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S&T POST

JUL-SEP 2018

INNOVATION *for* COLLECTIVE PROSPERITY

science for the people 2018

Prosperity for all through innovation

At the executive committee policy meeting held on 27 September 2018, key officials of the Department of Science and Technology (DOST) have decided to adopt a working definition of innovation as "a process, product or service which is new, original or improved that is applied to create value."

Research and development is among the precursors of innovation and the DOST is the lead agency that provides direction, leadership, and coordination of the country's scientific and technological efforts, making sure that these are geared towards the attainment of maximum economic and social benefits for the people.

It is therefore but fitting that this year's celebration of the annual National Science and Technology Week (NSTW) is centered on the theme "Science for the People: Innovation for Collective Prosperity."

Since the 90s, the NSTW has always been the DOST's banner activity to showcase the latest developments in the local science community. During the NSTW, the various products, researches, projects, and services offered by the DOST and its attached agencies are presented through a creative display for the enjoyment and appreciation of the public.

This year's displays and celebration proved to be a lot bigger than previous NSTWs with the country's top researchers, scientists, inventors, and experts all gathered at the World Trade Center where they shared about their current and future activities, all towards contributing to collective prosperity for all Filipinos and the nation.

The exhibits were even dressed up to provide a micro-community experience that features how science, technology, and innovation (STI) make life better for people in their homes, schools, places of work, and even in the marketplace.

To highlight this focus on innovation, this issue of the S&T Post features not only the technologies and innovations of the DOST as showcased in the 2018 NSTW, but also technologies and innovations from the academic researchers who were among the latest batch of fellows in the Leaders in Innovation Fellowship (LIF) program.

The LIF is a post-graduate program that gives opportunity to Filipino researchers to take master classes at the Royal Academy of Engineering in the United Kingdom (UK), as well as gain opportunities in international networking with fellow researchers, technology entrepreneurs, and experts in various fields of study.

On the following pages are 15 technologies and innovations by these LIF fellows who recently presented their commercialization plans to potential investors. By featuring them, we hope to have contributed to the advancement of research and development in the country by helping these Filipino researchers be exposed to potential business partners.

Incidentally, the LIF program is under the Newton Agham Programme which is a collaboration between the Philippines and UK governments. The DOST is co-funding the program.

Indeed, innovation can go a long way in helping the nation achieve our sustainable development goals. Through the advancements in the field of STI, the DOST hopes to do its share in the attainment of collective prosperity for all.

Richard P. Burgos

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VOL. XXXVI No. 3

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Email: dost.digest@gmail.com

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14th National BIOTECHNOLOGY Week: Pambansang Hamon, Pambansang Solusyon

Hall D, World Trade Center
Pasay Ext. Corner, Sen. Gil Puyat Avenue, Pasay City

GENERAL PROGRAM OF ACTIVITIES

CENTER STAGE

Date	Time	Title	Lead Agency
13 November 2018	10:00 – 11:30 AM	Opening Ceremonies	DOST-PCHRD
13 November 2018	02:00 – 05:00 PM	Forum on Application of Biotechnology in Sugarcane Breeding	DOST-PNRI
14 November 2018	09:00 – 01:00 PM	Awit, Sayaw, at Bioteknolohiya	DA-BPO
14 November 2018	02:00 – 06:00 PM	Madulang Sabayang Bigkas Para sa Bioteknolohiya	DA-BPO
15 November 2018	09:00 – 01:00 PM	Communicating Basic Research Results to the People (Biotechnology Results)	DOST-NRCP
16 November 2018	09:00 – 01:00 PM	Communicating Biotech: Youth Stories on Science, Technology, and Innovation	IRRI and PhilRice
16 November 2018	02:00 – 06:00 PM	Biotekasayahan	SEARCA, ISAAA with UP Grains & UPLABS
17 November 2018	09:00 – 11:00 AM	Biotechnology in Education and Food Safety	DOST-PCIEERD
17 November 2018	02:00 PM	Closing Ceremonies	DOST-PCHRD

CONFERENCE ROOM A

Date	Time	Title	Lead Agency
13 November 2018	11:30 – 01:00 PM	Press Conference	DOST-STII
13 November 2018	02:00 – 06:00 PM	DOST-PCAARRD S&T Agri-Forum	DOST-PCAARRD
14 November 2018	09:00 – 01:00 PM	#ScienceJournoAko: Communicating the Benefits of Biotechnology	DOST-STII
14 November 2018	02:00 – 06:00 PM	PSHS System Career Talks and Forum on Biotechnology	DOST-PSHS
15 November 2018	09:00 – 01:00 PM	Healthcare Forum on Biotechnology	DOH
15 November 2018	02:00 – 06:00 PM	Saving Philippine Forest Trees thru Genetic Diversity Study	DENR
16 November 2018	09:00 – 06:00 PM	Luzon Agri-Biotech Farmers Congress	DA
17 November 2018	09:00 – 01:00 PM	Phytochemical & Antimicrobial Properties of Bamboo	DOST-FPRDI

S&T POST

ISSN 0116-7766 Vol. XXXVI No. 3 JUL-SEP 2018

TABLE OF CONTENTS

DEPARTMENT OF SCIENCE AND TECHNOLOGY

THIRD QUARTER 2018

ABOUT THE COVER

The circle represents the Department's pursuit of creating a science, technology, and innovation culture that is centered not for the sake of science alone, but for achieving collective prosperity to bind the major sectors of the society (work, home, and academe). It also highlights that the development and application of innovations are meant to better our lives, which means that science, at its core, is for the people.

Plants as filters

By Kristine Melody C. Perez, *DOST-XI*

THE DEPARTMENT of Science and Technology-Region XI (DOST-XI) will soon roll out a project to cleanup a portion of the Davao River basin with a filtration system that will use plants to filter the polluted waters. The project, which is targeted to start by the third quarter of 2018, aims to establish a cleaner way of discharging wastewater in Davao City and to develop a flood prevention technology.

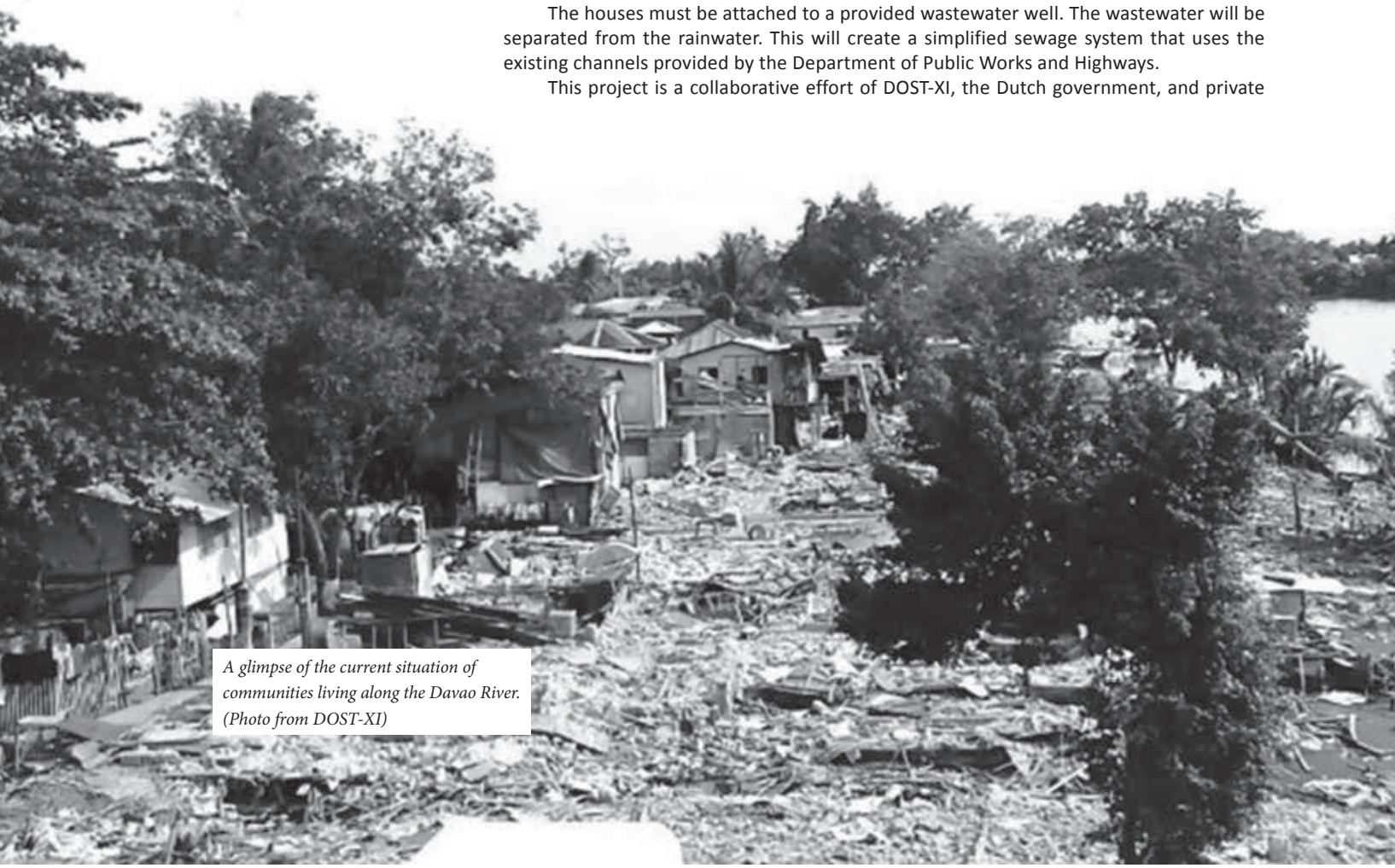
Called the Sani-Embankment project, the venture was developed to introduce a low-cost, nature-based solution to improve wastewater management in Davao River. To efficiently treat wastewater, a helophyte filter will be used. A helophyte filter is basically a sand filter planted with common reeds.

Bacteria living in the reeds' roots treat the water, making this filter 10 times less expensive than any other small-scale wastewater treatment system. Moreover, it can treat half a million liters of wastewater and can last for 20 to 25 years.

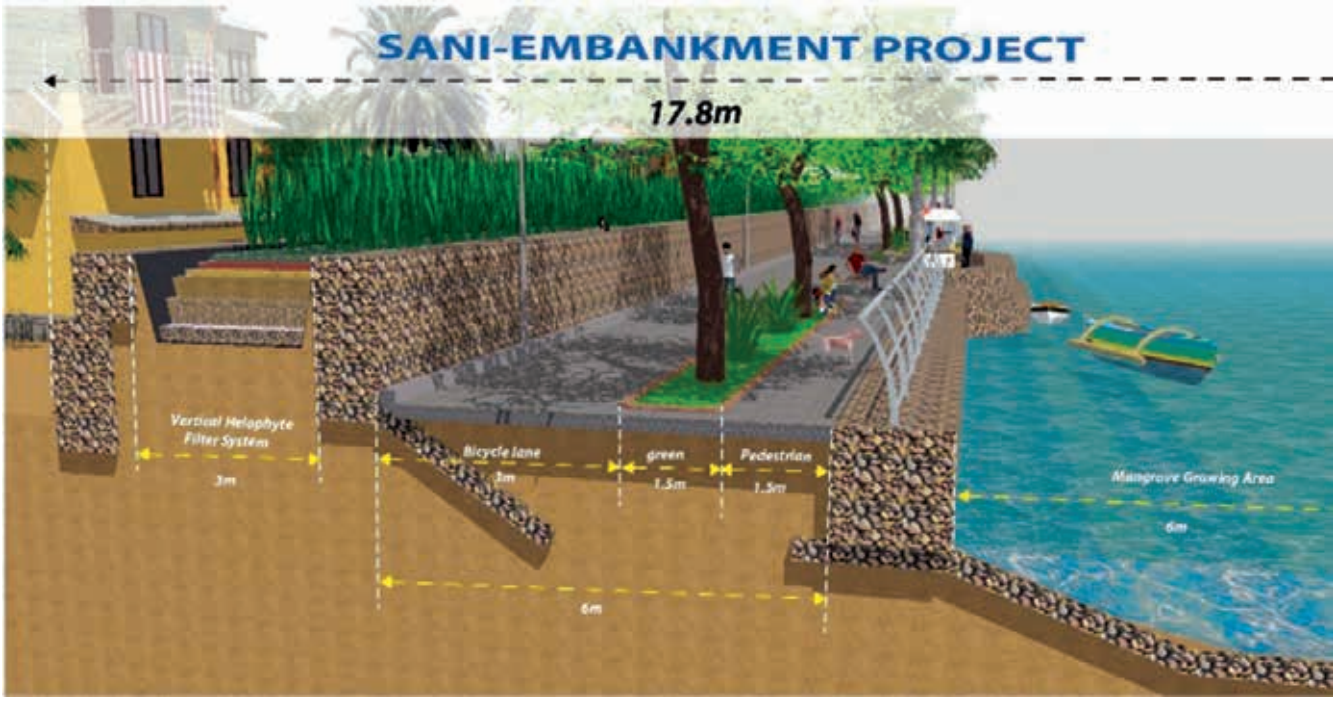
The project will use locally sourced materials and technology. A sanitary embankment with a dimension of 1.13km long, 15m wide and 3.5m high will be installed at Barangay 76-A, Bucana, Davao City. This will hep prevent wastewater from polluting the rivers.

The houses must be attached to a provided wastewater well. The wastewater will be separated from the rainwater. This will create a simplified sewage system that uses the existing channels provided by the Department of Public Works and Highways.

This project is a collaborative effort of DOST-XI, the Dutch government, and private



A glimpse of the current situation of communities living along the Davao River. (Photo from DOST-XI)



The helophyte filter system uses common reeds (Phragmites australis) and root bacteria as agents for treating the wastewater. (Photo from DOST-XI)

entities. HELP Davao Network will provide technical and infrastructure support and area preparation. DOST Region XI, as the monitoring institution, will supervise the project implementation and compliance of the work plan. Sanifyt, a partnership between Dutch and Filipino entities, will serve as the developer of the technology and administer the project funds in accordance with the work plan and timetable. Sanifyt aims to reduce environment pollution and improve sanitary conditions in informal settlements.

According to HELP Davao Network, there is an alarming number of illegal settlers along Davao riverbank, discharging waste directly on surface water. The Davao River is also exposed to pressures due to poor wastewater treatment system practices among residents and business establishments along the river banks. The Sani-Embankment project is designed to treat the wastewater coming from an estimated 3,500 residents who produce waste load of approximately 420,000 liters.

The Davao River basin is the third largest river catchment in Mindanao and is the largest of Davao City's nine principal watersheds, namely Lasang, Bunawan, Panacan, Matina, Davao, Talomo, Lipadas, and portions of Inawayan and Sibulan.

DOST awards innovators of tomorrow

By Laurence M. San Pedro, *DOST-STII*

OUT OF 55 research proposals from aspiring young innovators this year, six received recognition from the Department of Science and Technology-Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) for their innovativeness, potential, and impact on the society.

The individual researchers who received awards include: Gerardo Martin D. Quindoza III (BS student) of the University of the Philippines (UP)-Department of Mining, Metallurgical and Materials Engineering for the project entitled "Synthesis of nanocellulose reinforced chitosan hydrogel as bioink for 3D Printing of artificial articular cartilage"; Jeremy C. De Leon (BS student) of the Mapua University for the project "A low-cost micro wind turbine system for lighting, charging, and electrified floodwater detection"; and Janina M. Guarte (MS student) of the UP-Institute of Biology for the project "Capitalizing on microbial interactions for improving shelf life and gut-health benefits of Carabao's milk product (NICE4GUT)."

Meanwhile, the research teams who were awarded were: the Angeles City Science High School's Neil David C. Cayanan, Shaira C. Gozun, and E'van Relle M. Tongol, all high school students, for the project "Hibla: an alternative sound absorption material"; the Philippine Science High School (PSHS)-SOCCSKSARGEN Region Campus' Jether M. Arenga, John Angel C. Blancaflor, Kyle M. Enorio, Greg Norman C. Millora, and Jericho T. Portez for the project "Real time data logging and analysis with machine learning of sound frequency data in rainforests"; and St. Cecilia's College-Cebu, Inc.'s Joshua K. Pardorla (BS student), and high school students Christian Lawrence C. Cantos, Joefer Emmanuel T. Capangpangan, Dorothy Mae M. Daffon, and John Harold R. Abarquez for the project "Design and development of low-cost, high performance hybrid rocket for can satellite deployment applications."

This year's Young Innovators Program (YIP) grantees were awarded and recognized during the forum entitled "Up-close with our Talented Young Pinoy Innovators: A Forum with YIP Awardees" as one of the event highlights of the National Science and Technology Week held last July.

The DOST-PCIEERD, dubbed as the "Innovation Council," launched the YIP last year to give recognition to the youngest promising researchers through grants.

"We want to cultivate young minds to become our innovators of tomorrow," said Engr. Raul C. Sabularse, DOST-PCIEERD deputy executive director and officer-in-charge.

The YIP is envisioned to encourage new and innovative areas for research, and to expand the country's research pool.

"We provide support to students under the age of 30 to conduct their own scientific researches. Hopefully, motivating them to pursue a career in science and technology, and increasing our chances of discovering breakthroughs and creating more solutions," Engr. Sabularse added.

Through the YIP Awards, students and upcoming researchers with innovative research direction will be granted funds to pursue pioneering work that leads to a quality research paper, publication, product, or invention. Potential researchers, as young as high school students, will be ushered to independent research within the entire program duration.

(Photo from DOST-PCIEERD)

DOST exhibits 60 years of S&T journey at SM malls

By Jund Rian A. Domingo, *DOST-TAPI*

THE DEPARTMENT of Science and Technology (DOST) is commemorating 60 years of its science and technology (S&T) journey with a travelling exhibit in selected SM malls nationwide.

