NSTM.	Visitor Services Division

Date	Summary	Proposing Unit
08/06-08/11	The NSTM has joined hands with Delta Electronics Foundation to hold a press conference presenting the premiere of the 8K resolution documentary film "Water with Life" on August 6, 2019. VIP guests include Director Wu Jung-Feng of the Education Bureau of Kaohsiung City, Director-general Chou Chao-Chi, Founder and Honorary Chairman of Delta Electronics Mr. Cheng Chung-Hua and his wife, CSO Chou Chih-Hung, Vice Chairman Tsai Jung-Teng, Vice President Kuo Shan-Shan, Chairman Su Chin-Shu of Kaohsiung United Charity Association, Director Chang Chi-Chung of Kaohsiung City Mingdao Charity Association, as well as other VIPs, including Liberty Times, United Daily News, China Times, TVBS, Da Ai TV, Taiwan Public Television, Hitoradio HitFM, National Education Radio, and Global Views Monthly. The press conference was attended by 400 people of over 30 social media entities, with 2,397 participants in the film screening event.	Visitor Services Division
08/05-08/07	True Dream Land and NSTM disaster prevention-related exhibition halls co-organized the "Disaster Prevention Maker Workshop of the Education Bureau of Kaohsiung City Government" as the summer program for teachers. True Dream Land has launched activities, and 3 related lectures were provided by professionals in order to support the operation of machine tools as well as the disaster prevention teaching materials or teaching aids.	Visitor Services Division
08/07	The Executive Yuan held a press conference for the "20th Anniversary of the 921 Earthquake Disaster and 10th Anniversary of the Morakot Disaster Review and Development Project". NSTM published the book of the 10th Anniversary of the Morakot Disaster named "Stories of Recovery and Reconstruction after Morakot" commissioned by the Water Resources Agency of the MOEA.	Exhibition Division
08/07	The Environmental Training Institute of the Environmental Protection Agency of the Executive Yuan has led 5 members of the review committee to visit the hall for the evaluation of environmental education facilities.	Technology Education Division

Date	Summary	Proposing Unit
2019/08/07- 2020/02/13	NSTM organized the "From Past to the Present - Classical Artifacts of Metrology and Inspection" exhibition at the hallway on the first floor of the Administration Building of the Bureau of Standards, Metrology and Inspection of the MOEA.	Collections and Research Division
08/08	After being visited by 610,000 people over the past five years, the "Recovery and Reconstruction After Morakot" was renovated to "Stories of Recovery and Reconstruction after Morakot" on the 10th anniversary of the Morakot disaster. The opening ceremony of the "Stories of Recovery and Reconstruction after MORAKOT" was hosted by Vice Premier Chen Chi-Mai of the Executive Yuan, was attended by over 300 guests, and attracted news reporters from 20 media peers.	Exhibition Division Visitor Services Division
08/10	NSTM conducted the "Cross-Strait Urban Education Forum Project" commissioned by the Kaohsiung Education Bureau for the discussion of innovative STEAM education and experience in relative promotions. A total of 160 people from the education sector took part in the forum.	Technology Education Division
08/10- 08/11	The name of the event was changed from the NSTM Maker Festival to the "2019 NSTM Maker Party". The event invited Professor Lin Ming-Chao of National Pingtung University and Hsu Yi-Hsuan, director of the Southern Taiwan Maker Center, to give two exchange lectures, with a total of 35 exhibition booths and 7 workshops, and was participated in by 33 external units. The event generated a total of NT\$107,006 of revenue and was attended by 1,100 participants.	Visitor Services Division
08/13	NSTM applied for the "2019 MOEA Energy Efficiency Benchmarking Contest" Lock Team Silver Award, was shortlisted in June 2019, and was awarded by the Energy Bureau of the Ministry of Economic Affairs.	Secretariat
08/11- 08/17	NSTM has organized the first event of 2019 Technology Exchange and STEM Coopetition for junior high school students, in which 33 students participated (14 students from Malaysia, 4 students from Thailand and 15 students from Taiwan).	Technology Education Division

Date	Summary	Proposing Unit
08/17	The NSTM co-organized the "2019 1st Robotics Creative Competition" with MakeBlock Co., Ltd, with a total of 107 teams and 265 students.	Technology Education Division
08/17-08/18	NSTM trained a total of 21 "scientific toddlers" from Kaohsiung Wenhua primary school and Xinzhuang primary School on weekends, and has organized the Kenting Science Camp for 41 parents and students so that students can learn and have fun during the event.	Technology Education Division
08/20-08/25	The movie-screening good neighbor initiative for the second half of the year attracted 2,336 people.	Visitor Services Division
2019/08/20-2020/03/31	NSTM co-organized the "Southern Cross-Island Highway Development Artifacts Exhibition" with the Third Maintenance Office Directorate General of Highways of the MOTC, which was exhibited at the B1F Gallery and the Open Storage.	Collections and Research Division
09/05	NSTM performed an external audit on the museum's ISO50001:2011 energy management system on September 5, 2019. NSTM was registered with the Taiwan Accreditation Foundation (TAF) and received a certificate (valid from October 27, 2018, until October 21, 2021).	Secretariat
09/06	Director-general Shen Cheng-An of the National Taxation Bureau of Taichung has led a group of 250 colleagues and volunteers to visit the NSTM.	Visitor Services Division
09/07-09/15	"Photography Exhibition by the Photographic Society of Kaoshiung - Mr. Chen Chi-Chuan Photography Contribution Award and Kaohsiung Film Festival" was held at the art and culture exhibition area on 1F.	Exhibition Division

Date	Summary	Proposing Unit
09/11-11/03	Relocation of the "Technology and Preparedness for Disaster Reduction DNA" at the market of Puli Brewery in Nantou. The duration of cooperation begins on September 12, 2019, and ends on November 3, 2019. The opening ceremony was held on September 11, 2019, and participated by VIPs including Director Ting Yen-Che of TTL, Director Kao Chi-Chang of the Ministry of Education, and Mayor Liao Chi-Cheng of Puli Township Office.	Exhibition Division
09/11	Deputy Director Hsiao Shu-Chen of the National Museum of Taiwan Literature has led a group of 28 colleagues to visit the NSTM.	Visitor Services Division
09/16-10/31	The "Disease Prevention Combat Camp - Dengue Fever and Influenza" exhibition was relocated at Pingtung Science Education Resource Center (Jian-Guo Elementary School) from September 16 to November 30, 2019.	Exhibition Division
09/17-12/08	"Scientific Aesthetics and The Beauty of Craft Ceramics - Chu Chin-Min Clay Art Exhibition" is held at the Art Cafe on 2F.	Exhibition Division
2019/09/21-2020/08/30	"Nanometer: The Invisible Scale" relocated to Tree Valley Life Science Museum. The exhibition begins on September 21, 2019, and ends on August 30, 2020.	Exhibition Division
09/21-09/22	The 2019 National Disaster Prevention Day "Prepare, Respond and Information Network" disaster prevention education obstacle challenge activity was conducted in the North Building and was attended by 4,000 participants.	Exhibition Division
2019/09/27-2021/12/31	NSTM and National Kaohsiung University of Science and Technology co-organized "The Ministry of Education subsidized science and technology colleges and universities and the national educational institutions for the vocational subjects occupational experience activity project" - "My future - Technological and Vocational Paradise" and held the "Technological and Vocational Paradise Exhibition" at the 3rd exhibition hall.	Exhibition Division