DOST's celebration of its 60th anniversary kicked off on 22 July 2018 at SM Cherry Antipolo. The DOST partnered with SM malls to raise people's awareness about the DOST and to bring S&T closer to Filipinos.

Through the DOST-Technology Application and Promotion Institute, the DOST is exhibiting some of the products and technologies developed and assisted by the department and its attached agencies through the years.

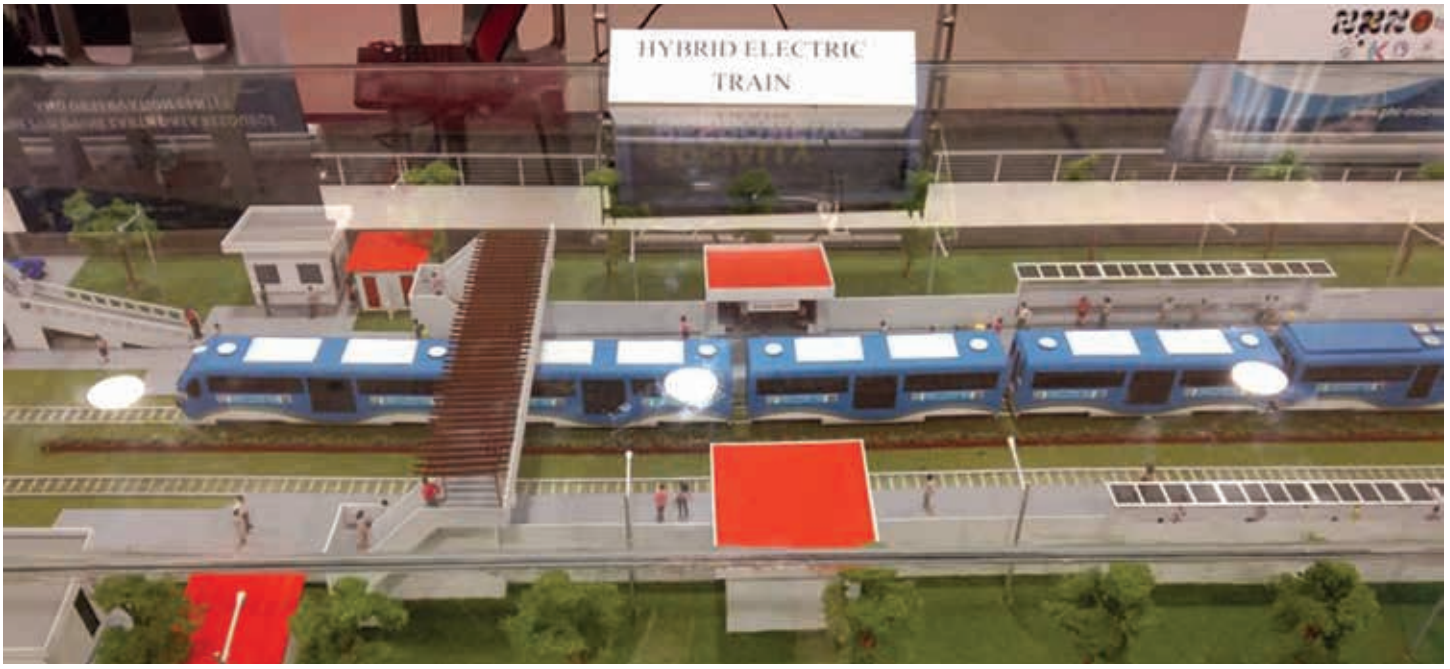
DOST's contributions to help solve some of the country's pressing problems can be seen in various research and development projects, as well as technologies and innovation in various fields such as health, agriculture, nutrition, transportation, disaster risk management, and climate change, to name a few.

Among those in exhibit include a miniature prototype model of the Hybrid Electric Train developed by the DOST-Metals Industry Research and Development Center and DIWATA-1—the first Filipino-made satellite. Various Filipino-developed products of micro, small, and medium enterprises that were assisted by DOST through SETUP or the Small Enterprises Technology Upgrading Program are also in exhibit.

DOST developed and assisted products are also featured in the exhibits. (Photo from DOST-TAPI)

The series of exhibits will run from 22 July to 21 October 2018 in the following selected participating SM malls.

- SM Cherry Antipolo – 22 to 29 July 2018
- SM City Rosales – 30 July to 5 August 2018
- SM City San Pablo – 1 to 7 August 2018
- SM City Novaliches – 2 to 10 August 2018
- SM City Olongapo – 6 to 12 August 2018
- SM City Cabanatuan – 12 to 18 August 2018
- SM Megamall – 13 to 19 August 2018
- SM City Dasmarinas – 13 to 18 August 2018
- SM City Fairview – 20 to 26 August 2018
- SM City Molino – 10 to 14 September 2018
- SM City Bicutan – 17 to 23 September 2018
- SM City Batangas – 8 to 14 September 2018
- SM City Cagayan de Oro – 15 to 21 October 2018



A miniature prototype model of DOST-MIRDC's Hybrid Electric Train is featured at SM Cherry Antipolo from 22-29 July 2018. (Photo from DOST-TAPI)

Sample currency base paper made from combining abaca, salago, and mangium. (Photo from DOST-FPRDI)

PH may soon make banknotes with locally available fibers

By Apple Jean Martin-de Leon, *DOST-FPRDI*

AFTER DECADES of depending on imported fibers, the Philippines may soon be able to make its own paper money using locally available plant materials.

Researchers at the Department of Science and Technology-Forest Products Research and Development Institute (DOST-FPRDI) recently developed quality currency base paper (cbp) from combining the fibers of abaca *(Musa textilis),* salago *(Wikstroemia spp.)*, and mangium *(Acacia mangium).*

"Our banknote or paper money is printed on imported cbp made from 20 percent abaca and 80 percent cotton. With our promising research result, we are planning to team up with the Bangko Sentral ng Pilipinas (BSP) to make Philippine banknotes using 100 percent locally available fibers," said Adela S. Torres of DOST-FPRDI's Pulp and Paper Products Development section.

Torres explained that fibers from abaca and salago, and wood chips from mangium were cooked, bleached, and formed into sample cbp at the FPRDI Pulp and Paper Testing Laboratory.

"Tests showed that its folding endurance is similar to that of imported currency base paper. It was also found to be tear resistant," she added.

Abaca is the strongest plant fiber in the world and is the main raw material in making specialty paper for producing paper money. "It is one of the Philippines' biggest exports, with the country supplying 85 percent of the total global abaca demand equivalent to 90 metric tons. Despite this huge volume though, the country still imports about 780,000 kilos of currency base paper a year, which the BSP turns into paper money," said Torres.

Salago, meanwhile, is a shrub whose bast fibers are similar to those used in Japan's specialty papers while mangium is a fast-growing wood species found in local plantations.

Banknotes last from one to five years, depending on how they are handled. "Producing our own paper money using locally sourced materials will not only promote our local fibers but will save us billions," said DOST-FPRDI Director Romulo T. Aggangan. According to the BSP, the government spends P3 billion annually to print new banknotes to replace deteriorated or demonetized ones.

"With the right policy support, the pulp and paper industry together with abaca and other bast fiber-producing farmers, plus local tree plantation owners, can work together to realize the dream of 'bringing home' the Philippine peso," said Aggangan.

The 15 fellows of the fourth batch of the Leaders in Innovation Fellowship Program with representatives from the Department of Science and Technology, British Embassy Manila, and the Asian Institute of Management. (Photo by Henry A. de Leon, DOST-STII)

LIF Leaders in Innovation Fellowship

Pitching technology and innovation

By Sheila Marie Anne J. de Luna, *DOST-STII*

A possible cure for dengue, vaccine for leptospirosis, mosquito-repellent textile, and a fast charger for electric vehicles, among others, are some of the featured innovations that Filipino researchers showcased at the recent Leaders in Innovation Fellowship (LIF) Programme Demo Day held on 2 August 2018 at the Asian Institute of Management (AIM) in Makati City.

During LIF Demo Day, academic research fellows get to showcase their products or technologies and pitch their commercialization plans to potential investors.

Currently on its fourth year of implementation, the LIF Programme aims to build the capacity and confidence of research and development practitioners in the Philippines on technology transfer and commercialization.

This fourth batch of LIF fellows is composed of 15 scientists and researchers who presented their innovations and commercialization plans with the hope of finding additional funds for further development of their technology.

The LIF is a postgraduate certificate program that started in 2014. It helps Filipino researchers create international networks with fellow innovators, technology entrepreneurs, and mentors who are experts in various fields of study.

Qualified Filipino researchers for the LIF program attend classes at the Royal Academy of Engineering (RAEng) in the United Kingdom (UK) for a certain period of training and coaching. The short term goal of the program is for the researchers to develop a commercialization plan for their innovation. After their study stint in the UK, researchers continue to benefit from the program through ongoing training and support to take their commercialization plans forward towards commercialization of their technology.

The LIF program is being supported by the United Kingdom and Philippine governments through the Newton Agham Programme, the Department of Science and Technology, and AIM.

The Newton Agham Programme believes that long-term sustainable growth can be achieved with a country's science, technology and innovation (STI) capability. The program also sees STI as essential component in the development of new technologies that would benefit the most vulnerable in society.

Gov't developed mobile app for better healthcare

By Geraldine Bulaon-Ducusin, *DOST-STII*

Good news for public and private healthcare facilities and research institutions. The government has developed a technology, eHATID LGU, which can help local government units' (LGUs) healthcare facilities to generate Department of Health (DOH)-based reports. This new technology can also be used to request benefit claims from the Philippine Health Insurance Corporation or PhilHealth.

The eHATID LGU is an eHealth TABLET (Technology Assisted Boards for LGU Efficiency and Transparency), a mobile android-based application that is cost-efficient and user-friendly. It is also a PhilHealth-certified electronic medical record (EMR) system designed to help LGUs make informed decision-making.

PhilHealth requires healthcare facilities to submit electronically generated data for benefit claims and also as part of PhilHealth's accreditation requirements. The eHATID LGU makes compliance to this requirement easier since it is a certified EMR especially used for benefit claims by PhilHealth. At the same time, it also functions as surveillance tool for notifiable diseases.

It also serves as a communication tool for LGUs, healthcare workers, and chief executives, and a predictive analytics tool using online data. eHATID LGU enables health workers to do away with tedious manual computation.

While this technology works online, it also has offline features that can help health workers even in far-flung areas.

Currently, eHATID LGU prototypes have been deployed in 450 LGUs. The app is also assessed for other intellectual properties (IP) through the Department of Science and Technology's (DOST) IP Rights Assistance Program.

This project is a product of collaboration among the DOST-Philippine Council for Health Research and Development, the DOH-Knowledge Management and Information Technology Service, PhilHealth, and the Department of Information and Communications Technology.

Screenshot of the eHatid LGU Website

DOST funded tech to help ease traffic woes

By Jasmin Joyce P. Sevilla, *DOST-STII*

Photo from Pixabay.com

Traffic flow in the Philippines is one of the worst in the world. A study by the Boston Consulting Group in 2017 revealed that Metro Manila ranks third among the countries in Southeast Asia with the worst traffic situation. The same study showed that commuters and motorists in the country's capital spend 66 minutes daily stuck in traffic.

In an effort to find solutions to Metro Manila's heavy traffic flow, authorities and local government units (LGUs) resort to trial-and-error to find appropriate solutions. There is, however, little to no scientific data gathering being done that can back up the solutions being proposed.

To help address this gap, the Department of Science and Technology (DOST) has backed up efforts to commercialize AGUS technology, a traffic micro-simulator software that analyzes traffic flow to help stakeholders better make sense of traffic concerns.

AGUS has two key tools in analyzing traffic flow – AGUSTrack and AGUSSim. AGUSTrack is a video-based traffic flow analysis solution that can accurately count and classify Philippine road users as vehicles (cars, bikes, motorcycles, buses, trucks, etc.) or as pedestrians. It can also capture information such as direction or movement on highways and turns at intersections.

The data gathered from AGUSTrack are then processed by AGUSSim, which is a traffic micro-simulator that generates simulations with up to 92 percent accuracy. AGUSSim also factors in the Filipino driving behavior. The generated simulations can help create better and optimal solutions to help ease heavy traffic flow in the metro.

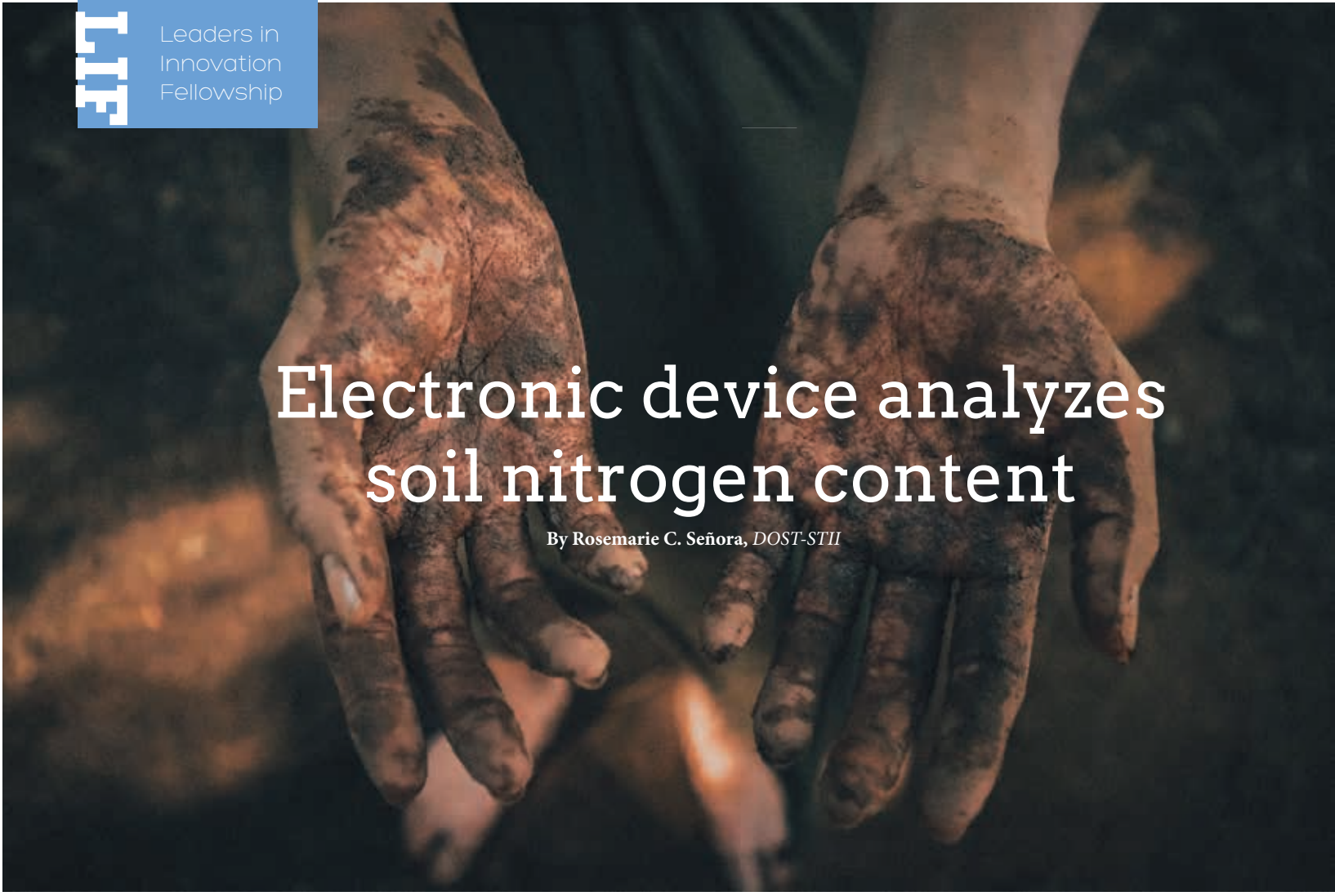
"The original intention of the project was to distribute the software to LGUs to help them with the traffic management plan," said Ma. Cristina R. Bargo from the University of the Philippines (UP) Diliman-Institute of Mathematics.

Bargo is part of the team that developed the AGUS software led by Dr. Hillario Sean Palmiano from UP Diliman-Institute of Civil Engineering and Dr. Adrian Roy Valdez from UP Diliman-Department of Computer Science, in partnership with the UP National Center for Transportation Studies.

In 2014, DOST-Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) funded the AGUS project. Currently, AGUS is on its second phase and is still being alpha tested.

According to Bargo, DOST-PCIEERD also encouraged her to apply to the Leaders in Innovation Fellowship Program that grants technical assistance to Filipino researchers. "I was fortunate enough to be included in the fourth batch of the program," she said.

Aside from the technology's promising potential to help LGUs address the country's traffic woes, AGUS also aims to enhance the way companies and research teams conduct data gathering by creating effective tools to not only improve but also to automate the collection and analysis of data.



Electronic device analyzes soil nitrogen content

By Rosemarie C. Señora, *DOST-STII*

Photo from Unsplash.com

One of the technologies that made it to the latest batch of the Leaders in Innovation Fellowship (LIF) is the Electronic Soil Nitrogen Analyzer or ESNA.

ESNA is an electronic tool comprised of a hand held instrument, probe, and test kit consumable that analyzes nitrogen from the nitrate concentration of soil using a sensor called nitrate ion-selective electrode. The nitrogen output, in terms of parts per million, is then displayed in the LCD of the device.

"With the use of ESNA, application of nitrate fertilizers can be optimized. There will be improvement of soil condition, pH level, and fertility," said Dr. Hermogenes M. Paguia, director of research and development at the Bataan Peninsula State University (BPSU) during his presentation of the technology at the LIF Demo Day held at the Asian Institute of Management in Makati City on 2 August 2018.

The use of ESNA will result in a reduced level and cost of chemical fertilizers and will serve as an intervention to national big data soil nitrogen mapping program. Paguia added that, ultimately, these improvements will increase productivity of crops.

Further, Paguia said that among the competitive advantages of ESNA include its reliability, effectiveness, cost-efficiency, and user-friendly features.

Engr. Rodrigo C. Muñoz, Jr., technical developer of ESNA and associate professor at the BPSU-College of Architecture and Engineering, added that ESNA was developed to provide smart technology to improve farmers' profitability and promote sustainable agriculture.

It was also developed to help address the problem of declining soil fertility and poor soil texture attributed to unregulated use of chemical fertilizers; low productivity level of largely 1.2 million hectares of rice fields; and lack of electronic-based soil test kit that will analyze the nitrogen content of soil and give recommendation for rice and other crops.

Photo from ESNA Presentation.

The technology is now open for possible manufacturing and marketing partnerships. Interested partners and investors may send a message at research@bpsu.edu.ph or via www.facebook.com/BPSURDO.

UPLB Biotech researchers develop all natural colorant

By Rodolfo P. de Guzman, *DOST-STII*

Photo by Henry A. de Leon, DOST-STII

For hundreds of years, artificial food dyes have been developed to make food more appealing to consumers. However, majority of these colorants have since been found to be toxic and only a handful of artificial dyes are still used for food preparations.

Although regulatory agencies like the United States Food and Drug Administration and the European Food Safety Authority have certified that food dyes do not pose significant health risks, confusion still hangs in the minds of many.

What is confusing is that there are food dyes that are deemed safe in one country but banned from human consumption in another. Further, most of the synthetic colorants found in the market have been found to possibly lead to some illnesses like cancer, allergic reactions, and worsening of hyperactivity in children.

To address the gap, researchers at the National Institute of Molecular Biology and Biotechnology or BIOTECH at the University of the Philippines Los Baños developed an efficient technology for the production of an all natural colorant that is more affordable and safer to use—the Monascus Red Colorant.

The Monascus colorant comes from natural plant sources that possess a range of biological activities, such as antimutagenic and anticancer properties, antimicrobial activities, potential antiobesity activities, and a lot more.

This colorant is said to add value to products because of its antioxidants and cholesterol lowering compounds. The technology can be used by local food and beverage companies, baking industries, and beauty and personal care products industries.

According to the researchers, they conducted their study because there is currently no existing local company that produces alternative natural colors.They likewise assured that the product is safe to use and that there will be a steady supply, which could help bring the cost of production further.

The Monascus Red Colorant can be used as substitute for the most popular food dyes, particularly those found in the United States, which are the Red 40 (Allura Red), a dark red dye that is used in sports drinks, candies, condiments and cereals; Yellow 5 (Tartrazine), a lemon-yellow dye that is found in candies, soft drinks, chips, popcorn and cereals; and Yellow 6 (Sunset Yellow), an orange-yellow dye that is used in candies, sauces, baked goods, and preserved fruits.

Among the other positive features of the Monascus Red Colorant are the following: it can be produced in powder form and enhanced with fruity fermented scent, it is soluble in water and alcohol, it has improved color and flavor, it has antioxidant properties, it contains Monakolin K (cholesterol lowering compound), and it has a shelf life of two years.

The project shows promising results after being tested and validated to be safe for human consumption in different food items and personal care products.

Fidez Z. Tambalo, project leader for the development of the Monascus Red Colorant disclosed that production studies have also been conducted at pilot scale and that the project is now open for licensing. The research team is now looking for companies and investors who are interested to commercialize the Monascus Red Colorant.

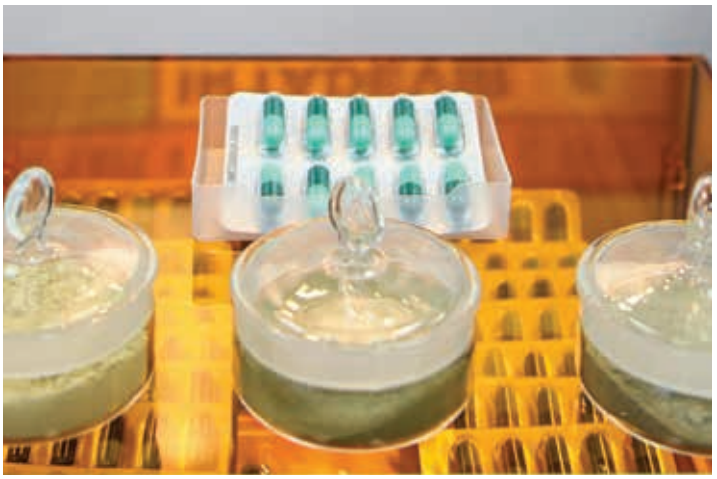


Photo by Henry A. de Leon, DOST-STII

New drug promises cure for dengue

By Sheila Marie Anne J. de Luna, *DOST-STII*

At last, a cure for dengue is here!

This was the banner statement that headlines the research paper presented by Dr. Rita Grace Y. Alvero, a pharmacologist from the College of Medicine at the De La Salle Medical and Health Sciences Institute in Dasmariñas, Cavite and founding president of RGA BioPharma Solutions Inc.

Called Irtadevir, this possible cure for dengue can be given for two days with the treatment benefit immediately seen thereafter, affirmed Dr. Alvero.

"Irtadevir is a combination of herbal drugs, the first in the market. It addresses the root cause of the problem by reducing the replication and infectivity of the four serotypes of the virus," Dr. Alvero explained.

This means that Irtadevir works by decreasing the viral load and reducing the ability of the virus to produce infection, thus it is recommended that the drug be given to patients before the virus increases rapidly. Moreover, Dr. Alvero clarified that the drug will be used and marketed as an antiviral drug.

"We can give it when the patient has a mild symptom and the doctor is thinking it could be dengue, so that it will not progress to the severe form of the disease," suggested Dr. Alvero. She added that the drug can also be given and will still have a positive effect on treatment in patients who are already in the severe stage of the disease

Irtadevir's market and social values

"This is the first definitive treatment for dengue. It fills the gap because there are no other treatment options," declared Dr. Alvero. She said that one of its advantages is that it can be used in far-flung areas in the absence of intensive care facilities.

Dr. Alvero reported that current total direct cost of standard of care for dengue would be P2.9 billion. That is based on the 65 percent of the reported cases of dengue admitted in hospitals in 2017. Given the same data, using Irtadevir will result in savings of up to P2.4 billion.

With that, she hopes to grow the business through several options. First is that they set up a company and have the product solely manufactured and distributed to government and private hospitals, as well as to drugstore chains. The other option is to partner with a local manufacturer and resort to out-licensing agreement.

Aside from offering hope to those who are now gripped with fear of the disease, the researchers behind Irtadevir also hope to provide farming communities with new livelihood as contract growers of the herbal ingredients of the drug. Dr. Alvero said that it can also generate employment opportunities for production and distribution staff and generate revenues for the government through taxes. With reduced cost for the treatment of dengue with Irtadevir, Dr. Alvero believes that it can also help conserve healthcare resources for use in other diseases.

Funding needed

Dr. Alvero and her research team projected that in five years, Irtadevir will be the drug of choice for the treatment of dengue and they hope to see a reduction in dengue mortality by 50 percent. By that time, it is also projected that Irtadevir's therapeutic indication would have been expanded to include Zika and Chikungunya. In terms of business, they hope to establish licensees in about five to 10 countries within five to 10 years.

To obtain marketing authorization, the researchers need to do two more trials that will cost roughly P24 million.

This clinical innovation is now in its final stages of development in partnership with the Department of Science and Technology (DOST)-Philippine Council for Health Research and Development.

Dengue has been identified as a global healthcare risk with no definitive treatment. About 390 million people are infected with dengue annually, with some 3.9 million more at risk of getting the disease in 120 countries. Locally, dengue is among the top ten causes of deaths.

Dr. Alvero presented her research and development at the recent Leaders in Innovation Fellowship (LIF) Demo Day on 2 August 2018 at the Asian Institute of Management (AIM) in Makati City.

The LIF program is being supported by the United Kingdom and Philippine governments through the Newton Agham Programme of the British Royal Academy of Engineering, the DOST and AIM.

For more information on Irtadevir, contact Dr. Rita Grace Y. Alvero at 09178201862, or email at rgalvero@gmail.com.

R&D project makes affordable classical guitars

By Allan Mauro V. Marfal, *DOST-STII*

Photo by Henry A. de Leon, DOST-STII

Local guitar makers now have an opportunity to improve their craftsmanship and livelihood by producing quality and affordable classical guitars.

A team from the Department of Science and Technology-Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) and the University of the Philippines (UP) College of Music and UP Electrical and Electronics Engineering Institute have been working together in producing quality classical guitars that are locally made.

Called "Gitara ni Juan", this research and development (R&D) project aims to help local guitar makers create quality guitars that are much more affordable than the imported ones. The normal price of one of the cheapest and more popular imported classical entry-level guitars in the country is around P25,000.00, said Professor Nathan Manimtim of the UP College of Music, project leader of the Gitara ni Juan project. Under the project, a local guitar maker can produce a prototype classical guitar that costs 40 percent lower.

Through a P5-million grant from the DOST-PCIEERD, the Gitara ni Juan team went to Los Baños in Laguna, Vigan in Ilocos Sur, Pampanga, Cebu, the City of Dipolog in Zamboanga del Norte, and Dumaguete City in Negros Oriental to study how local guitar makers or luthiers manufacture the six-stringed instrument.

"The group discovered that due to inadequate capital of small-time luthiers, they often rely on plywood to make guitars, which compromises the quality of the musical instrument," said Manimtim.

He further explained that mainstream Pinoy guitar makers use jackfruit, narra, and Blackwood ebony, while imported guitars are made of hardwoods like spruce, cedar, and rosewood that are known for their durability and ability to produce quality sound. However, guitars made of these woods are costly.

"We would like to look for local wood suitable for [producing] classical guitar because we are rich in wood resources. We use other types of wood so we need to adjust the design in such a way that it syncs on how our wood moves," said Manimtim.

To assist them in identifying and selecting necessary wood species and orienting the researchers on current forest policies regarding restricted and legally available timber species for wood-based industries, the research team tapped the expertise and technical assistance of the DOST-Forest Products Research and Development Institute (DOST-FPRDI).

"We shared some literatures from the studies made by DOST-FPRDI. Afterwards, we identified the types of wood that can go well with stringed musical instruments," said Forester Robert Natividad, a supervising research specialist at DOST-FPRDI.

In the span of 18 months of conducting research, the group was able to produce a prototype classical guitar using different wood species. The prototype has undergone acoustic analysis as well as simulation of vibration, among others.

Ferdie Medina, founder of Sparrow Music Learning Center based in Payatas, Quezon City shared his satisfaction about the Gitara ni Juan prototype design. "When the Gitara ni Juan prototype was finally made, I said to myself that what we have here is the appropriate [guitar] measurement. It is beautiful and it feels good when you touch it. It is just the right measurement for my hands, for my height, for the height of a typical Filipino," Medina said.

"The sound produced is very promising, considering that we are just in the initial phase of the project in which we used local wood," added Medina.

Gitara ni Juan was one of the R&D projects supported by the DOST that was presented at the recent Leaders in Innovation Fellowship Demo Day held on 2 August 2018. The LIF program is supported by the United Kingdom and the Philippines through the Newton Agham Programme.

DOST's e-vehicle charger now in Isabela

By Allan Mauro V. Marfal, *DOST-STII*

CharM unit at UP EEEI before it was shipped out for deployment. (Photo from CharM Project team)

(L-R): Department of Science and Technology (DOST) Secretary Fortunato T. de la Peña together with CharM Developer Engr. Leo Allen Tayo; Cauayan City Mayor Bernard Faustino Dy; DOST-II Regional Director Engr. Sancho Mabborang; and Isabela State University President Dr. Ricmar Aquino during the launch of CharM in Cauayan City, Isabela. (Photo by Gerardo G. Palad, DOST-STII)

A technology funded by the Department of Science and Technology (DOST) that can charge electric vehicles or e-vehicles in less than 30 minutes instead of the usual six hours is now operating in Cauayan City, Isabela.

Called CharM or Charging in Minutes, it is an electric vehicle charger that charges e-vehicles quickly.

CharM features an on-board Battery Management System to balance the charge of the batteries while running. Usually, e-vehicles run in different environmental conditions, route, and load. These factors affect the discharging of the batteries. CharM's battery system helps ensure better battery integrity and safety.

Two CharM chargers are currently installed in Cauayan City, Isabela to service local e-trikes and e-bikes in the area.

DOST Region II Director Sancho P. Maborrang said that the deployment of CharM in Cauayan City is among the initiatives of the local government to achieve its vision of "Smarter and More Progressive City" with the introduction of a fleet-managed and greener mass transport service through e-trikes.

Meanwhile, the team of researchers that developed the technology from the University of the Philippines Diliman Electrical and Electronics Engineering Institute (UP EEEI) shared that the current project deployment serves as a market validation study. This is expected to lead to a proper marketing strategy for the CharM chargers to make it economically sustainable.

The facility built for research and development of the project served as venue to test and qualify lithium ion batteries and even e-vehicles for roadworthiness and compliance with Philippine National Standards.

CharM was among the technologies presented during the technology demonstration of Leaders in Innovation Fellowship program held on 2 August 2018 at the Asian Institute of Management in Makati City.

The development of the technology is funded by the DOST-Philippine Council for Industry, Energy and Emerging Technology Research and Development.

For more information, contact Asst. Prof. Lew Andrew Tria (lew.tria@eee.upd.edu.ph) of the Artesyn Power Electronics Laboratory of the UP EEEI, or Engr. Leo Allen Tayo (leoallen_tayo@rocketmail.com), CharM technical project leader.

R&D developed PayRuler provides complete HR management, payroll system

By Laurence M. San Pedro, *DOST-STII*

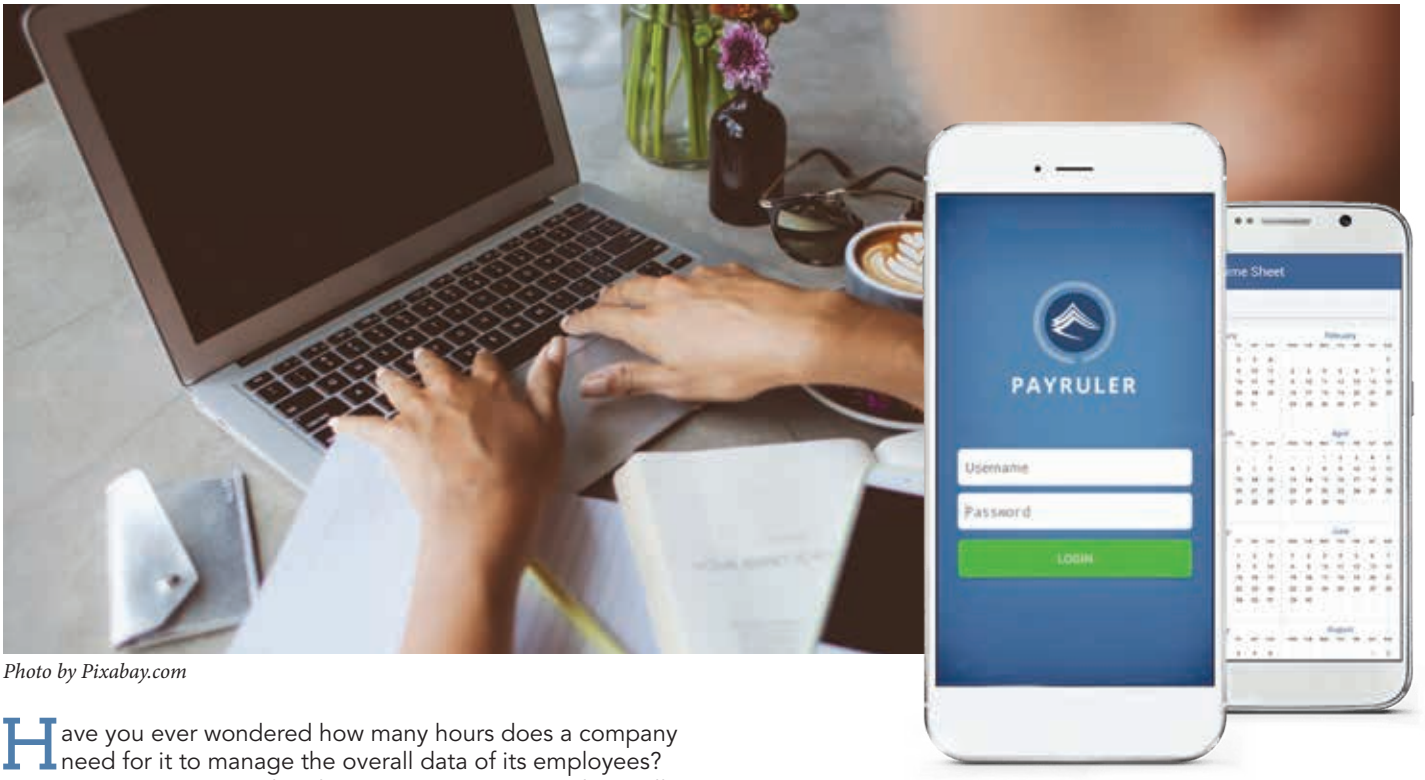


Photo by Pixabay.com

Have you ever wondered how many hours does a company need for it to manage the overall data of its employees?

For some companies, their human resource (HR) and payroll teams render an average of 60 hours per week per employee on every monthly payroll cutoff. This accounts for a lot of overtime pay, unproductive working hours due to repeated tasks, and minimized career growth and potential.

It is the HR department that acts as the implementing body for initiatives that align the company's business strategy with the well-being of their employees. However, with inefficiencies and inaccuracies, the overall health of the company gets affected and compromised.

To address this problem, a complete Human Resource Management System (HRMS) with payroll application called PayRuler was developed to deal with complex applications of human resources management.