Date	Summary	Proposing Unit
2019/09/27- 2021/12/31	NSTM and National Kaohsiung University of Science and Technology co-organized "The Ministry of Education subsidized science and technology colleges and universities and the national educational institutions for the vocational subjects occupational experience activity project" - "Experience Activity on Intelligent Agricultural Machinery" and held the "Agronomy Wonderland, Intelligent Agricultural Machinery, Introduction to Technical and Vocational Education" exhibition at the circular courtyard of NSTM (B1F) and The Story of Taiwan Agriculture Exhibition Hall.	Exhibition Division
09/27- 12/29	NSTM and Professor Chiu Mei-Hung of National Taiwan Normal University co-organized the "150th anniversary of the Periodic Table of Chemical Elements" exhibition at the gallery on 6F.	Exhibition Division
09/27	NSTM co-organized the Xuan Lan Forum in 2019. On September 27, 2019, Director-general Tseng Shu-Hsien of the National Central Library led a group of 13 representatives, including representatives from the National Library of China, Nanjing Library, Xuzhou Library, and Jinling Library to attend the exchange seminar. There were exchanges and discussions on the lock exhibits and the development of cultural and creative products, with the hope of gaining opportunities in co-organizing the relocation of exhibitions in the future.	Visitor Services Division
10/01	NSTM organized the "Smart manufacturing experience area - The Development of Taiwan Industry 4.0" permanent exhibition at the Taiwan Industrial History Exhibition Hall.	Exhibition Division
10/01- 10/02	NSTM conducted the "2019 Popular Science Forum" with the theme of "Towards a Smarter Generation - Technology is Fun" at the South Building. 13 units have participated in setting up popular science workshops, with a total of 620 participants.	Technology Education Division

Date	Summary	Proposing Unit
10/06	NSTM and the MOE's Office of Talent Cultivation for the Integration and Application of Clean Energy Systems co-organized the "Clean Energy Creative Competition". 6 briefing sessions were conducted and participated in by 500 teachers and students from 170 teams. A total of 42 winning teams were selected, and awards were presented to 204 students.	Technology Education Division
10/07-10/31	Relocation of "Soil and Water Conservation for Disaster Prevention" at Matsu Library of the Lien Chiang County Cultural Affairs Department (Matsu Village, Nangang Township). The exhibition begins on October 7, 2019, and ends on October 31, 2019.	Exhibition Division
10/07-12/09	MOST sponsored the 2019-2020 7th "Meeting Master of Science on Sunday" popular science lectures in cooperation with National Cheng Kung University. A total of 8 activities were held and participated in by 2,357 people in 2019.	Technology Education Division
10/15-12/22	"Explore IoT Exhibition" was relocated at the National Taiwan Science Education Center from October 15 to December 22, 2019.	Exhibition Division
10/26-10/28	NSTM invited to join the project of "Educational exchange activities for popular science museums of the four regions across the strait" of the Macau Science Center. In addition to NSTM, other museums including the Macau Science Center, China Science and Technology Museum, Hong Kong Science Museum, Cixi Science and Technology Museum, Shenzhen Science Museum, Xiamen Science and Technology Museum, Heilongjiang Science and Technology Museum, and Guangdong Science Center also participated in the exchanges and sharing of cooperation experiences as well as experiences on education and promotion.	Exhibition Division
10/29-12/29	Relocation of "Eureka! The Fun Science Zone" at the National Library of Public Information. The exhibition begins on October 25, 2019, and ends on December 29, 2019, and the opening ceremony was held on October 29, 2019.	Exhibition Division

Date	Summary	Proposing Unit
11/01-12/29	NSTM conducted the "Pioneering Wisdom - Donated Cultural Relic Exhibition" with the theme of donated cultural relics at the Open Storage in 2019.	Collections and Research Division
11/02	Awarded the Excellence Management Quality Three Star Medal of the Chinese Society for Quality. In July 2019, NSTM applied for the "Excellence Management Quality" award of the Chinese Society for Quality, and won the top award after a written work review and on-site inspections. The society's evaluation uses the "Total Quality Management-Business Excellence Model" as the benchmark and is divided into seven major assessment items. NSTM's evaluation score was more than 800 points and was in top position in at least three outstanding performances. This indicates that no matter whether in customer relationships, business markets, shaping organizational culture, corporate social responsibility achievements, strategic planning, and innovation, NSTM has obviously reached a certain level of performance and has been highly recognized in all aspects.	Visitor Services Division
11/02	Volunteer Ms. Liu Lin Chao-Hua has won the 2019 Golden Camel Award. NSTM's volunteer Liu Lin Chao-Hua, with the age of 86, has obtained the 2019 Golden Camel Award. During her volunteer service for exhibition halls, she often serves people with enthusiasm and provides various suggestions for NSTM's experience facilities in order to significantly enhance service quality. NSTM has won the Gold Camel Award in great recognition of its volunteer services. On November 2, 2019, NSTM volunteer supervisors, volunteer contractors, and volunteer staff attended the award to receive praise from the Ministry of Health and Welfare in Taipei, indicating high quality in NSTM's service culture.	Visitor Services Division
11/05	NSTM has won the 2019 Disease Prevention Excellence Official Group Award of the MOHW, and Director-general Shiunn-Shyang Chen attended the ceremony at Sheraton Grand Taipei Hotel to accept the award on November 5, 2019.	Exhibition Division

Date	Summary	Proposing Unit
11/08	NSTM organized the "Smart manufacturing experience area - Textile & Clothing and Smart Farming" permanent exhibition at the Textiles and Clothing Exhibition Hall as well as The Story of Taiwan Agriculture Exhibition Hall.	Exhibition Division
2019/11/08-2020/03/01	Relocation of "Soil and Water Conservation for Disaster Prevention" at the National Museum of Marine Science and Technology. The exhibition begins on November 8, 2019, and ends on March 1, 2020.	Exhibition Division
11/08	In response to the development of Industry 4.0 including IoT, big data and intelligent robotics, NSTM's 22nd Anniversary Celebration on November 8, 2019 has launched the renovation of "Textile & Clothing and Smart Farming", continued the "Industrial Robotics", "Smart vehicles", and extended the story line of the Textiles and Clothing Exhibition Hall as well as The Story of Taiwan Agriculture Exhibition Hall with the exhibition themes Smart Car and Industrial Robot. Meanwhile, NSTM has set up a virtual Taiwan night market area and fun gaming facilities to provide educational attractions for family sightseeing in autumn and winter, enabling fun learning in the mystery of probability via the obstacle challenge "The Probability in Life" exhibition. The "Snow Paradise - Ski Park for Kids" exhibition in the winter of 2020 has made a debut in NSTM's Anniversary Celebration, and this large-scale indoor snow park for kids will surely become a popular attraction following the spiral slide.	Visitor Services Division
11/12	The Environmental Training Institute of the Environmental Protection Agency of the Executive Yuan has conducted the "Evaluation of environmental education facilities" in August 7, 2019. The environmental education and promotion was unanimously approved by the members and passed the evaluation on October 24, 2019, and the NSTM Director-general attended the ceremony to accept the praise and obtain the award on November 12, 2019.	Technology Education Division

Date	Summary	Proposing Unit
11/16-11/24	NSTM organized the "2019 Taiwan Can - Clean Energy Creative Exhibition" on November 16-24, 2019 in cooperation with the Talent Cultivation for the Integration and Application of Clean Energy Systems Project Office of the MOE. The exhibition includes the annual achievements of 2 Energy Resources Centers, 9 Promotion Centers, prize-winning designs of Clean Energy Creative Competition, energy hands-on activities, as well as test driving events of holiday solar cars. The exhibition had a total of 17,567 visitors in 8 days.	Technology Education Division
10/17-10/18	NSTM and 5 organizations including the Graduate Institute of Conservation of Cultural Relics and Museology, Tainan National University of the Arts, NCKU Museum, the Department of Theater Arts, National Sun Yat-sen University, and the Chinese Association of Museums jointly held the "2019 International Conference on Contemporary Challenges for Museums".	Collections and Research Division
11/22-12/01	NSTM co-organized the Civil IoT Taiwan Disaster Reduction Exhibition from November 22 to December 1, 2019 with the National Fire Agency, the National Center for Research on Earthquake Engineering, and the National Science and Technology Center for Disaster Reduction. The opening ceremony was held at the first-floor lobby on November 22, 2019, which were participated by VIPs including Deputy Director Hsiao Huan-Chang of the National Fire Agency, Director Huang Shih-Chien of the National Center for Research on Earthquake Engineering, and Deputy Director Lin Feng of the National Science and Technology Center for Disaster Reduction.	Exhibition Division
11/24	Director Lu Yu-Kuo of Beijing Academy of Science and Technology and Director-general Meng Ching-Chin of the Beijing Museum of Natural History have led a group of 5 VIPs to visit the NSTM.	Visitor Services Division
2019/11/25-2020/1/30	"Chen Po-Yu Bird Calligraphy Exhibition" was held at NSTM's art and culture exhibition area on 1F.	Exhibition Division

Date	Summary	Proposing Unit
11/30	NSTM co-organized the "The Truth Taiwan must Face - The Wheezing between Disasters" lecture with the Global Affairs and Science Engagement (GASE) of the Ministry of Science and Technology, in which a total of 252 people participated.	Technology Education Division
2019/12/5-2020/4/26	Relocation of the "Technology and Preparedness for Disaster Reduction DNA" at Tzu Chi Foundation' s Buddhist Temple in Hualien County. The exhibition begins on December 5, 2019, and ends on April 26, 2020. The open ceremony and signing of the disaster reduction education and promotion Cooperative Agreement was conducted on December 5, 2019. The agreement was signed by NSTM' s Deputy Director Mr. Wu and CEO Yen Po-Wen of Tzu Chi Foundation, with Mayor Hsu Chen-Wei of Hualien County Government as witness.	Exhibition Division
12/09	NSTM applied for the "2019 MOEA Energy Efficiency Benchmarking Contest" F Team (Government Agency Team) Silver Award, and was awarded with a silver trophy in the award ceremony at NTUH International Convention Center on December 9, 2019, which was participated in by NSTM's Deputy Director-general Wu Pei-Hsiu, Director Chou Wan-Jung of the Secretariat, Wu Ching-Yun, Ko Tzu-Hsiang.	Secretariat
12/10-02/09	"The time comes, fortune turns: Everything Is Made from the Mind - Cheng Chao-Nan Ceramic Art Exhibition" at the Art Cafe on 2F.	Exhibition Division
12/13-05/31	NSTM curated "The Probability in Life" exhibition at the 2nd exhibition hall.	Exhibition Division
12/13-12/15	NSTM co-organized the Environmental Education Achievement Exhibition with National Kaohsiung University of Science and Technology and the ASE Group from December 13 to 15, 2019. The opening ceremony was held on December 13, 2019. In addition to the exhibits, the exhibition also provided hands-on activities which attracted a total of 1,350 people.	Technology Education Division

Date	Summary	Proposing Unit
12/14- 12/15	NSTM organized the 9th "National Hand Launch Glider Flying Competition" in 2019. Kaohsiung Feng-Shan Senior High School came first in the senior high school competition, Taipei Municipal Jianguo High School second, and National Chiayi Senior High School third. As for the junior high school competition, Ming Cheng Junior High School of Pingtung County came first, Tainan Municipal Houbi Junior High School second, and Kaohsiung Feng-Shan Junior High School third.	Technology Education Division

List of NSTM Personnel

2019 NATIONAL SCIENCE AND TECHNOLOGY MUSEUM ANNUAL REPORT

 Textiles and Clothing



STAFF

(In Alphabetical Order)

Director-General

CHEN, SHIUNN-SHYANG

Deputy Director-General

WU, PEI-HSIU

Secretary

SU, YI-HSIANG

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HSIAO, KUO-HUNG / HUANG, CHENG-CHONG

HUANG, JUN-FU / LIN, LI-CHUN / LIU, CHING-HO

TSAI, CHIA-JUNG / TSUI, YA-TING

WANG, YAO-HUI / WANG, YUN-YING

WU, CHING-TAI

Exhibition Division*Director* -CHEN, CHI-HSIA

CHEN, MEI-TSEN / CHUANG, CHUN-LIN

CHUANG, SHENG-TENG / HONG, WAN-JHEN

HOU, CHIEH-LI / HUNG, HUANG-KAI

JHENG, ZONE-JHE / KAO, SHIH-WEN

LEE, CHIA-FEN / LI, HSING-LIN / LI, JU-CHING

LIN, CHAO-HUNG / LIN, CHEN-YIN

LIN, CHUN-WEI / LIN, HUI-CHUAN

LIN, JIAN-LIANG / LIN, SHIS-TANG / LIN, SHU-CYU

LIN, WEN-HSIEN / LU, THAO-RONG / SU, FANG-YI

SUN, HUNG YU / SUN, YI-JEN

TSENG, HUI-CHANG / WANG, TSUNG-CHI

WU, SU-HUA / WU, YU-CHUN / WU, YUN-JU

YAN, LI-WEN / YANG, YUNG-HSUAN

Technology Education Division*Director* - CHANG CHIEN, CHIH-TING

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CHEN, YI-CHEN / CHEN, YU-HSIN