PayRuler is tailored to cater to specific company sizes and needs. It can be used by companies with number of employees ranging from 16 to 24,000 for HR and payroll processes that include recruitment, employee information management, timekeeping and attendance management, payroll processing, and reporting. With an added feature called "timeruler", tracking of employees deployed for field work is also possible.

To date, its HRMS and payroll combined service is being used for over 47,000 employees and is being enjoyed by 51 local companies across 11 of the 17 recognized industries in the country. It has already generated more than one million e-payslips and has computed over 81 million work hours translating to over P9 billion worth of employee salary passing through the system.

In the advent of mobile technology, PayRuler is also made accessible right at the end-users' fingertips through its self-service feature. Employee-employer data management via the PayRuler mobile application is available for iOS and Android devices.

PayRuler is currently housed at the University of the Philippines Cebu Business Incubator for IT. It is managed by its five-member founding team who are in the fields of entrepreneurship, technology and software development, and human resources for 10 years now.

A start-up business, PayRuler was established through the assistance of the Department of Science and Technology (DOST) Technology Business Incubation (TBI) support program.

The DOST TBI is one of the strategies identified by the DOST to promote innovation and technopreneurship for the country's socioeconomic development in a knowledge-based world economy. A technology business incubator is a facility where start-ups are hosted and business development services are provided.

In addition, office spaces and technical services and facilities are being offered by the DOST-funded TBIs for incoming technology entrepreneurs and start-ups to get their business established.

Sea cucumber eyed for sustainable livelihood opportunities

By Louella D. Labasbas, *DOST-STII*

RISE provides sea ranch to market technical services for the production of premium export-grade sandfish products depending on the needs of clients. (Photo from the RISE presentation)

Rich with pristine waters and biodiverse marine and freshwater environment, aquaculture is one of the oldest and biggest industries in the Philippines.

Aside from imparting a significant contribution to the country's food security, aquaculture provides foreign exchange earnings and employment. Some of the leading aquaculture products include shrimp, tuna, milkfish, tilapia, mussel, and seaweed.

However, increasing population means higher demand, which the environment sometimes cannot provide consistently because some species require time to reproduce and grow. And with the fast growing population, nature finds it difficult to cope.

In the Philippines, the aquaculture production has fallen steadily from fourth place in 1985 to 12th place today, which is equivalent to roughly 1 percent of the global farmed fish production.

Due to the significant challenge to the industry, coastal fishery resources are dwindling, resulting in a more limited source of income for small marine farmers, who are among the poorest and most vulnerable sectors.

Balatan culture production

Given the various challenges in the aquaculture industry, it has become necessary to consider other marine species for cultivation, one of which is the sea cucumber. It has a low supply but very high market demand for premium grade dried sea cucumber.

Locally known as *balatan*, sea cucumber (*Holothuria scabra*) or sandfish is a species that belongs to the same group as starfish and sea urchins. It is also consumed as a fine delicacy in expensive Asian cuisine in Japan, Korea, China, Malaysia, and the Philippines.

Researchers from the University of the Philippines Marine Science Institute has come up with an integrated, science-based and environmentally sound sandfish ocean production system that aims to contribute to diversification of livelihood options for inclusive rural development.

Called RISE or Responsible Inclusive Sea Cucumber Enterprise, it provides customized sea ranch management, technical support services for site assessment, sea ranch establishment, monitoring, and scale-up to production clusters.

The experts behind RISE also provide basic orientation and training on responsible ocean-based nursery and grow-out premium-grade sized sandfish. Moreover, RISE will also provide supply of quality juveniles for stocking sea ranch areas, as well as post-harvest support for proper processing and market linkages.

The researchers invite interested individuals or enterprises who may want to partner with them in developing sustainable sandfish culture production clusters initially in northern Palawan and southeastern Mindanao.

Environmentally sound sea ranching

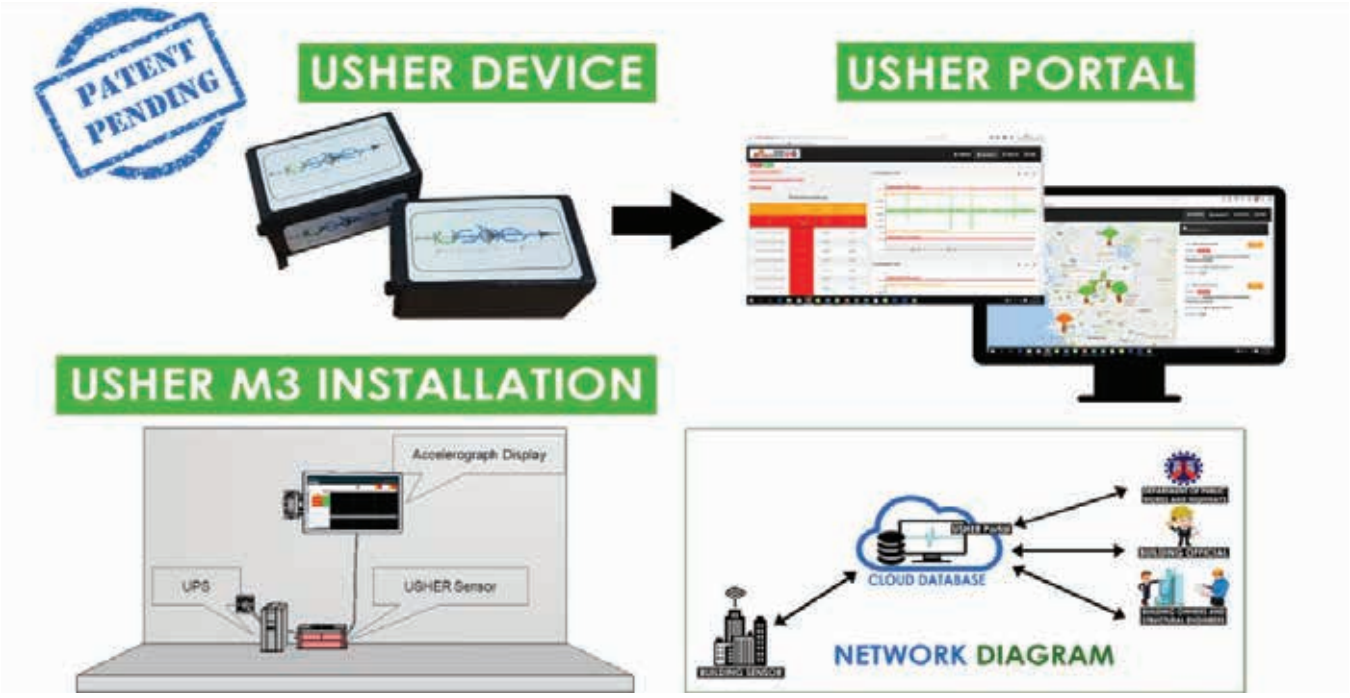
Since the process of sea ranching is commonly practiced especially during conservation and rehabilitation of coastal areas, it could also be used as an effective platform in producing more premium grade sea cucumber. This can be achieved by rearing hatchery-produced juveniles in ocean nursery systems on natural food and released in suitable sea ranch areas to grow up to desirable sizes of around 400 grams.

Effective management of sea ranching will also serve as reproductive reserves in increasing natural sea cucumber populations in adjacent areas that will benefit other fishers' livelihood.

Fast-paced life requires innovation from what people used to practice. And with the growing challenge of harvesting abundant marine products for consumption, sea cucumber farming could be a unique choice and flavor to try on. Not only that, it could open up a new avenue for livelihood among local marine farmers.

USHERing a more resilient Philippines

By Judy Q. Aca-Saclamitao, *DOST-STII*



Together with at least 14 other countries, the Philippines sits along the Pacific Ring of Fire. Putting great importance on infrastructure resiliency has therefore become a necessity as the Philippine government in 2015 required building instrumentation to ensure structural health.

Now part of the building and business permit compliance process, this government regulation has affected an initial inventory of 85,000 buildings in the country.

Promoted as a cost-effective 24/7 structural health monitoring system for buildings and bridges that ensures economical and hassle-free compliance, USHER or Universal Structural Health Evaluation and Recording System was developed in compliance with the requirements set by the National Structural Code of the Philippines 2015 on earthquake instrumentation. Likewise it is compliant to the Guidelines and Implementing Rules on Earthquake Recording Instrumentation of the Department of Public Works and Highways (DPWH).

USHER can be installed in all types of buildings, allowing building managers to remotely monitor the buildings' structural integrity. Unlike other existing products in the market, it is said to be remarkably lower in cost, yet it offers a complete solution to ensure business continuity.

The three main features of the USHER System are its sensor device, portal, and its end to end service and technical support. The sensor device is locally made and a cost-effective structural health and earthquake recording instrument which is easy to install, low maintenance, locally fabricated with readily available parts, and with design specification based on the DPWH guidelines.

Remote monitoring of the building's structural health is possible with the portal as it provides a decision-support tool for building owners, structural engineers, building officials from local government units, and the DPWH. With 24/7 data access, the said portal is also capable of wireless data retrieval, storage, and archiving. It also has an alarm system (e.g. SMS, e-mail), automatic data interpretation based on set thresholds, and is likewise public announcement system-ready.

USHER's end to end service and technical support includes the following: pre-assessment of buildings, installation and certification, post-assessment of buildings, annual data interpretation and report, annual building certification, and 24/7 technical support.

This system is a product of Mapua University's recently concluded SmartBridge (Development of Wireless Sensory Network System for Structural Health Monitoring of Bridges Project), which was funded by the Department of Science and Technology (DOST). The project showcased Philippine advancement of its civil system in bridge monitoring and maintenance and likewise supported the Smarter Philippines program of the DOST.

Earlier this year, USHER earned a distinction from the UK Royal Academy of Engineering. Dr. Francis Aldrine A. Uy, dean and professor at the School of Civil, Environmental and Geological Engineering of Mapua University, and his team emerged as the winner for best project presentation in the Leaders in Innovation Fellowship (LIF) held in January in the United Kingdom.

Proudly Filipino-made, this building structure health monitoring system's call to invest and usher a safer and more resilient world is our country's contribution towards building a more equitable and sustainable future. This innovative response in addressing climate change adaptation and disaster risk reduction challenges hopes to lessen the impact of natural hazards and disasters in our society and environment.

Sago-based lactic acid makes bioplastics

By Allyster A. Endozo, *DOST-STII*

Sago or tapioca, a granular preparation of cassava starch that is usually round, sometimes colorful or pearl-like in appearance, with a mild and sweet flavor is a favorite ingredient of many Filipinos, particularly in the all-time summer favorite *halo-halo*.

Dr. Melvin S. Pasaporte of the University of the Philippines Mindanao looked into this cassava derivative to explore how lactic acid derived from its fermented form can be used to make bioplastics.

Industrial-grade starch derived from *sago* first undergoes fermentation through the action of *Enterococcus faecium*, a bacterial species used in making *puto* or rice cake.

Recovery and purification of subsequent derivatives yield lactic acid, which is then converted to polylactic acid (PLA)—the main building block of bioplastics capable of complete biodegradation within 80 days.

PLA has been placed on the radar of experts in recent years for its biocompatibility, biodegradability, and safety—key attributes that allowed it to thrive in applications like pollution-free manufacturing and health care.

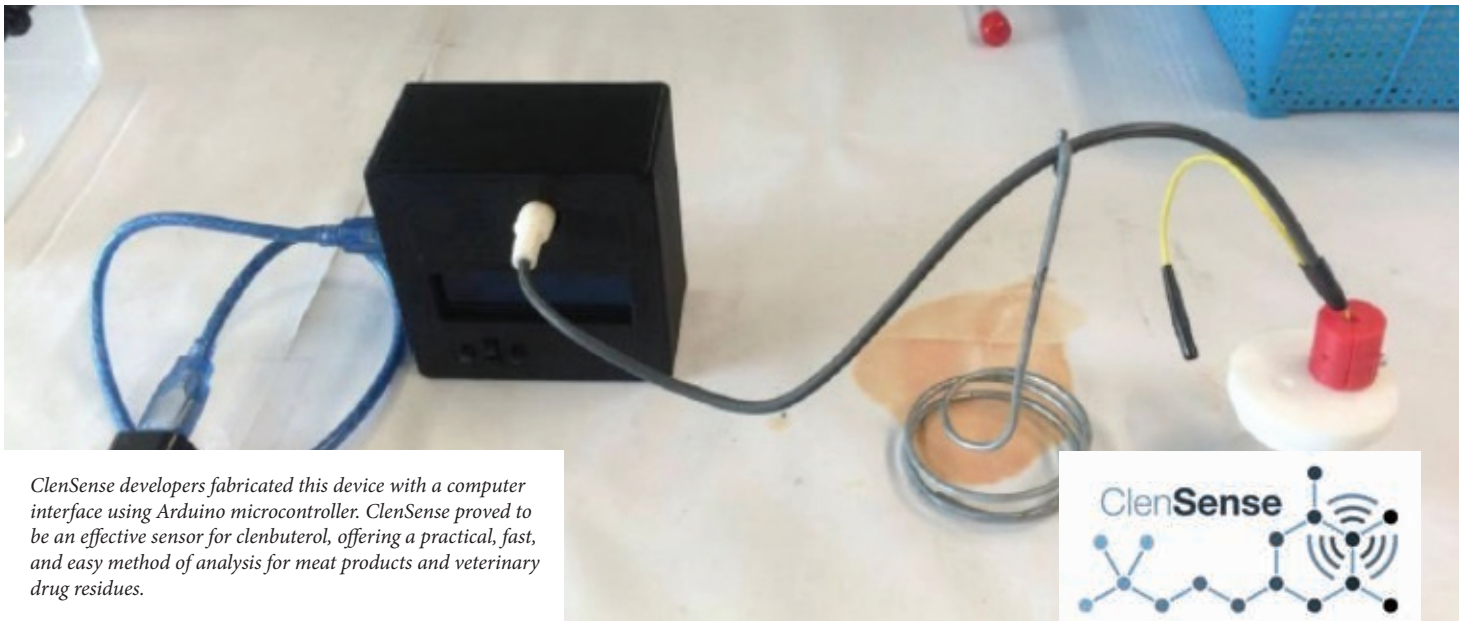
Commercialization of this technology has already surpassed the preliminary research phase, having completed the lab-scale and pre-pilot processing stages. The technology is now aimed towards pilot bioprocessing en route to pre-industrial demonstration and industrial production, which would eventually upscale lactic acid output to over 10,000 tons.

Pasaporte presented his paper on novel lactic acid technology during the Leaders in Innovation Fellowship (LIF) Demo Day on 2 Aug 2018 at the Asian Institute of Management in Makati City. His intellectual property, "Direct Lactic Acid Fermentation from Sago Starch," has been submitted for patent processing at the Intellectual Property Office of the Philippines.

During the LIF residency program on 18-27 Jan 2018 at the Royal Academy of Engineering (RAEng) in London, Pasaporte received coaching on business model development, executive summarization, and "pitch" presentation, in addition to master classes on entrepreneurship, finance, intellectual property, and planning.

LIF is part of the Newton Agham Programme, an inter-government initiative on science, research, and innovation upgrade hosted by RAEng in partnership with the Asian Institute of Management and the Department of Science and Technology.

Photo from static.webshopapp.com/shops/



ClenSense developers fabricated this device with a computer interface using Arduino microcontroller. ClenSense proved to be an effective sensor for clenbuterol, offering a practical, fast, and easy method of analysis for meat products and veterinary drug residues.

ClenSense:
Screening kit for meat quality and safety

By David Matthew C. Gopilan, *DOST-STII*

The current rise in the price of pork is an important issue to people even as its safety and freedom from harmful chemicals is likewise an important concern.

To ensure food quality and safety, researchers from the University of the Philippines (UP) in Diliman, Quezon City developed ClenSense, a technology that meat inspectors can use in slaughterhouses to detect clenbuterol in pork samples.

Dr. Susan D. Arco from the UP Institute of Chemistry and Idona Porlaje from the UP Technology Transfer and Business Development Office explained that clenbuterol (CLB) is a "potent long-lasting bronchodilator used to treat asthma and related drug disorders." It was later discovered that this drug can make pigs gain more muscles and reduce body fat; thus, hog raisers often use clenbuterol as an additive in animal feeds.

Also called as the lean meat powder, it can make the meat look pinker, misleading buyers that the pork they get from the market is fresh. "Residues of CLB that accumulate in animal tissues can affect human liver and heart functions and can even cause death to those who have consumed meat that is contaminated with clenbuterol," Porlaje and Arco explained.

As soon as the ClenSense device is calibrated, it can start analyzing samples. The device displays the voltage reading and the clenbuterol value. After three to five minutes, the readings in the device will stabilize and the user will be able to interpret the final reading.

To use the device again, the user only has to wash the electrode and the sample container and wipe them dry. After this, the device will be ready for another sample analysis.

The Meat Inspection Code of the Philippines and the Food Safety Act of 2013 gave authority to the National Meat Inspection Service (NMIS) to ensure meat quality and safety, and to monitor the use of banned drugs in livestock industry.

"There were incidents in China, Mexico, and France among others, that affected the public but none reported in the Philippines. However, the NMIS have tested pork samples tainted with clenbuterol," the researchers revealed.

"Although government agencies worldwide have banned its use for humans and livestock, illegal use of the drug is still occurring. Because of this, it is necessary to develop quick and accurate methods to detect clenbuterol," the researchers added.

They are now looking for business partners and government agencies to validate the current prototype in the field. They are also considering developing portable devices to detect other chemicals that need monitoring.

Porlaje is also fellow in the Leaders in Innovation Fellowship (LIF) Program which allows qualified Filipino researchers to attend classes in the Royal Academy of Engineering of the United Kingdom (UK), enjoy possible networking with international experts, and eventually move their technologies to commercialization. LIF is part of the Newton Agham Programme spearheaded by UK, the Department of Science and Technology, and the Commission on Higher Education.