CHENG, CHIEN-CHI / CHENG, JUI-CHOU

CHUANG, TING-YU / HO, SHU-MIN

HONG, JHIH-MING / HSIAO, DER-REN

HUNG, HSUEH-CHIN / JIANG, SHU-FANG

KUO, HONG-BIN / LIN, HSIN-JU

LIN, PEI-YING / LIN, SUNNY-S

LIU, CHIH-YUNG / LIU, JIA-RU

MAI, HSIU-WAN / TSENG, JUI-LIEN

WANG, CHU-LIN / WANG, YU-HUNG

YANG, YI-TING / YEH, CHIN-YU

Visitor Services Division**Director** - WANG, LIANG-CHUAN

CHANG, SIN-YI / CHEN, CHUN-AN
 CHEN, HSIANG-CHUNG / CHEN, I-WEN
 CHEN, JUO-HAN / CHENG, CHUN-HSIANG
 CHENG, HSIEN-JEN / CHIU, PING
 CHU, PEI-YING / CHUANG, TING-YU
 CHUNG, YING-SHIUE / HSIEH, YA-WEN
 HUANG, HUI-TING / HUANG, PEI-YU
 HUANG, SHIH-TING / JHENG, ZONE-JHE
 LEE, KUAN-CHING / LIN, HUI-CHUAN
 LIN, JIAN-LIANG / LIN, SZU-YUAN
 LIU, FUN-RU / LIU, JIN-YI / LO, SZU-YI
 PU, CHING-CHING / SONG, GIANG
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 TU, MEI-FANG / WU, YI-NA / ZOU, JIA-PING

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CHEN, CHUN-AN / CHEN, LIN-YUAN
 CHEN, TAI-WEI / CHIEN, I-CHUN
 GER, TZU-HSIANG / HORNG, JING-YI
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 JU, YUAN-CHING / KUO, CHUNG-HAO
 LAI, JUO-NAN / LEE, CHIEN-HSING
 LEE, HOUNG-JYH / LEE, SHUN-HSIUNG
 LI, CHANE-WEN / LIAO, MIN-LING / LIN, WEN-CHIH
 LIN, YAO-TING / LIU, CHIN-HUNG / MO, HSIUNG-WEI
 OU, HUI-LING / SU, PEI-JHEN / SU, YU-JEN
 SUN, MING-SHENG / TAI, YU-CHIN
 TSAI, CHENG-TE / TSAO, CHIH-HSIEN
 WANG, CHIEN-PING / WANG, CHU-LIN
 WU, CHENG-CHAN / WU, CHING-YUN
 YANG, LI-WEI / YANG, MEI-HUI
 YEH, CHIA-HSING / YOU, SHUN-PING
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Personnel office**Director** - KUNG, CHING-WEN

LIN, YU-TING / CHEN, YI-TING
 TAI, MENG-CHUN

Accounting and Statistics Office**Director** - FU, CHEN-MEI

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 YANG, TE-WEI

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0860487 CHEN JIA-SHIANG	0860673 CHANG SHU-MEI	0860929 LEE TZU-CHI	0861173 PENG LAI-YU-HUA
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0860587 LIN LIANG-HSIU-YUAN	0860845 KU BAIR-HWA	0861103 CHEN SUE-HUA	0861339 LEE FANG-YING
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0860599 CHUANG MEI-CHING	0860865 LAI RONG-JER	0861158 HONG KO-MENG-LI	0861370 CHOU FANG-HUA

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0861416 WU WEN-CHING	0861676 CHUANG PAO-AI	0870077 LIN CHUEN-MEEI	0870229 YANG SHU-HUA
0861419 CHOU HUI-LIEN	0861677 LI,SU-CHEN	0870078 CHEN,LI-HUA	0870231 CHUANG CHIA-NU
0861421 WU CHING-HUNG	0861678 LEE SHIH-FANG	0870084 CHEN,LI-YU	0870242 LEE LING-FEN
0861500 HUANG SU-SHIA	0861690 CHOU HUA-KUEI	0870085 HUANG LIN-LIANG-HUI	0870244 CHEN MEI-CHU
0861540 CHIH CHEN-KNEI-YING	0861694 CHUNG HUI-LAN	0870088 CHEN LI-HUA	0870246 LIN HUI-YANG
0861553 SU SU-HUI	0861695 CHEN SU-CHIN	0870091 LIN WU-MEI-LAN	0870248 LEE SHU-CHEN
0861560 LIN HSIU-FANG	0861703 CHEN YOUNG-CHING-MEI	0870103 TSAI SHU-HSIEN	0870263 WANG YA-LI
0861589 CHOU PEI-YING	0861718 LIU,YUE-JIAO	0870110 CHEN,JIN-RUI	0870281 CHU,JUI-FANG
0861590 LEE LI-HSIANG	0861759 CHEN MAY-LIE	0870111 LEE YA-LINE	0870290 WANG JUI-HAN
0861619 LIN PSAI-FA	0861765 HUANG SHIH	0870117 CHEN CHUNG-SHENG	0870294 KAO FEN
0861629 CHANG MAI-LING	0861781 CHOU CHEN-MEI-WEN	0870127 SU TENG-KUEI-YING	0870300 CHANG SU-YING
0861630 HU CHIN-CHAI	0870001 LIN,HUI-ZHEN	0870131 WU TUAN-MEI	0870306 ZHENG,LI-XIANG
0861640 WANG HUI-CHING	0870010 LIN,XIU-BEI	0870138 SU CHIN-TSUNG	0870315 LEE HSIU-HUA
0861645 TSOU HSING-YING	0870012 SHIH PAO-HSIU	0870141 HO YUAN-PIN	0870316 SHIH LI-HUA
0861649 YANG HSIU-YNÜ	0870016 YE,YUE-YING	0870144 YANG SHU-FEN	0870322 CHUANG PI-YUN
0861652 HUANG MEI-LAN	0870027 LI SING-HONG	0870149 SHIEH CHI-HUI	0870330 ZENG,YAN-HUA
0861653 LIN SHAN	0870039 KUO WEN-CHEN	0870150 YU,SHUN-YI	0870332 HSU WANG-LI-YU
0861658 HSIEH TSAI LEE-FENG	0870058 LIN SHU-WAN	0870152 SHIU LI-CHUAN	0870333 WANG LEE-BAO
0861672 CHENG CHIN-CHAI	0870061 YU CHEN PI-LIEN	0870190 TSAI CHIN-CHIH	0870338 KUO MEI-JU
0861673 LIU,CHUN-TSENG	0870070 HUANG TSAI-FZNG	0870199 CHEN LI-CHU	0870348 LIN,QIN-JUAN
0861674 HSIEH SHIANG-ER	0870071 TSAI,YU-CHEN	0870202 CHANG HSIU-CHIN	0870362 WEN CHIU-CHU

0870372 ZHANG,MEI-YUN	0880037 CHAO PI-LIEN	0890006 CHEN HSIEN HUI-LI	0890119 TSENG YEN-HSIN
0870403 WEI YANG-HSIU-HUA	0880041 TIAN CHEN,MEI-ZHU	0890008 CHU LI-YU	0890129 CHANG,YUN-HUA
0870411 LIN SU-LING	0880045 LIU KE-SHIU	0890009 YU CHEN-YUEH-HSIA	0890132 CHEN,HUI-CHEN
0870413 QIAN,LI-ZHEN	0880046 WU,SHU-YUE	0890010 WANG CHIN-HUAN	0890133 CHENG,HUI-LING
0870415 LI,YUAN-XIAN	0880054 LU,LI-RONG	0890013 LI HUI-CHEN	0890140 CAI JIA-JUAN
0870428 LIANG,ZHU-YAN	0880055 TAI CHING-MEI	0890018 LIANG,LI-ZHU	0890145 CHAO JUI-CHU
0870429 CHENG YEN-PIN	0880058 CAI,ZHEN-FEN	0890019 LIN,GUI-FEN	0890147 TING MEI-HUI
0870431 LIN KUEI-MEI	0880064 TAI CHIEN-HUI	0890021 LIN,YU-CHIUNG	0890151 WANG,CHIUNG-YUN
0870446 HONG,QING-XIN	0880078 LIN CHEN-MING-SHOW	0890022 YANG LI-CHU	0890153 HO,SHU-LIU
0870451 WEN,XIN-LAN	0880082 LEE HSIU-HSIANG	0890023 CHEN CHUN-TAO	0890155 DU SHU-FANG
0870459 CHEN YANG-SHOW-CHING	0880086 LIN SHU-CHEN	0890047 CHEN JIAN-LONG	0890163 LIU MAM-NING
0870465 HU XU, XIU-QIN	0880087 PAO CHIUNG-YING	0890062 LIU CHIN-YEH	0890189 KUO FANG-MING
0870483 GUO,MING-ZHEN	0880093 HUANG,YU-LI	0890065 WU HSIU-LIN	0890197 WU,JIAN-LANG
0880002 ZHANG,MEI-FENG	0880097 SUN YU-CHU	0890074 CHANG HUI-HSIEN	0890198 LEE LING-FIENG
0880004 SU HUI-MIN	0880123 HUN SHU-YING	0890075 HUANG SHIH-LIAN	0890202 HSIEH TUNG-PAO
0880007 YU JUNG-SHIN	0880138 CHEN CHAI-CHIN	0890080 TSAI JUAN-LI-CHUAN	0890203 CHANG MANG-LING
0880010 LIOU SHOU-YING	0880161 CHEN NENG-YU	0890083 LUO,YU-MEI	0900004 XU,TIAN-DE
0880013 YANG LING-FEI	0880179 ZHENG WU,YING-LUAN	0890084 TSENG SHU-HUI	0900008 FENG SHU-JUNG
0880017 CHUANG CHUN-HUA	0880185 WANG,PIH-SIA	0890086 LU,XIU-ZHU	0900010 LEE,YU-YAN
0880019 LIU MING-CHU	0880195 HUANG HUNG HSIU-CHIN	0890097 YANG HSUEH-CHIH	0900024 LIU YU-HUA
0880029 WU CHIN-TUAN	0880236 WANG FENG-YI	0890109 KUO HSUEH-LU	0900027 LIEN CHING-YUN
0880034 WU CHIN-JUI	0880241 LAN MEI-CHU	0890111 LIU CHEN-CHEAN	0900034 CAI,QIU-YING

0900048	HSIEH PAO-HUA	0900151	CHEN KU-LAN	0930007	HUANG MING-HUA	0930048	TSENG YEN-MEI
0900049	LIN MIN-YI	0900152	KUO YU-LING	0930009	HSU LI-HSIA	0930053	SHYU HUEY-LI
0900050	CHEN AI-LING	0900158	TU YUAN,LI-DE	0930010	FAN CHENG-YI	0930055	HSU CHING-HUA
0900052	CHIANG TAI-CHEN	0910039	HOU WEN-FU	0930011	CHEN HUI-HUA	0930060	CHEN,SHU-NU
0900053	PENG,CHIH-CHIANG	0910040	CHOU YU-CHIAO	0930012	HUANG GUO-SHENG	0930061	WANG YA-CHIH
0900055	HSU SHU-YING	0910043	HUANG CHING-MEI	0930013	YU CHIU-YI	0930062	CHANG JUNG-CHUN
0900074	HUANG HOU-HSUEH-YUEH	0910047	HUANG MEI-YING	0930014	CHEN LI-CHOU	0930065	LIU FONG-HSIUNG
0900085	WANG YU-CHUNG	0910051	LIU GUO-CHIEN	0930016	SU PAI-WEI	0930073	CHEN,NAI-JU
0900086	ZHAO,ZI-WEI	0910052	SUN JUI-HUNG	0930017	CHAN MEI-CHU	0930074	HU YU-LE
0900089	CHEN YUEN-HSIA	0910053	CHEN MING-HUANG	0930018	CHEN HSIUNG	0930078	LIN SHU-CHUAN
0900094	WU MEI-CHIN	0910054	YANG MEI-LI	0930020	CHIANG AN-NAN	0930081	YIN WEI-HUNG
0900098	CHENG CHUANG-CHUEI	0910088	KUO CHIU-TAO	0930021	TSAI SU-CHEN	0930087	TSAI LI-HSIANG
0900109	WANG,JUN-KAI	0910091	SU YUNG-PING	0930024	LIN BI-CHEN	0930088	GU,YONG-JIE
0900125	HUANG FENG-CHIEN	0910094	LIN ENG-MIN	0930025	CHANG YUEH-YUN	0930095	LIN,CHIH-CHUNG
0900126	CHENG I-CHEN	0910096	WENG,MEI-CHU	0930026	LEE YU-HSIA	0930102	DAI KO-LI
0900127	CHEN CHI-YUAN	0910098	HUANG CHIEN-CHENG	0930030	LEE MU-HWA	0930109	LU SHU-CHEN
0900133	YEH HSIEN-WEN	0910099	CHANG CHIN-CHENG	0930031	KUO CHAO-HSU	0930111	HUANG HSUEH-CHIAO
0900134	CHANG CHIN-YON	0910104	TENG CHIN-HSIANG	0930032	LI WANG LI-YU	0930119	YANG LING-CHEN
0900139	LIN HUANU-SHU-HSIA	0910110	LAI KE-NAN	0930036	WANG,HSIU-CHING	0930124	WU CHEN,SU-YU
0900141	HSIEH MEI-CHEN	0930002	CHEN YUEH-HSIA	0930043	HSIAO LI-YING	0930127	LIU LIN CHAO-HUA
0900144	LIN,SHI-LANG	0930003	CHOU SHIU-CHU	0930045	WANG CHEN-SHOW-WONG	0930134	CHEN TLU-CH
0900146	HSU SU-CHEN	0930005	CHANG SU-CHIAO	0930046	LEE CHAO-FEN	0930138	CHANG LIEN-CHU