Vaccine targets leptospirosis strains prevalent in PH

By Sheila Marie Anne J. de Luna, *DOST-STII*

Photo from pixabay.com

As a tropical country, the Philippines experiences at least 20 typhoons annually, not to mention other weather disturbances that cause various degrees of flooding in many low-lying areas.

Records show that numerous cases of leptospirosis are reported as aftermaths of typhoons, especially after heavy flooding. And though it exists worldwide, leptospirosis is said to be found most likely in tropical climates.

Leptospirosis, which is caused by specific types of the bacteria Leptospira, is an infection that can spread between animals and people. Though rats are the primary culprit, other domestic and wild animals may carry the disease as well including dogs, cattle, horses, and swine.

The disease is spread even further when the urine of these infected animals gets into water or soil where the bacteria can survive for weeks to months. Other animals and humans can become infected when they come in contact with the contaminated water or soil.

Transmission of leptospirosis in humans happen when the bacteria enters the body through cuts and abrasions of the skin, or through exposure of the mucous membranes of the eyes, nose and mouth with water contaminated with the urine of infected animals.

Targeting locally relevant strains

There are several strains of Leptospira that can cause the disease, which is important to consider when developing possible preventive action for leptospirosis.

A team of researchers from the University of the Philippines (UP) Manila-Technology Transfer and Business Development Office looked into targeting specific strains of the disease-causing bacteria that are prevalent in the Philippines, with potential application to neighboring Southeast Asian countries.

They came up with LeptoVax, a leptospirosis vaccine that is being developed by the UP Manila College of Public Health, in partnership with Kyushu University and Kake Educational Institution in Japan. By targeting specific strains of the disease, LeptoVax offers effective protection through specific action.

The development of the vaccine aims to fill the gap in Philippine-specific animal and human vaccination against leptospirosis.

LeptoVax would target susceptible animals that would give a layer of protection against the spread of the disease among humans. Aside from the animal vaccine, the vaccine for humans could target those who are more exposed to potential animal carriers like people working in agriculture and animal production industries.

Humans infected with the bacteria may show symptoms like fever, jaundice, kidney failure, and bleeding of the lungs, which may be life-threatening.

Researchers are now looking for partners for the continuous development of the vaccine, particularly for animal testing and the conduct of clinical trials.

LeptoVax's market potential

Research data show that in 2013, the cost per patient of leptospirosis treatment amounted to more than P20,000. Meanwhile, commercially available leptospirosis vaccines available in the Philippines for animal use are imported. Moreover, these imported leptospirosis vaccines target strains that may not be prevalent in the Philippines.

Moreover, recent reports show that the number of leptospirosis cases in the country has been increasing steadily with 1,085 reported cases from January to June 2018, which is already 35 percent higher than the number of cases reported from the same period in 2017. Leptospirosis outbreaks have also been declared by the Department of Health in in at least 28 barangays in July 2018.

Other than constant warnings not to wade in flood waters, to use protective clothing, and take antibiotic prophylaxis or antibiotics to prevent infection complication, the need for a standard protective action against the disease is still wanting.

Since there are still no available leptospirosis vaccines that are specifically targeted for the Philippine market, the development of a potential vaccine that can give animals and humans a certain layer of protection against leptospirosis is indeed a welcome development that can likewise improve the country's public health situation.

For more information on LeptoVax, contact Patricia S. San Jose at (02) 310-5727, or email at pssanjose@up.edu.ph.

DOST-PTRI develops mosquito-repellent textiles

By Rodolfo P. de Guzman, *DOST-STII*

Photo by Henry A. de Leon, DOST-STII

The threat of the dengue virus caused by the *Aedes aegypti* mosquito remains a big concern for communities both in the rural and urban areas across the country. The incidence of dengue cases continue to rise, with a record of 25 percent increase in Metro Manila as of the second quarter of 2018, according to the Department of Health (DOH).

Since the onset of the rainy season, the DOH has already recorded 7,200 cases of dengue in Metro Manila alone compared with about 5,800 cases for the same period last year. There was also substantial increase in dengue cases in the provinces particularly in the Ilocos Region and Cagayan Valley, as well as in Central Luzon, CALABARZON, MIMAROPA, Bicol, Western Visayas, and Northern Mindanao.

The key to curb this threat is prevention. Aside from maintaining a clean surrounding and getting rid of mosquito breeding grounds, it is important to have a means of protection when these mosquitoes attack.

While scientists and doctors are researching on effective vaccines against dengue, people should make use of preventive or precautionary measures such as the use of mosquito repellants.

The Department of Science and Technology-Philippine Textile Research Institute (DOST-PTRI) has developed mosquito repellent textiles that can be used as protection against dengue carrying mosquitoes. The DOST-PTRI dubbed this mosquito-repellent textile "Mosquito Re-Coil", a modern take on the traditional mosquito coil or "katol".

Based on research studies conducted by the group of Evangeline Flor P. Manalang, senior science research specialist from DOST-PTRI, commercially available topical repellents using essential oils as active ingredient last only for a few hours when applied on the skin. In some instances, these may even have harmful effects particularly to persons with sensitive skin.

With natural essential oils as the active ingredients, the application of controlled-release system on natural textiles through surface modification technology can provide protection from mosquitoes for up to six days per activation, according to the researchers.

One of the benefits of this technology is that it can easily be adopted by existing textile finishing mills because it requires machineries already existing in the mills. It is made from natural active ingredients and natural textile thus it is safe to be used and reused. It can be replenished with the active ingredient easily and provides longer protection against mosquitoes.

"With the development of mosquito-repellent finishing technologies, local finishing companies can adopt this technology to add functionality and premium to textile which in turn can be converted to various end uses that are of value to people," said Manalang.

As of writing, there are already three utility models that have been granted intellectual property rights valid up to 2022 by the Intellectual Property Office of the Philippines, and there are still ongoing field testings.

The technology can also be converted or incorporated into various products not limited to things that can be worn like clothing items and other accessories made with textile materials. According to the researchers, the technology can also be applied to home textiles and other decorative items.

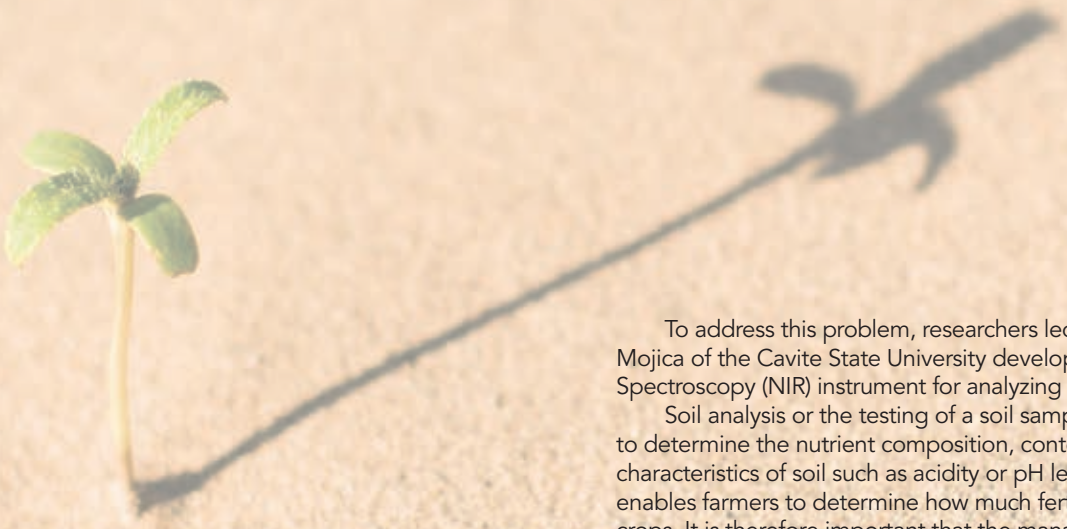
"We have developed prototypes of various textile products such as ID lanyards, patches, lamps, and home textiles where the mosquito-repellent technology can be applied. This way we can further extend its use to other products to maximize its benefits," Manalang said.

From the consumer's point of view, this innovation will ease the burden on pregnant women and families who have children because they will no longer worry that much because of added protection. This will also benefit those who love to travel and commune with nature because this "smart textile" will provide practical protection against mosquitoes and mosquito-borne diseases when they are camping out or trekking up the mountains.

The Mosquito Re-Coil was presented recently during the Leaders in Innovation Fellowship (LIF) Demo Day. LIF is under the Newton Agham Programme, a collaboration between the United Kingdom and Philippine governments to promote science, research, and innovation. The LIF program is delivered by the Royal Academy of Engineering in partnership with the DOST and the Asian Institute of Management.

Problem soil, problem solved

By Allyana A. Almonte, *DOST-STII*



In our homes, we treat our plants with an extra TLC or tender loving care through touch, light and sometimes, conversation. Yet, there are still some plants that refuse to grow or be abundant.

Most folks would suggest to cut them down to the roots to get rid of the problem before they become contagious to other plants. But after taking out that problematic plant and replacing it with another, the new plant would not flower or bear fruit as well.

What we often miss out is the possible root of the problem—the soil we use for planting.

Addressing low farm productivity

The lack of information and knowledge on different soil properties can impact the cost of farm inputs, which often results to low farm productivity.

This lack of knowledge, limited information or none at all can be attributed as root causes as to why Filipino farmers remain to be the poorest among the poor.

To address this problem, researchers led by Professor Ruel M. Mojica of the Cavite State University developed the Near Infrared Spectroscopy (NIR) instrument for analyzing soil properties.

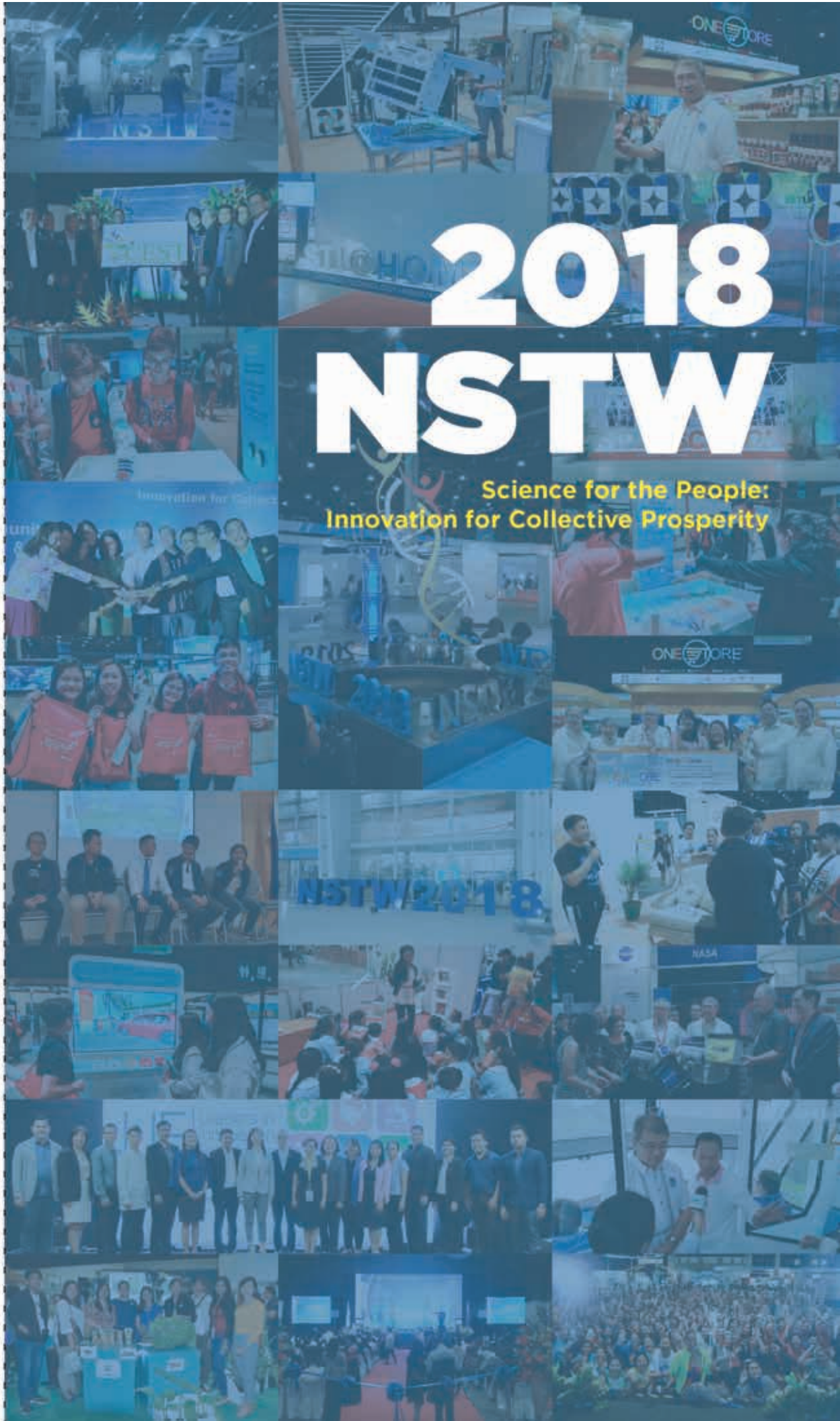
Soil analysis or the testing of a soil sample is important to determine the nutrient composition, content and other characteristics of soil such as acidity or pH level. Soil testing also enables farmers to determine how much fertilizer to apply to their crops. It is therefore important that the management of soil fertility levels become one of the top priorities in any farm.

The NIR instrument offers convenience to soil analyzers because it can measure the combined NPK (nitrogen, phosphorus and potassium), moisture, and pH content of the soil all at the same time and within seconds.

The NIR team is currently developing the final prototype of the equipment and is also looking for additional fund support to develop the technology further. In addition, researchers said that potential licensees are most welcome to commercialize the product.

The team has also readied the draft of the intellectual property that has been filed to the Intellectual Property Office of the Philippines through the support of the Department of Science and Technology-Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development.

Aside from the NIR, the researchers also offer training and consultancy services to help enrich the minds of farmers on soil and bean properties.



2018 National Science and Technology Week

2018 NSTW STATS

Here is a short list of interesting facts and figures from the **2018 National Science and Technology Week**.

26,932
Total attendees

11,983
Walk-in attendees

14,949
Online registrants

20	Diplomatic corps
238	Exhibitors
124	Media
4,295	Government
1,991	NGO/Private sector
19,017	Academe/Students
1,247	Others

180+
Products/Programs/ Technologies featured

30+
Events/Activities[1] held in various areas

P1.6M
Worth of products[2] sold by the OneStore Hub

15k+
Users[3] of the NSTW website

11,300
Square meters of exhibit space

60+
Participating DOST agencies/exhibitors

1,406,341
Total FB Organic Reach[4]

357 %
Increase in page likes[5]

27
Viral posts (10k+ reach)

177
Facebook posts

207k
Highest organic reach

[1] including pre-NSTW events
[2] products of DOST's Small Enterprises Technology Upgrading Program (SETUP) adoptors
[3] 139% higher than the previous year
[4] data taken from the NSTW Facebook page: www.facebook.com/2018nstw
[5] comparison of data on the number of Facebook likes at the end of each month of the NSTW celebration

science for the people 2018

2018 National Science and Technology Week

President Rodrigo Duterte at the launch of the 2018 National Science and Technology Week in Davao. (Photo by Henry A. de Leon, DOST-STII)

NSTW highlights innovation for collective prosperity

By Sheila Marie Anne J. de Luna, *DOST-STII*

"Innovate now or perish!"

These were the exact words uttered by President Rodrigo Duterte at the launch of the National Science and Technology Week (NSTW) in Davao in July this year, to highlight the importance of innovation in the country's development.

It may sound harsh to some, but in reality the most developed nations have indeed benefited from innovations in many ways than one. And the current administration is bullish of the country's prospects of collective prosperity and progress with the help of advancements in science, technology and innovation (STI).

In fact, there is a chapter on vigorously advancing STI in the Philippine Development Plan for 2017-2022. To promote science, technology, and the creative arts to enhance innovative capacity towards inclusive growth is one of the President's 0-10 point agenda. This is particularly shown in agenda item 3 on increasing competitiveness; agenda item 5 on promoting rural and value chain development towards increasing agricultural and rural enterprise productivity; agenda item 7 on investing in human capital development; and agenda item 8 in promoting science, technology and the creative arts to enhance innovation and creative capacity toward self-sustaining and inclusive development.

The NSTW theme, "Science for the People: Innovation for Collective Prosperity," was actually anchored on the administration's emphasis on the "three I's"— infrastructure, interconnectivity, and innovation.

In a message read by Department of Trade and Industry Secretary Ramon M. Lopez during the NSTW opening ceremonies, President Duterte emphasized the various steps that his administration is taking towards the promotion of collective prosperity through international cooperation agreements in the fields of STI, as well as multilateral collaborations with international agencies.

"My administration is fully committed to enhance bilateral and multilateral collaborations to strengthen international STI. We will continue to build strategic partnership with foreign counterparts to enhance the capacity of our S&T experts in cutting edge technologies," said the President.

He also reiterated the current administration's support to DOST as manifested through his signing of the Balik Scientist Act of 2018 and the incremental increase in the 2018 DOST budget in support of the agency's many programs including scholarships, development of S&T programs in the region, the Small Enterprises Technology Upgrading Program or SETUP, among others.

The President likewise commended the DOST for showing its dedication to its tagline or motto "Science for the People."

"You are not only bringing science, technology and innovation closer to the people, but you have also been delivering timely, efficient and effective means to promote innovation and inclusive growth especially in the regions," said President Duterte.

On his part, DOST Secretary Fortunato T. de la Peña highlighted the many programs that the DOST has undertaken and is continuously doing to promote science for the people and collective prosperity.

During the opening ceremonies, the Secretary presented the accomplishments of the Department in various areas including health, human resource development, technology transfer, among others.