0930139 YU KU-YUNG	0940050 CHEN HSIU-CHU	0950027 WU HUAN-JAN	0950076 LEE MING-HUI
0930142 SHEN MING-CHIN	0940051 YANG MAY-JU	0950028 CHEN CHIH-YUAN	0950077 WANG CHIA-TSENG
0930147 LI YU	0940052 YU LEE-MEI	0950030 TSENG CHUAN-SUNG	0950078 CHANG HSIAO-HIS
0930148 YANG,SHU-CHEN	0940058 HUANG WEN-HSIUNG	0950031 LU KAI-CHUAN	0950079 YI CHEN-YU
0930150 LIN JUI-MEI	0940061 QIU,LIN-YUE	0950034 LEE BAO-NAN	0950080 LAI SHU-YING
0930151 SU JUI-CHUAN	0940063 TUNG WAN	0950036 ZHANG,LI-MEI	0950081 CHUANG,HSIU-LI
0930153 LIN PI-CHAO	0940064 HOU CHUN-HUA	0950039 HUANG YU-LAIN	0950084 HSIEH MEI-YING
0930154 HUANG TSAI-YUN	0940070 LIN HSIU-LING	0950044 LU,YA-HUI	0950089 KUO CHIUNG-CHU
0940001 CHEN,LI-E	0940080 HUNG YI-WEN	0950045 SUN,YU-HUI	0950090 LEE MEI-YUEH
0940002 LIU WANG-WAN-MAN	0950001 CHOU LIN-CHIU-HSIA	0950046 HUANG,HUI-LING	0950096 LIU SHU-HUI
0940003 SU CHENG-CHIAO	0950003 CHEN LIN-CHIN-LUN	0950047 LIN,CHUN-HUI	0950098 LIU WEN-CHI
0940007 CHIU,YU-LUN	0950004 YU,SHU-ZHAO	0950048 SHI XIAO,SEN-ZHI	0950104 LIU CHING-HIN
0940008 CHUNG CHIG-YEN	0950005 HUANG SHU-YEN	0950049 LEE CHIAJO	0950105 ZHANG,RONG-LAN
0940010 SHIH LING-TZV	0950007 KUO KUEI-CHU	0950051 SU JU-SHU	0950112 CHEN,XIU-YAN
0940027 LIN PEI-YU	0950008 CHANG YUEH-YING	0950054 LEE YU-CHIN	0950113 HSIEH PEI-CHU
0940029 YANG SHU-YING	0950009 HUANG CHIN-PEN	0950055 TSAI LI-MAN	0950116 TSAI SU-CHEN
0940033 CHUNG,JUI-HUA	0950014 LIN CHIN-MEI	0950059 CHEN LINH-LI	0950119 ZHOU,AI-YING
0940036 CHEN YU-YING	0950015 JU,JIA-LING	0950062 WU KUEI-MEI	0950122 LIN LONG-MIN
0940037 CHEN HSIU-FENG	0950020 TUNG SHU-CHEN	0950063 TSENG FONG-O	0950125 CHEN LIOU-JIN-YING
0940038 CHIU CHI-SHENG	0950023 CHU LIEN-HWA	0950066 WENG,XIU-MIAN	0950128 HOU JHAO-WUN
0940040 LI,BI-MEI	0950025 WANG CHAO-YUAN	0950068 CHEN AI-LING	0950129 WU SU-CHING
0940045 SHIH WAN-YI	0950026 CHEN LIN	0950071 TSAI SHU-YUAN	0950131 HUNG LI-HWA

0950134 HUNG JU-RUNG	0960005 CHEN,XIAN-YI	0970038 HSU SHIH-CHENG	0980028 CHEN,WEN-SHAN
0950136 TSO TSUNG-YI	0960009 CHEN,YI-MING	0970039 HSIAO LI-CHING	0980031 CHOU CHIU-LAN
0950139 LU DU-MEI	0960010 XIE,YING-DONG	0970040 YU CHIEH	0980032 LIU,XING-LIAN
0950140 RUAN,ZHONG-QING	0960012 CHEN,SHENG-XIONG	0970041 TSAI CHIA-YI	0980033 LIU HSIANG-JU
0950144 SUNG LONG-SHENG	0960017 WANG HSIU-CHU	0970043 HU,JUI-HUI	0980034 WANG,LI-MEI
0950145 LIN SEN-TIEN	0960022 TSAI JU	0970051 CHEN HSIAO-HUAN	0980036 LIN DAR-NAN
0950147 LIAO,YU-CANG	0960023 CHEN NENG-CHI	0970052 CHOU HUI-LING	0980038 HUANG SU-MEI
0950151 HUANG,HE	0960029 PAN JIN-LONG	0970055 TESNG YUEH-HSING	0980039 YANG HSIU-YING
0950153 HUANG YU-HSIN	0960040 WANG YU-HSIANG	0980002 YIN JIAN-CHUNG	0980042 CHEN TZU-JIUN
0950154 CHOU PO-SHIUN	0960045 HUANG TZU-CHUAN	0980005 CHIANG YU-YUN	0980045 CHEN,ZI-LING
0950156 LIU MEI-MAN	0960048 CHUNG YAN-SUH-JAU	0980007 CHEN YU-CHIN	0980046 PENG HUI-CHEN
0950159 CHANG,KUEI-YING	0960053 WANG CHIU-HSIANG	0980012 CHEN,JIE-PING	0980050 LIN MEI-FEI
0950163 CHEN YI-LI	0960054 CHEN,MEI-YIN	0980013 LI YUN-YIN	0980053 LIN KUNG-SHU-MAN
0950165 SU,XUE-MEI	0960057 CHEN NAN-SHENG	0980014 CHANG CHIEN-CHUN	0980054 KUO KUEI-LAN
0950166 WU FU-I	0960060 XU,YING-YU	0980015 CHEN,SHAN	0980061 CHUNG MEI-LEE
0950175 CHENG,HSIU-CHING	0960063 CAI,JIN-ZHANG	0980016 CHIANG HSIU-MAN	0980067 LIN SHANG
0950176 LIU CHUN-YUEH	0960072 YANG HSUEH-FEN	0980017 LIN MEI-LAN	0980074 CHANG,LI-CHING
0950177 CHENG MING-HSANG	0970004 WENG TZU-SHUAN	0980018 CHIANG HUI-CHIN	0980081 CAI,CAI-LING
0950181 TSAI HSIU-MEEI	0970006 LIN JIA-HONG	0980021 WANG NITA	0980082 ZHANG,MEI-JIN
0950185 CHEN TENG-CHAO	0970032 HONG,ZHEN-SHAN	0980022 CHOU LING-CHUAN	0980084 LEE LI-YING
0950186 CHAO CHENG-CHIEH	0970033 YAO CHU-LI-HUA	0980025 HSU MEI-JEN	0980085 CHANG CHAW-YANN
0960001 MA SAI-FEN	0970035 CHEN SIANG-SYUE	0980027 HU SHU-CHEN	0980086 LIN,XIU-LUAN

0980087 HSU HSIEN-TANG	0990026 LEE MIAO-CHEN	0990066 TSAI HSUEH-HSIANG	1000030 HUANG YI-CHENG
0980089 LIN CHUN-SHIA	0990028 LU FU-MEI	0990067 HSU KUEI-JEN	1000034 CHU MAN-CHEN
0980090 YEH,PAO-CHIH	0990029 CHEN,MEI-YING	1000001 LO YU-HUA	1000035 HSIEH HO-MING
0980091 CHEN HONG-SHING	0990030 CHU YU-FANG	1000003 HSIAO CHIN-CHAO	1000036 FANG SHU-LING
0980092 YE,MEI-MAN	0990031 TONG,MING-CONG	1000005 YEH PAI-MEI	1000037 TSEN HUI-CHAO
0980095 CHUANG CHEN-CHIN-YUEN	0990040 CHANG MING-SUNG	1000006 HSU SHU-CHUN	1000039 TSAO EN-TE
0980096 CHEN LEE-HUA	0990042 LIU,YU-LAN	1000007 CHENG CHEN-SU-LUAN	1000040 WU CHIU-HUAN
0980101 CHANG CHIEH-YUN	0990044 HSU CHIH-MING	1000008 CHENG CHI-MING	1000041 HSU MING-FU
0980102 LEE SHU-FEN	0990045 CHANG LI CHIEH-YIN	1000009 TSENG YEN-HUANG	1000044 LIN RONG-BIN
0990004 LAI,KUN-YI	0990047 CHOU YEONG-CHI	1000010 WEI CHIN-SHUN	1000045 FENG YU-KUEI
0990005 TSENG,YU-LUN	0990048 CHEN SHUI-WANG	1000012 KUO YU-CHING	1000046 LIN SHIU-SHIA
0990006 CHEN,CHUN-HSIUNG	0990050 CHEN YI-CHUN	1000013 WANG LUNG-YUAN	1000047 WU SHIU-CHU
0990010 JIN,CUN-SHAN	0990051 CHEN WAN-FU	1000014 YUAN YA-CHIN	1000048 CHEN MAI-YEN
0990013 TUNG CHENG-LIANG	0990053 CHENG RUEY-SHAN	1000015 JUAN YUEH-YUN	1000049 SONG,LI-ZHU
0990015 LEE YI-HOUN	0990054 HE,XIA-ZHI	1000017 ZHUANG,JIN-ZHI	1000050 CHAN CHIN-YUEH
0990016 JIANG,HUI-TIAN	0990056 LEE YURN-CHONG	1000018 HUANG SU-HUA	1000053 LIU MEI-HSUEH
0990017 QIU,JIN-CHENG	0990057 LIN SHOU-SHAN	1000019 CHEN PI-ER	1000054 CHEN YUAN-MING
0990019 HSU,HSIN-CHU	0990058 LIU CHIN-CHIH	1000020 TSAI CHEN-YUAN	1000055 CHUNG LO-CHUN-YING
0990020 HUANG KUN-TSE	0990059 HSU,YUEH-YING	1000022 CHANG FU-SHAN	1000056 HU CHIA-LIN
0990021 CHEN HSIU-HUA	0990060 HUANG CHIN-HUEI	1000025 HUANG HUI-HIS	1000057 LI,JIN-LING
0990024 SHI,XIU-ZHEN	0990062 LIN HUI-LI	1000027 LIAN,SHENG-LIN	1000059 KUO HSIANG-JUI
0990025 KUO CHING-MEI	0990064 HUANG JEN-TSUNG	1000029 WU TSUN-NENG	1000062 TSAI HSIU-CHIN

1000064	CHANG MAY-CHING	1000107	LIN,BI-ZHU	1000150	WANG LI,BI-XIA	1000181	SU,TUNG-CHUN
1000070	CHIU HSUEH-LING	1000108	YANG HSIU-CHAO	1000151	CHEN,QING-SONG	1000182	LIN,CHING-YING
1000071	YAN,YU-RU	1000110	YEH,HSIU-JUNG	1000152	CHENG,LI	1000183	LI,MING-JANE
1000072	WEN HUI-YEN	1000118	HUANG YU-CHUAN	1000153	CHANG PAI-LIEN	1000184	LI,QING-XIAN
1000073	YEN CHING-KAO	1000119	LIN YU-YING	1000154	YE,RUO-YI	1000185	CHEN,ZHI-SHENG
1000074	ZHENG,BO-XIONG	1000120	YANG CHING-YUN	1000155	HUANG LI,CHUN-QIN	1000186	WEI,JU-HSU
1000075	YU MING-HO	1000121	CHANG,LI-CHUEH	1000159	TUNG,WEN-SHIANG	1000187	KO,NAI-HUA
1000080	HUANG PO-HSIANG	1000123	LIN,DE-YU	1000160	ZHENG,XING-XING	1000188	LIAO,YI-CHUN
1000081	PAN CHIEN-MEN	1000125	LIN LI-CHENG	1000161	WANG KUANG-HSIEN	1000189	HUANG,MEI-LAN
1000084	LI,YAN-XIANG	1000127	HUANG WEI-PING	1000162	HU,QIU-MEI	1000191	HUNG,JUNG-YI
1000087	HUANG MEI-CHI	1000130	PENG,GUANG-TANG	1000163	WU,KUEI-HSIANG	1000193	CHANG,FENG-CHEN
1000088	CHEN CHUN-KUANG	1000132	LUO,JIN-DAO	1000165	LIN HOU,XIU-ZHU	1000195	WU,PI-YUN
1000090	HSIEN,YU-CHIN	1000134	LEE SHAO-MEI	1000166	LU,XIU-ZHU	1000197	HSU,JIN-WEN
1000091	LEE,HSIU-CHU	1000136	XIE,GUAN-ZHENG	1000167	CHEN,SHU-DAN	1000199	WANG,SHUN-HIEN
1000093	YANG WEN-CHUAN	1000139	RUAN TANG,FENG-JIAO	1000168	LIU,MING-LI	1000202	CHOU,HSIU-CHUN
1000097	LO CHIEH-TSUN	1000142	LU,SHAO-YU	1000169	TAO,SHU-CHIN	1000203	PAN,TSUNG-MIN
1000099	KUNG LEE-SU-FEN	1000144	SHI,NAI-YING	1000170	YANG TSAI-CHUAN	1000204	CHEN,GUEY-SHIANG
1000100	KUNG TING-HUI	1000145	CHIU,SUE-CHEN	1000171	XIE,FU-ZHEN	1000205	WU,MING-ZHU
1000101	YU CHIH-HUA	1000146	WANG,TE-SHENG	1000172	CHEN,CHUN-MAN	1000206	TAN,HAI-LIN
1000103	HUANG YANG-CHIH-HUI	1000147	ZHENG LIN,XIU-ZHU	1000173	ZHANG,YU-MEI	1000207	LU,ZONG-MING
1000104	YANG,CHAO-QUN	1000148	LAI,HE-JING	1000174	WANG PAI-KUNG	1000208	LI,YUNG-CHI
1000105	LI,DE-XING	1000149	LU,JIAN-CHENG	1000178	CHUANG,YUNG-JEN	1000211	FU,CHUN-YING