STI showcased through exhibits

The 2018 NSTW highlighted how STI play a major part in achieving the nation's sustainable development goals. With an exhibit area that simulated an ecosystem of how STI work together for the progress of a community, technologies and products developed by various agencies under the DOST were showcased to emphasize how these technologies and innovation can bring the country towards the attainment of collective prosperity.

Technologies developed by the DOST and its attached agencies were shown via interactive displays in the four exhibit clusters namely: STI at Home, STI at School, STI at Workplace, and STI at Marketplace.

Aside from the main exhibit, various forums were conducted by DOST attached agencies, which include a forum on SETUP and the Community Empowerment through Science and Technology program.

Meanwhile, the OneStore exhibit showcased products from all over the regions that were assisted through SETUP.

There were also various activities that include film showing, scientific career talks, and science journalism writeshop, among others.

The 2018 NSTW was held from 17-21 July at the World Trade Center in Pasay City.

The NSTW is celebrated every third week of July through Proclamation No. 169 of 1993. It aims to recognize the contribution of science and technology in the development of the country and garner support from the public and private institutions for its sustainable development.

One of the exhibitors during the 2018 NSTW showcases his technology to (L-R) DTI Secretary Ramon M. Lopez, DOST Undersecretary for Research and Development Rowena Cristina L. Guevara, DOST Secretary Fortunato T. de la Peña, and DOST Undersecretary for S&T Services Carol M. Yorobe. (Photo by Gerardo G. Palad, DOST-STII)

DOST-STII staff demonstrates the use of the Philippine Journal of Science app to high school students. (Photo by Kimverlyn C. Sayson, DOST-STII)

DOST Secretary Fortunato T. de la Peña, DTI Secretary Ramon M. Lopez, DOST Undersecretary for S&T Services Carol M. Yorobe and DOST Undersecretary for Research and Development Rowena Cristina L. Guevara view the scale model of the Hybrid Electric Train. (Photo by Gerardo G. Palad, DOST-STII)

Children from different schools listen to a storytelling during the 2018 NSTW. (Photo by Kimverlyn C. Sayson, DOST-STII)

Participants of the zumba session pose after the activity. (Photo by Henry A. de Leon, DOST-STII)

Robotic arm prototype to aid stroke patient's rehab

By Allan Mauro V. Marfal, *DOST-STII*

There are certain parts of the brain of stroke patients that will not be able to control the muscles of their upper extremities, especially the arms and hands. Physical therapy could aid in performing repetitive and task-oriented exercises to rewire the pathways of the brain and regain control of their muscles.

Hoping to offer innovative and cost-effective ways during the rehabilitation process, a group of biomedical engineers from the De La Salle University (DLSU) and rehabilitation experts from the University of the Philippines-Philippine General Hospital are currently working together in developing robotic exoskeleton prototypes that can assist motor movements in the shoulders, arms, and hands of post-stroke and injured patients.

Called the "Agapay Project" and funded by the Department of Science and Technology-Philippine Council for Health Research and Development, the project aims to produce biometric wearable design of a robotic exoskeleton arm that can assist post-stroke and injured patients in performing physical and occupational therapy exercises.

"This research and development project centers on giving advanced treatment and rehabilitation process that could speed up the recovery of stroke and injured patients," said Dr. Nilo T. Bugtal, professor from DLSU and lead researcher for the Agapay Project.

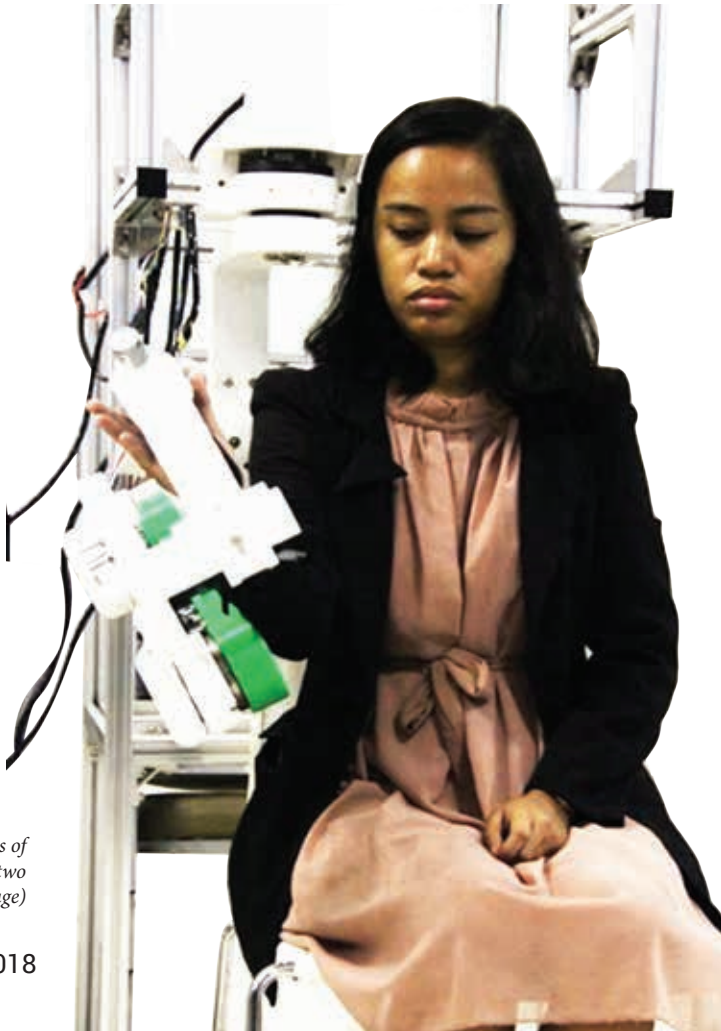
The robotic exoskeleton arm device developed under the Agapay project is actuated using high-power servo motors attached to an adjustable and lightweight frame. It has a 12-degree of freedom system that accounts for shoulder, elbow, wrist, and finger movements.

"It can perform active and passive motion exercises through gamification techniques using integrated haptics and a graphical user interface. Under this [Agapay] project, we are eyeing to offer innovative method for upper limb rehabilitation therapy for the Filipinos that could lead to a faster recovery," Dr. Bugtal said.

Gamification refers to the application of game elements and principles while haptics is the science of applying touch sensation and control.

The Agapay Project is currently conducting safety testing, pre-clinical trials, and ethics review courtesy of the Food and Drug Administration. After this, it will move forward with clinical trials and manufacturing.

Department of Science and Technology Secretary Fortunato T. de la Peña explores the different features of the prototype robotic exoskeleton arm developed under the "Agapay Project" during the 2018 National Science and Technology Week celebration at the World Trade Center in Pasay City. (Photo from Agapay Project Facebook page)



Robotic exoskeleton arm prototype, as demonstrated to the audience, goes through the motions of mobility in seven different degrees: three movements for the shoulder, two for the elbow, and two movements for the wrist. (Photo from Agapay Project Facebook page)

Dr. Steve Graham sparks students' interests with his lecture on NASA's earth-observation system.

NASA scientists pose with DOST-Science and Technology Information Institute Director Richard P. Burgos (second from the left) and Sec. Fortunato T. de la Peña (second from right) at their booth in the 2018 NSTW.

Florence Tan engages in a panel discussion about space technologies.

DOST brings NASA in S&T week celebration

By Louie Aldrin M. Intalan, *DOST-ITCU*
Photos from DOST-ITCU

Six scientists from the United States (US) National Aeronautics and Space Administration (NASA) arrived in Manila to set up their first-ever exhibit in the country during the National Science and Technology Week (NSTW) held on 17-21 July 2018 at the World Trade Center in Pasay City.

NASA is the US civilian space agency responsible for some of the breakthrough achievements in space exploration including the first man to land on the moon, flight missions to Mars and Jupiter, and sending astronauts to live outside of Earth at the International Space Station.

Thousands of Filipino students and teachers flocked to the NASA booth to hear about its latest earth and space missions. They also took the opportunity to ask the NASA experts what it is like to work at the space agency, prompting for tips to get in.

The NASA exhibit at the NSTW featured CAMP2EX— Cloud, Aerosol and Monsoon Processes Philippines Experiment—a joint project between NASA, Manila Observatory, and the Department of Science and Technology-Philippine Atmospheric, Geophysical and Astronomical Services Administration.

CAMP2EX is a climate study of the Philippine archipelago and will explore how aerosol particles from land use and urban activities may influence weather formation in tropical environments. NASA scientist and program manager of CAMP2EX, Dr. Hal Maring, extended his visit beyond the NSTW to provide lectures on climate modeling to more than 200 Philippine science, technology, engineering and mathematics teachers in Subic Bay.

On 20 July, NASA Deputy Chief Technologist Florence Tan also joined a panel discussion with Filipino scientists, academics, and government officials about space technologies and innovations. Her first-hand involvement in the Mars mission as well as her expert knowledge on space debris was insightful to the audience. She went on inspiring students with her unique story as an immigrant Asian woman who pursued her studies and rose from the ranks at NASA.

NASA was invited to the NSTW by DOST Secretary Fortunato T. de la Peña during a courtesy meeting to highlight the Department's international collaborations.

The coffee berry borer is known as one of, if not the most, damaging insects to coffee. Research shows that this pest can cause about 30 percent harvest loss. Farmers can use the SPId Tech to properly identify this insect and know the mitigation steps. (Screenshot from SPId Tech app available for Android phones)

Photo from Project Sarai

Smart approaches for smarter agriculture

By David Matthew C. Gopilan, *DOST-STII*

The celebration of the National Science and Technology Week or NSTW of the Department of Science and Technology (DOST) has the agriculture sector abuzz with smart approaches for a smarter way of farming.

In a NSTW-related forum held at the World Trade Center on 19 July 2018, two researchers from the University of the Philippines Los Baños (UPLB) discussed two technologies that would provide decision support system for farmers through crop advisory and management, as well as weather forecast, among others.

The technologies are part of the "Smarter Approaches to Reinvigorate Agriculture as an Industry in the Philippines" program or SARAI, a project funded by DOST-Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development.

"Our farmers are at the forefront of our fight against climate change, and they are the most vulnerable. If this is the case, we need to pour away resources to these technologies for them," said Prof. Moises A. Dorado, project leader of SEAMS.

Crops monitoring from the sky

SEAMS, spelled out as SARAI-Enhanced Agricultural Monitoring System, uses satellite images to monitor and give near real-time updates of rice and corn fields. Through this, farmers can assess the vulnerability of their crops, observe weather conditions even in places without any weather stations, identify possible breeding grounds of pests, and see land use change.

"What we want to do is to guide the farmer with advanced technologies that we have," explained Prof. Dorado who is from UPLB's Institute of Agricultural Engineering. He added that

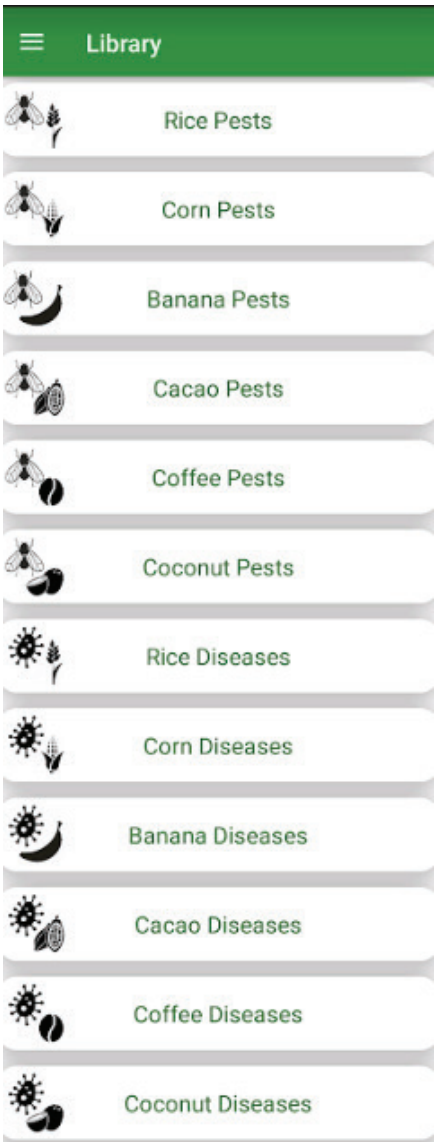
satellite remote sensing is the most feasible technology, and the images generated by more than 200 satellites already in outer space are freely available. Every crop has a specific spectral signature, thus the satellite system would know if the field is planted with rice or corn, for example.

SEAMS can also give site specific advisories and information to farmers about the most suitable crop for a particular soil. Farmers can also refer to SEAMS if they decide to plant another crop or replace their crop with a drought-resistant variety in the next planting season.

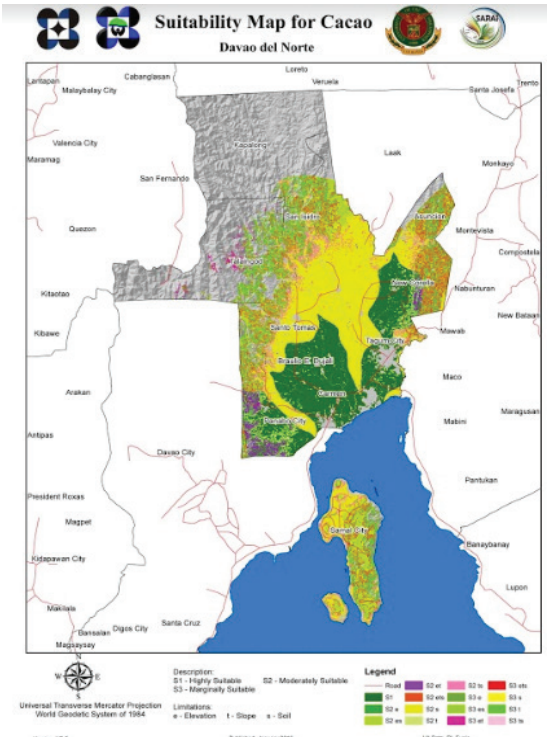
Prof. Dorado further explained that their team sends real-time or even ahead-of-time information like weather forecast to the farmers through radio or text, among other means.

"This ability to provide farmers with real-time or ahead-of-time information is what we want to happen especially when we talk about climate change. We need to be prepared," he added.

He also noted that it is not enough to know when the temperature will rise or whether the rainfall will be stronger. "We need to know how much, how many degrees [will the rise in temperature be]? How many millimeters of rainfall will come?"



Screenshot of the SARAI Application.



Suitability map generated from Project SARAI was able show four towns in Davao del Norte that have conditions highly suitable for planting cacao. (Screenshot from Project SARAI)

Mobile app-based agri library

Meanwhile, the Smarter Pest Identification Technology (SPId Tech) gives farmers a quick, accessible, and accurate pest and disease identification of major crops like banana, cacao, rice, corn, coconut, and coffee. Not only that, the technology gives suitable methods to control such pests. It can be downloaded in Android phones and is available in both English and Filipino.

With SPId Tech, farmers can identify pests and diseases and learn ways to manage them. This can be done in two ways. The first one is through the pest and disease library wherein farmers can browse database about crop pests and diseases and learn about their names, both common and scientific, as well as their physical characteristics.

The second one is by pest and disease identification and it requires farmers' participation. A farmer will take a photo of the pest and upload it in the application, or answer a series of questions. It uses machine learning and image processing.

A total of 62 pests and 36 diseases are already available for rice, corn, banana, coconut, coffee, and cacao. "We focused on these crops first as they are the most common and there are too many pests and diseases for vegetables," said Mr. Melvin D. Ebuenga, head of the pest and diseases component of Project SARAI, who is also a university researcher at UPLB's National Crop Protection Center.

SEAMS and SPId Tech are two of the five-component projects of the SARAI program. The other three projects are the (1) cost-efficient soil moisture sensors and meters, (2) Automatic Weather Station and Unmanned Aerial Vehicle, and the (3) SARAI Knowledge Portal. All of these aim to equip farmers with state-of-the-art tools in dealing with climate change. All information that will be generated in the SARAI program are in the website sarai.ph.

DOST-TAPI frontlines startups in biz forum

Text and photos by Rodolfo P. de Guzman, *DOST-STII*

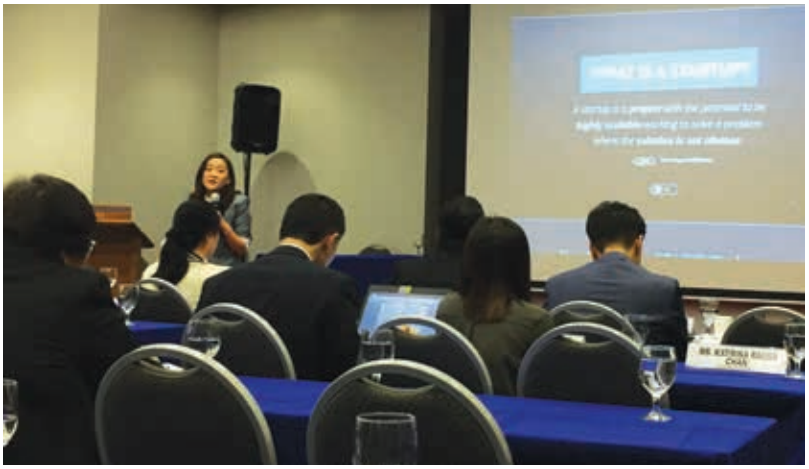
With the growing number of startup businesses in various fields particularly in the information and communications technology sector, assistance in terms of technical and financial support is highly important for them to become successful.

However, mainstream financial institutions and organizations have very limited support for startup businesses.

Stepping in to fill the gap is the Department of Science and Technology-Technology Application and Promotion Institute (DOST-TAPI) that gives support to startup businesses to complement the Department's technology business incubation program.

During the recent celebration of the National Science and Technology Week on17-21 July 2018 at the World Trade Center, DOST-TAPI hosted the "Regional Forum on Strategies to Enhance Innovation and Management Capacities of Startups and SMEs" in partnership with the Asian and Pacific Centre for Transfer of Technology (APCTT) and the United Nations Economic and Social Commission for Asia and the Pacific.

Dr. Shigehiro Shinozaki, financial Sector Specialist from the Asian Development Bank, shares his insights on financing models for small and medium enterprises.



QBO Innovation Hub Director Katrina Rausa Chan explains the concept of QBO in assisting startup businesses in the Philippines.

DOST-TAPI Director Engr. Edgar I. Garcia said that the institute fully supports startup businesses by providing them with technical and financial assistance up to application for patents and intellectual property rights. He further said that recently, DOST-TAPI partnered with the Land Bank of the Philippines (LBP) to help local inventors and innovators avail of low interest loans under the I-Tech Lending Program as part of the Inventor's Guarantee Fund.

In this collaboration, DOST-TAPI evaluates startups on the viability of their business ventures or the commercial value of their inventions and endorses them to the LBP for financing at low interest rates.

Taking the extra mile in support of startups, the DOST through the DOST-Philippine Council for Industry, Energy, and Emerging Technology Research and Development collaborated with QBO Innovation Hub, a local company that promotes innovation and technopreneurship in the country.

"The DOST supports startups like us when we set up QBO (which stands for *kubo*, short for *bahay kubo* or nipa hut). QBO serves as a technology business incubation hub for people to get together and brainstorm ideas similar to startups in Silicon Valley," said Katrina Rausa Chan, director at QBO and one of the speakers during the DOST-TAPI forum.

Looking beyond local boundaries, DOST-TAPI also tapped foreign speakers during the forum to talk on strategies for small and medium enterprises (SMEs) and share their expertise in assisting startups in the ASEAN region with similar concerns.

Dr. Shigehiro Shinozaki, financial sector specialist from the Asian Development Bank, shared his insights on innovation and technology by citing the importance of SMEs in stimulating domestic demand for jobs, competition, and products. He also underscored the extent of expenditures of SMEs in research and development particularly in Indonesia, Malaysia, Thailand, and the Philippines.

"It is important to support the startups because business opportunities for tech-based SMEs are increasing and due to limited access to bank credit there is slow growth of SMEs," added Shinozaki.

According to DOST-TAPI, the regional forum was successful in providing an appropriate platform for policy makers and senior representatives from key government agencies, research and development institutions, financial institutions, universities, and SMEs particularly in the ASEAN region to exchange ideas on different strategies for SMEs. Likewise the forum enabled the participants to discuss new and emerging policy frameworks and tools, institutional/infrastructural support systems, national/regional collaboration networks and platforms, and innovative financing models.

Lastly, the APCTT was able to share its regional experience in fostering the innovation ecosystem, regional cooperation, as well as knowledge networks for promoting technology-based startups and SMEs that will greatly help DOST-TAPI in implementing its various programs in support of local SMEs, startups, and inventors.

In touch with excellence

By Geraldine B. Ducusin, *DOST-STII*
Photos by Gerardo G. Palad, *DOST-STII*

Dr. Josette T. Biyo challenges the scholars to serve the country after studying abroad.

The good news is that more Filipina youths are getting interested in the sciences, judging from the 60 percent of scholarship applicants being females. However, only 40 percent of the scholarship passers are females, while 60 percent are males.

"In almost all subject areas, there are more males," said Dr. Josette T. Biyo, Director of the Department of Science and Technology-Science Education Institute (DOST-SEI).

The other good news is that from the P5,000 monthly allowance, the scholarship monthly stipend increased to P7,000, with the government doubling the budget allocation for the scholarship program.

"We are not a financial granting institution. We help deeper. We understand that the number one cause of poor performance is family problem. And the gifted are the most sensitive," said Dr. Biyo who explained what they have been doing to address some problems of the scholars.

She added that they have also adjusted their policies to address the scholars' needs for assistance. The DOST-SEI, for instance, adopted some flexibility for scholars having difficulty in coping academically. In the past, if scholars get two failed marks, they were out of the program.

"Mas niluwagan ang policy," she said while discussing some of the measures that DOST-SEI has adopted to help scholars cope. Now they just withhold the allowance and give it back to the scholars once they achieve the required grade.

According to DOST-SEI, 96 percent of the scholars were able to graduate at the undergraduate level. The DOST-SEI has also allotted 250 scholarship slots and waived examinations for those coming from Marawi. The Institute also allotted 10 PhD slots under the Human Resource Development Program.

During the recently held In Touch with Excellence, an awarding ceremony that recognizes the outstanding feat of DOST scholars, Dr. Biyo showed the gaps between classes, at how the children of those in the higher income brackets (classes A, B and C) already have a head start in life. But she said that despite this, the government can help provide equal opportunity by way of a scholarship program because through scholarships they can send Filipino children to schools abroad like the Massachusetts Institute of Technology.

But her plea to the scholars is that after they study abroad, they should come back and help those in the classes D and E of the economic strata.

Dr. Biyo emphasized to the scholars, "You are DOST scholars for life. Will you accept the challenge? The country needs you badly."

In Touch with Excellence speakers pose with the outstanding DOST scholars. (L-R, seated): Engr. Lorenzo A. Moron, Weather Specialist I, DOST-Philippine Atmospheric, Geophysical and Astronomical Services Administration; DOST Secretary Fortunato T. de La Peña; Dr. Josette T. Biyo, director, DOST-Science Education Institute (DOST-SEI); and Engr. Albert G. Mariño, Director III and OIC of the S&T Scholarship Division, DOST-SEI.

Communicating health risk a challenge, science journalist says

By Angelica O. Paz, *DOST-STII*
Photos by Kimverlyn C. Sayson, *DOST-STII*

Communicating science to Filipinos remains a challenge. Popularizing information on science, technology and innovation needs a certain kind of skill in order to raise public awareness, especially on issues surrounding health.

Health issues and risks are very difficult to communicate to Filipinos said Ruby Shaira F. Panela, a science journalist who regularly contributes articles for the Asian Scientist magazine and Rappler. In a writeshop entitled "#ScienceJournoAko: Communicating S&T Innovation", Panela emphasized how Filipinos remain skeptical when it comes to discussions on health.

"It is very difficult to communicate health related issues in the Philippines. It always becomes a problem inside the newsroom. Another factor is most Filipinos do not even read beyond the headlines, so it is important to be careful in writing headlines and captions so that we don't scare away the audience," Panela said.

She added that this challenge can be overcome through proper communication with editors. "You must have the same agenda with your editors. Your agenda should be to inform the people of what they need to know, and what they should do in case of these kinds of events. Your goal is not to scare them, but to inform them of the solutions," Panela explained.

On the other hand, innovations and technologies are not entirely problematic since they possess an element of wonder. "Communicating Filipino innovation is not necessarily the easiest but it is the most fun to do," Panela added.

Panela's talk revolved around "Writing Effective and Accurate Stories on S&T Innovation for Print and Social Media" wherein she discussed key techniques in science writing. She also elaborated the vital characteristics a science news should possess such as impact, proximity, timeliness, conflict, human interest, and prominence.

Moreover, she told the participants the importance of understanding the tone and voice of the article's message. "Voice is how a writer's personality is reflected through written words, while tone is the writer's attitude to the reader. You are speaking with the readers, not lecturing them," Panela said. Above all, she reiterated the significance of multiple editing and proofreading.

Meanwhile Henry A. de Leon, resident photojournalist of the Department of Science and Technology-Science and Technology Information Institute (DOST-STII), led the interactive session on photojournalism with emphasis on science journalism. He shared practical principles in photojournalism and how to apply them in the field, as well as the importance of accurate and well-written captions.

"The photo and the caption should complement each other. Together they should tell the story," de Leon shared.

The event also included a writeshop wherein the participants applied what they have learned from the resource speakers. To put their knowledge to the test, they were asked to write a science article on DOST technologies such as Itik Pinas, a genetically superior breeder duck, and the Hybrid Electric Train.

They were also given the option to write a social media post with an accompanying photo caption. Towards the end of the writeshop, Panela and de Leon critiqued selected outputs and gave pointers for improvement.

"What I learned from the writeshop are some important guidelines in writing science related articles. Furthermore, I learned from the speakers the responsibility of communicating innovations in science and technology particularly in the Philippine setting," said Joshua Michael Jonas, a participant from the University of the Philippines Los Baños.

After their writeshop experience, the participants said that they will highly recommend attending the science journalism workshop to their own circles of influence. "I will definitely encourage my college classmates to participate in the next #ScienceJournoAko event, because it is not very often that journalism writeshops focus on science communication," Jonas added.

The science journalism writeshop, organized by the DOST-STII, was held on 18 July 2018 at the World Trade Center, Pasay City as part of the celebration of the National Science and Technology Week. The event was attended primarily by students and teachers from Metro Manila and neighboring provinces.

One of the participants in the event drafts his article about the Hybrid Electric Train.

Ruby Shaira Panela gives a talk on effective science writing during the DOST-STII's science journalism writeshop.

Process of restoring Philippine Civet.

The complementing colors of **science and arts**

By Louella D. Labasbas, *DOST-STII*

For centuries, scientists and explorers were eager to explain how the very first life on earth looked like and evolved over time. At present, these ideas are confined in the pages of books, caged in glass at museums, and stored in the deep corners of the internet.

"All good science is art. All good art is science," said John Robert Fowles, an international English novelist who was known for his work The Collector, The French Lieutenant's Woman, and the Magus.

Science explains the existence of everything; art expresses its existence.

One of the most fortunate countries to have the best of both worlds is the Philippines. The Philippine archipelago is known for its rich biodiversity and culture, yet there are still a lot more in store for future explorations.

To feed curious minds, the Department of Science and Technology-National Research Council of the Philippines gave a glimpse on the fusion of arts and science in the country throughout the centuries. This interesting and learning-filled forum was held on 21 July 2018 during the celebration of the 2018 National Science and Technology Week at the World Trade Center in Pasay City.

Artifacts that lived ages ago

Advancements in the lives of the 21st century people are thought to be revolutionary and practical. Yet, whatever materials, equipment or technology that people are using now are products of what have been made in the past.

At the heart of Manila, the National Museum of Anthropology showcases archaeological heritage and artifacts of the earliest tribes in the Philippines.

The field of archaeology, which is known to study the human past, started in late 1800s by European explorers. Because of the rich lands of the Philippines, more explorers began to gain interest in traversing it.

In the early 20th century, American anthropologists explored the Philippines. Some of these notable American anthropologists include Carl Guthe, who surveyed Luzon and Palawan, and Henry Otley Beyer, also known as the Father of Philippine Anthropology and Archeology.

It was only in 1980s when Filipino archeologists began to make their own explorations. Five locations across the country were identified to have traces of archeological discoveries.

The oldest is found in Kalinga, Cagayan Valley from where artifacts of various animals were found that include the rhinoceros, the *Stegodon* from the family *Stegodontidae* where the elephant family also belong, the Philippine brown deer *(Rusa marianna)*, freshwater turtle, and monitor lizard. This location is also identified to have direct association of animal life and stone tools during the mid-Pleistocene era.

Second to the oldest of discovered artifacts was located in Tabon Cave, Palawan. Traces of robust and gracile (of slender build) *Homo sapiens* (the species to which human beings belong) showed mastery in using stone tools.

Meanwhile, Batanes and Northern Luzon were identified as the location for Neolithic Period where human migration in the Philippines initially occurred. Improvement in the tools used by earlier people, known as the Metal Age, occurred in Bacong, Negros Oriental. Lastly, artifacts from new *Homo sapiens* were recently discovered in Callao Cave in Cagayan.

Although further refinement in the chronology of Philippine prehistory is still needed to trace the actual culture—food, tools, technology, religion, and social organization—it is still worth mentioning that these artifacts serve as the backbone in knowing our past, ancestry, and cultural heritage.

These photos share the meticulous process of restoring marine species.

Photos taken from the presentation of Ms. Aissa M. Domingo, Artist Illustrator II , National Museum of Natural History

House of unimaginable things

Have you ever wondered how artifacts displayed in a museum are preserved to look exactly like they are in their original state? Each specimen or artifact displayed at the National Museum of Natural History seems alive because of the recreation of its living environment.

A process called taxidermy is performed to preserve the animal from its original state.

The specimens are intricately handcrafted and restored by a group of researchers and artisans in the museum in order to foster scholarly study and appreciation among students, researchers, professionals, and curious minds.

The challenge lies on how to bring art and taxidermy (science) together.

When restoring old specimens, a taxidermist takes into consideration the fact that most of the collected specimen are organic and deteriorate over time, especially the soft and hollow parts where smaller insects could be found. To display the specimen in its natural state, artisans use reference photos to study the anatomy and pose of the specimen. From there, they will employ standard procedures such as cleaning and checking for insects to ensure that the inside portion is clean and empty. The next step is reconstruction of the face and repainting.

Another challenge is how to bring back specimen to their lifelike state. For instance, the color of marine species like corals, sea urchins, and sea stars tend to fade their colors after death and preservation in formalin, so artisans take a photo first to document the actual color before they preserve the specimen. Other challenges when handling marine species for preservation include potential damages when transporting the specimens to the laboratory as it sometimes would cause thorns to bend or break. It is also extra challenging to remove of marine species meat from its hard parts and then putting them back again.

Last is fabricating an exact replica just like with "Lolong", the largest saltwater crocodile in captivity, which took two years to finish reconstruction. With Lolong, the artists carefully isolated its skin and used stuffing materials throughout its body.

So what is the point of going to all these troubles and doing all of these in order to preserve a specimen?

Artists mainly believe that art reveals life and beauty in science. They also believe that these specimen are important in raising awareness of the country's rich biodiversity, to show people the newly discovered species and the extinct ones, and to learn conservation of natural resources.

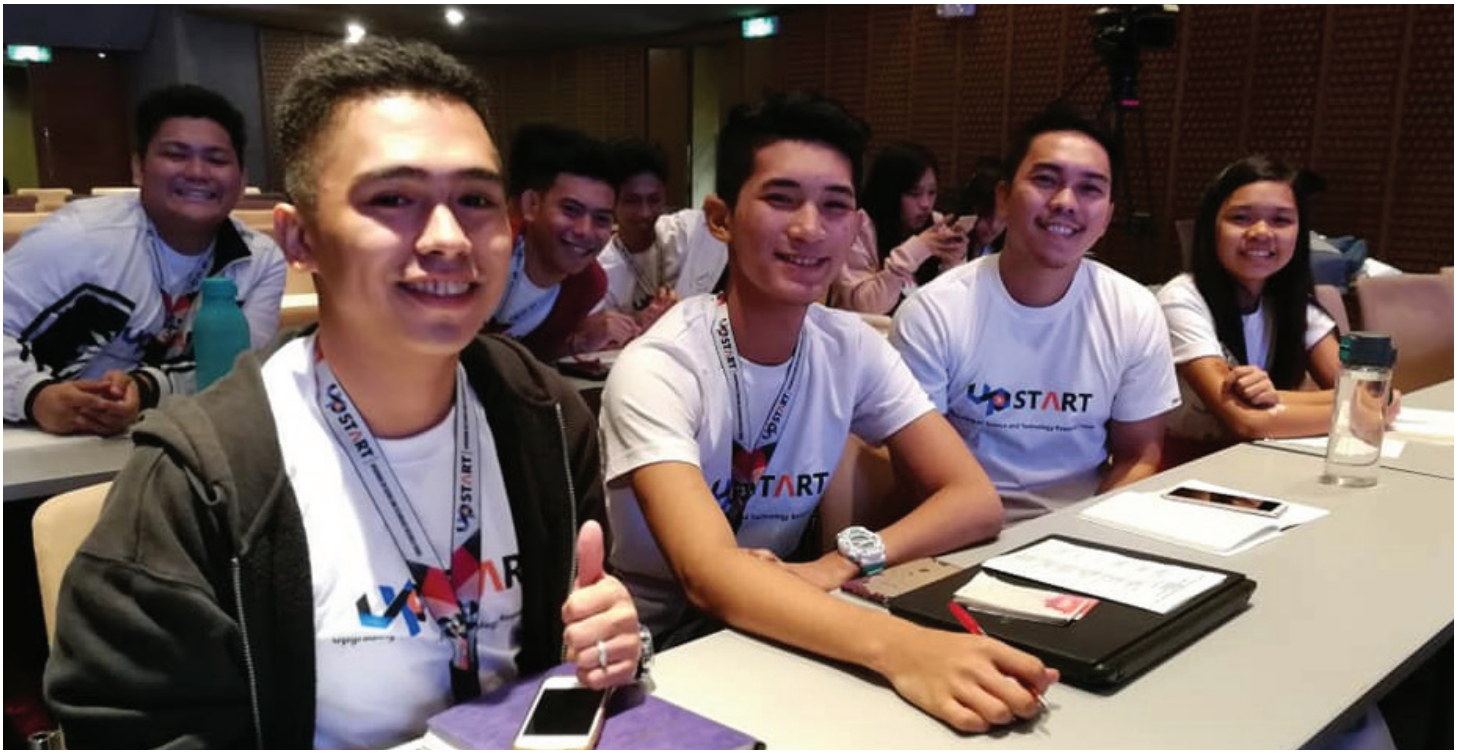
These artists also hope that the next time people visit a museum, they would be more appreciative of the beauty that is found inside what can be described as a house of unimaginable things.

Restored Lolong

Restored Philippine Macaque

Forum inspires students to pursue science-related courses

By Geraldine B. Ducusin, *DOST-STII*



Participants during the UPSTART forum. (Photo from DOST-SEI Facebook page)

"I really wanted to be a researcher, but I'm not sure if there'll be a job waiting for me, or if I will be able to feed my family if I pursue that career."

This comment by Hilary Anne M. Capistrano, a student of Pasay City National High School (PCNHS), basically sums up the thoughts of many other students who are wary of pursuing a career in research and taking up science-related courses in college.