1000213	HU,RUEI-SHAN	1010031	CHIU,PEI-DE	1010069	ZHUANG,XUE-YU	1020012	CHEN,LIU-SHIH
1000216	TSAI SHU-CHIN	1010032	CHEN,MEI-CHING	1010070	WANG,SHAO-HSIN	1020013	HSIEH TSUI
1010001	LI,CHUN-HUI	1010034	JUAN,LU-CHIANG	1010073	CHEN,XIU-XIA	1020016	HUANG,SHAN-FU
1010003	LU,JING-XIAN	1010035	CHEN,JING-KUAN	1010074	CHANG,YUE-NU	1020019	WANG,FU-YING
1010005	CHOU,YU-CHING	1010037	JIANG,RUO-ZHEN	1010075	LIU,SHAO-ZHANG	1020021	YANG,BI-HUI
1010007	WANG,ZAI-FU	1010039	CHEN,YUN-JUAN	1010076	HUANG,HUI-YIN	1020027	CHEN,CHIN-ZONG
1010008	WANG CAI,MEI-HUI	1010040	LIU,HSING-KUEI	1010080	YU,DE-XIAN	1020028	CHEN, JU
1010009	ZHENG HUANG,YU-XIU	1010044	LI,YI-JU	1010081	HUANG,YAN-HUI	1020029	CHEN,PEI-LIN
1010010	CHEN,YI-LONG	1010047	HSU,CHENG-TUNG	1010082	ZHANG,SUI	1020032	WANG LIN,YUE-YING
1010011	YE,HUI-MIN	1010048	CHUANG,PI-CHUAN	1010084	LIN LEE-HUA	1020033	CAI,LAN-XIANG
1010012	HUANG,XIAO-ZE	1010050	CHOU,SU-JEN	1010085	HUANG WAN-WAN	1020034	CHANG,TSUI-HUA
1010013	HSU YUEH-YEH	1010051	WU,WEN-LI	1010086	XIE,QIN-CHENG	1020036	LEI,SHAO-LAN
1010014	MAI,SHU-CHING	1010052	GUO,CHUN-CHING	1010088	LIN HSUEH-HUI	1020038	DU,YI-YUN
1010017	YE,LI-HUA	1010053	TZENG KUEI-YU	1010091	ZENG,YU-JING	1020039	HUANG,HUI-ZHU
1010018	RAO,YU-TING	1010055	YU,SHU-FANG	1010092	LEI,SHAO-YING	1020040	HU,HUI-HUANG
1010019	HSU,MING-HSIU	1010056	HSIEH,HSIU-LI	1010093	CHEN,KUEI-CHU	1020042	SHEN,WEI
1010020	SHI,YU-YING	1010059	LU,PEI-HUA	1010094	CHEN,LING-NA	1020043	ZENG,QI-CANG
1010022	YANG,SEN-GUI	1010060	CHEN,XIANG-JUN	1020001	CHEN HUI-CHU	1020046	WANG,SZU-KO
1010023	WU,SHU-YUAN	1010064	DING,HUI-MEI	1020006	WANG,XIN-LEI	1020047	KUO SOONG-YU
1010024	CHEN,ZHEN-MEI	1010065	SU,HSIU-LI	1020007	SUN I-NAN	1020048	XIE,CHUN-MAN
1010026	SU,YUE-LI	1010066	LI,LIAN-LIAN	1020010	CHEN CHIH-FANG	1020049	LIN,JIN-YAN
1010030	WA,CHAO-JUNG	1010068	GUO,XIU-YING	1020011	DING,YONG-CHING	1020052	LIN,JUN-LI

1020055	GUO,GUI-XIANG	1030016	YANG,CHENG-YUNG	1030048	WANG CHIOU-I	1040012	SU PIN-YEN
1020058	YI,QING-LING	1030017	HUANG,HSIU-LI	1030052	JAU CHII-JONG	1040014	TSAI LI-CHEN
1020060	GUO,CHUN-QING	1030018	CHAI,CHIH-HSUAN	1030053	DAI SHWU-NU	1040015	CHAO,CHIA-LI
1020061	DAVID TSENG	1030019	LIAO YIHG-LI	1030054	CHEN YI-WEN	1040017	CHEN,TSAI-HUA
1020063	CHAN CHIU-YING	1030020	WU,HSIANG-CHIH	1030055	CHOU,PEI-HAN	1040018	TZENG YUH-TYUG
1020065	LO PEI-JU	1030021	CHANG KAO-LAN	1030056	HSIAO,LI-CHEN	1040019	LI,TZU-JUI
1020066	TU CHIU-YU	1030022	TSAI LI-HAW	1030057	CHEN HO-JUNG	1040020	LIANG,I-CHIEN
1020067	ZHANG,CHENG-FANG	1030025	CHEN,HUO-YEN	1030058	LIN LI-MEI	1040021	WANG,MING-HUI
1020068	ZHENG,DING-FU	1030026	WANG AY-JANE	1030060	CHIH MING-SHEN	1040022	HSIEH MING-HAN
1020069	WU,YU-FEN	1030027	TSENG SHU-FEN	1030062	YANG WEI-CHANG	1040023	YEH,CHIA-CHEN
1030001	HOU,PO-YAO	1030028	TSAI CHIUNG-YUAN	1030063	LIN YU-LING	1040024	TZENG YA-JIUAN
1030002	CHEN KUN-CHANG	1030029	HUANG HSIU-LUAN	1030064	LI MEI-LING	1040028	KUO,YU-CHIU
1030004	KUO MING-CHU	1030030	HUNG MEI-CHIH	1030065	KSU KUEI-HSIANG	1040029	LI CHING-LING
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Ms. Xu Bao-li	10,000				

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Cultural & Educational	
The Corporate Body of Yuan Dao	10,000
Cultural & Educational	
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Foundation	
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Ms.Cai Lian-zhu,	
Ms.Cai Xue-pin	
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