To help inspire high school students to pursue a career in research or take up science-related courses in college, the Department of Science and Technology-Science Education Institute (DOST-SEI) conducted the Upgrading on Science and Technology Research Trends (UPSTART) forum at the Philippine International Convention Center.

UPSTART is a two-day event that aims to expose senior high school students in the science, technology, engineering, and mathematics (STEM) strand in Metro Manila to learn about current trends in scientific research and innovative practices that may help them with their science investigatory projects. During the event, the participants were also encouraged to apply for the DOST-SEI scholarship.

After hearing the speakers at UPSTART, Capistrano said that she had a change of heart about research. "The speakers inspired me to really get into it. They gave me an idea that there are a lot of possibilities if one pursues research. I especially liked the patriotism part, of studying abroad and going back to serve the country," she said.

Camille Anne L. Valdez, another student of PNHS said, "I wanted to pursue medicine, but the only thing I only know is the broad topic of biology. Today here at UPSTART, I was introduced to the other branches of sciences and I learned that they can be useful too. I'm also glad that DOST offers scholarships that will give us opportunities."

Academician Rhodora V. Azanza, president of the DOST-National Academy of Science and Technology said that the country needs more people to get into the science, mathematics, engineering courses, and to do research and development (R&D).

"R&D budget actually increased from .01% of the country's Gross Domestic Product (GDP) to .1% of the GDP. The budget is bigger now than before, but what we need are people," said Azanza.

She cited that in the 2017-2018 Global Competitiveness Index where there are sub-indexes (basic, efficiency, innovation, and sophistication) by which the country's competitiveness is measured, a country has to be competitive in basic measure first before it can be efficient, and eventually be capable enough to innovate.

Health and primary education are basic, to which the Philippines ranked 82nd among 137 countries. In terms of higher

education and training which measures efficiency, the country ranked 55th and in terms of innovation, it ranked 65th.

"If you are not well-prepared (or) well-trained, you cannot innovate," said Azanza, who said that a country's R&D output, specifically publication, compared with its neighboring countries, signals its development.

The Philippines ranked lower at 67th than Indonesia (62nd) and Vietnam (59th) in the area of research output because the few researchers that we have hardly publish. But the good news is that when it comes to the number of top 10 percent paper ranking, the country ranked 59th, Indonesia ranked 63rd, and Vietnam ranked 67th. Thus, despite the small number of researchers in the Philippines, the country was able to produce good quality researches.

Azanza added that science mindedness is not common in the Philippines, because if it is, no parent would allow a child to bathe in flood waters, risking leptospiroris, she said. She also encouraged UPSTART participants to be passionate for excellence and to raise the bar of excellence as an individual and as an institution. "Love your science. Love your country," she said.

The other speakers who inspired the participants of UPSTART were Dr. Cynthia Saloma, director of the National Institute of Molecular Biology and Biotechnology at the University of the Philippines (UP) Diliman who discussed about the current trends in STEM; Dr. Nathaniel Hermosa II, program coordinator of Photonics Research Laboratory of UP Diliman; Dr. Nestor Tiglao of the UP College of Engineering who discussed the current trends in STEM Engineering; Dr.Aletta T. Yñiguez, associate professor at the UP Marine Science Institute; Dr. Rogel Mari Sese, president of Regulus Spacetech Incorporated; Engr. John Kenneth Cruz, instructor at the UP Diliman Department for Mining, Metallurgical, and Materials Engineering ; Dr. Richard Lemence, associate professor at the UP Institute of Mathematics; and Dr. Edmund Centeno of the UP Los Baños College of Development Communication.

Teacher Johann Shaira S. Malicana (left) has been teaching research for three years now at the Pasay City National High School. She accompanied her students Hilary Anne M. Capistrano (center) and Camille Anne L. Valdez (right) to attend the UPSTART forum. (Photo by Geraldine B. Ducusin, DOST-STII)

When blue turns red: The sea is blooming

By Louella D. Labasbas, *DOST-STII*

It is beautiful when flowers bloom, but it's a different picture when we talk about algal blooms. Algal bloom is a natural activity in the marine ecosystem. To some extent, it poses a negative threat due to excessive occurrence. In celebration of the National Science and Technology Week (NSTW), the Department of Science and Technology (DOST)- Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development conducted a forum centered on the extensive emergence of algal blooms in the Philippines.

The ecology of life under water

Marine ecology is considered to be one of the richest ecosystems in the planet. It comprises different organisms such as microorganisms, zooplankton, phytoplankton, sea grass, and small and huge fishes.

Scientifically, algal bloom is described as a rapid increase in the population of algae in an aquatic environment like a marine ecosystem. It is a result of a higher concentration of nutrients in water particularly nitrogen and phosphorus. Contrary to what people know about algal bloom or more commonly known as "red tide," it is not always red. It may also be observed in green, blue-green, or brown depending on the dominating algal species.

What happens underneath during bloom is favorable to algae, aquatic plants, and most especially to bacteria. There is more food and dissolved oxygen for them to consume. Meanwhile, bigger organisms such as fishes and aquatic insects are unable to survive because the smaller creatures use up all the dissolved oxygen and turn it into carbon dioxide, leaving the bigger ones with no more oxygen to breathe.

Boracay algae (Photo by Rappler)

Dr. Rhodora V. Azanza explains the algal bloom phenomenon in the Philippines including the causative species and its origin. (Photo by Kimverlyn C. Sayson, DOST-STII)

Bad soldiers of the blue sea

Red tide in the past decade has become a national threat particularly to those who consume a lot of seafood and those who dwell near the seashore. Residents from the coastal areas are more likely to eat seafood that is contaminated with toxic producing algae that may cause gastrointestinal illness or food poisoning. Aside from red tide's effect on people's health, the aquaculture industry is affected as well due to massive mortalities in marine wildlife.

But this misconception about red tide was corrected by Dr. Rhodora V. Azanza, president of the DOST-National Academy of Science and Technology and a professor emeritus from the University of the Philippines.

"Not all red tides are harmful," said Dr. Azanza. "[This is] because if you have a density of microalgae, they become food for other organisms."

Commonly coined as toxic algal bloom, harmful algal blooms or HABs refer to organisms – dinoflagellates,

cyanobacteria, diatom, and other phytoplankton – that alter the ecosystem and are capable of imposing threat to other marine organisms even without the discoloration of the sea.

Some of the common diseases caused by HABs include paralytic shellfish poisoning (PSP), diarrhetic shellfish poisoning, and neurotoxic shellfish poisoning. PSP is caused by the dominance of a certain salt-tolerant dinoflagellate (*Pyrodinium bahamense var. compressum*), a microalgae (*Gymnodinium catenatum*), and several species of dinoflagellate (*Alexandrium spp.*). These species are capable of producing saxitoxin, a potent neurotoxin that is responsible for the illness known as paralytic shellfish poisoning.

"Saxitoxin has been declared as a biochemical weapon, as it can kill in seconds," said Dr. Azanza.

Threats in Philippine marine life and quest for mitigation

The Ciguatera Fish Poisoning (CFP) targets big reef fishes and it was first experienced in the Philippines on 16 September 2014. The incident happened in Zamboanga City where 18 individuals were reported to experience CFP after eating barracuda (Sphyraena sp.)

Another incident of extensive bloom occurred in 2005 known as *Cochlodinium polykrikoides* bloom. *C. polykroides* is a species of red tide producing dinoflagellate known to cause fish kills worldwide. It also resulted in mass mortality of several reef fishes in Northwestern Palawan.

To know the determinant of fish kill in the northwestern area of Palawan, a study was initiated by Dr. Azanza and her colleagues from the UP Marine Science Institute.

"The interface in the discoloration of water indicates that it [red tide] came from an outside source," said Dr. Azanza as she pointed out the six different sample sites starting from southwestern part all the way up to northwestern part of Palawan where they conducted the experiment.

"We strongly believe that the recent algal bloom that occurred in the Philippines came from Malaysia and we have empirical evidence [to prove it]," she added.

A work in progress to "un-red" the sea

In a study titled "Detection and Mitigation Technology and Early Warning System for Harmful Algal Bloom developed in the Philippines," Dr. Azanza revealed that near real-time monitoring using operational predictive system is necessary to locate the seeds of cysts, which eventually grow into bloom, and control their number.

Aside from monitoring algal bloom using sensors, Dr. Azanza is also looking forward to monitoring a more important concern-- the toxicity in blooms.

"We are also developing a technology tool that would identify the toxin even at a very low level, and this will be called bio-toxin absorption shocking technique," she revealed.

Furthermore, she mentioned that the most important element to mitigate this environmental concern is to have a systematic collaboration with the community on what to do during red tide season.

"Magkakaroon lang ng risk if there are people who are not well-informed, pati na rin risks sa ibang aquatic organisms (There will be risk if there are people who are not well-informed, as well as risks to other aquatic organisms)," Dr. Azanza explained.

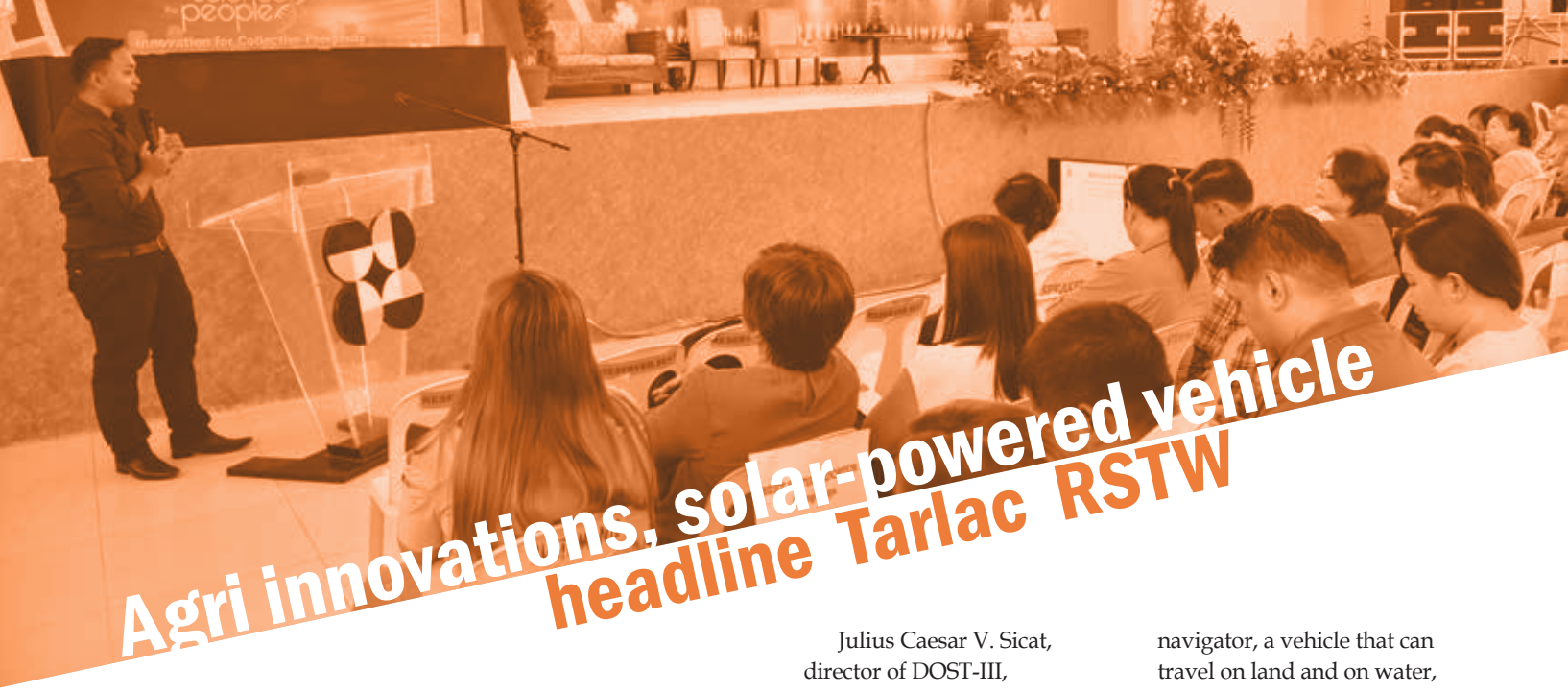
Learning is a continuous process and as for Dr. Azanza, her campaign to disseminate accurate information about algal bloom does not stop in forums and scientific talks.

Recently, she launched her own coffee table book "When the Blue Sea Turns Red" some copies of which were distributed to participants from different state universities and colleges, government and private institutions who attended the forum during the NSTW 2018.

Launching of Dr. Azanza's coffee table book titled When the Sea Turns Red during the National Science and Technology Week 2018. (Photo by Kimverlyn C. Sayson, DOST-STII)

2018 Regional Science & Technology Week

The Regional Science and Technology Week (RSTW) celebrations showcase local innovations developed by local experts for Filipinos. Through RSTWs, people outside Metro Manila will have an experience of science and technology in familiar places such as homes, schools, and workplaces. This is the Department of Science and Technology's way of bringing science to the people.



Agri innovations, solar-powered vehicle headline Tarlac RSTW

By Jasmin Joyce P. Sevilla, *DOST-STII*
Photos by Gerardo G. Palad, *DOST-STII*

It was indeed a big celebration for the province of Tarlac as it carries the banner of Central Luzon with its hosting of the Regional Science and Technology Week (RSTW) for the first time.

Spearheaded by the Provincial Science and Technology Center of Tarlac and held on 1-3 August 2018, the RSTW celebration showcased a lineup of science, technology, and innovation (STI) exhibits, fora, and products from micro, small, and medium enterprises assisted by the Department of Science and Technology-Region III (DOST-III).

Dubbed as the "Melting Pot of Luzon" for its mixture of four diverse and distinct groups of Kapampangan, Ilocano, Pangasinense, and Tagalog, Tarlac is best known for its agriculture products and practices, as it is situated at the heart of "The Rice Granary of the Philippines."

DOST Secretary Fortunato T. de la Peña (third from left) poses with some of the students who visited the exhibits during the RSTW Tarlac held at the Bulwagan ng Kanlahi, Tarlac City.

Julius Caesar V. Sicat, director of DOST-III, emphasized the importance of conducting such events that highlights the individuality as well as the STI needs of every region.

"We need to pursue technologies that are world-class, relevant, and region-based. These are our guiding principles when we planned and organized this event for Region III," Dir. Sicat explained.

During the RSTW opening ceremonies, Tarlac City proudly unveiled the SPInCart or the Solar-Powered Innovative Cart. The development of this solar-powered vehicle was made possible through the collaboration of DOST and the Tarlac State University to help address the increasing prices and fuel consumption in the region.

The SPInCart is a five-seater vehicle with a two circle brake system. With its attached solar panels that has a rated maximum power of 500 watts, the SPInCart can run at a maximum speed of 25 km per hour.

Dir. Sicat also acknowledged how Region III suffered the devastating effects of the recent Typhoon "Josie" that struck the majority of Central Luzon, particularly the provinces of Bataan and Zambales. He mentioned that an amphibious navigator, a vehicle that can travel on land and on water, can be a huge help to assist in rescue and evacuation of residents in flood-stricken areas.

"DOST is continuously pushing for the research and development on the amphibious navigator. Hopefully within the year, we can see its first prototype," he said.

Aside from the technologies and innovations, beneficiaries under the expanded Community Empowerment through Science and Technology program of the DOST were recognized during the RSTW celebration. DOST Secretary Fortunato T. de la Peña, Tarlac Governor Susan A. Yap, and Tarlac City Mayor Maria Cristina Angeles, together with Dir. Sicat, led the awarding of certificates of ownership to beneficiaries.

In addition, various schools and local government units (LGUs) across the provinces of Central Luzon received from the DOST a total of 61 units of STARBOOKS or the Science and Technology Academic and Research-Based Openly Operated Kiosks—the digital library developed by the DOST-Science and Technology Information Institute.

Also awarded to the selected schools and LGUs were 22 units

of portable biogas digester, 22 units of dual drum composter, and 17 units of hydroponics and aquaponics system. Hydroponics refers to soil-less growing of plants, while aquaponics is the combination of aquaculture or fish raising and hydrophonics.

The technology fora on the succeeding days of the RSTW in Tarlac centered on the improvement of the region's agriculture sector. The three-part seminar series featured topics on alternative energy systems (e.g. tube-bag digester, biogas technology, solar energy, and wind energy), preparedness for the 'Big One,' and green technologies for enterprises (e.g. organic farming and cleaner production technologies).

Project visits

Golden Crown Petals and Herbs

One of the highlights of the three-day celebration is the site visit to some of the DOST-assisted enterprises in Tarlac City. Secretary de la Peña, together with Dir. Sicat, DOST-Technology Application and Promotion Institute Director Edgar I. Garcia, and DOST Assistant Secretary for Administration Teodoro M. Gatchalian visited the Golden Crown Petals and Herbs (GCP) in Maliwalo, Tarlac City.

Owned by Fe Esperanza A. Sado, GCP produces gum paste sugar flower icing decorations for cupcakes and wedding cakes. According to Sado, she officially started her then small business in 2003 out of her passion for baking and decorating cakes and pastries. It was in 2014 that DOST through PSTC-Tarlac reached out to her and introduced DOST's flagship program, SETUP or the Small Enterprises Technology Upgrading Program.

"Kung hindi po dahil sa SETUP, wala kami ngayon dito (If it were not for SETUP, we wouldn't be where we are today)," exclaimed Sado as she toured DOST officials and staff on the production area of GCP.

"Nag-start kami with 30 workers. Ngayon, meron na kaming 90 staff after ng intervention ng DOST (We started with 30 workers. Now, we have 90 staff after the DOST intervention)," she added. Sado also explained that they are able to hire additional workers during the peak seasons ofApril and May.

Sec. de la Peña and Tarlac Governor Susan A. Yap browse through the DOST-assisted products featured in the exhibit area.

Through SETUP, Sado was able to acquire training and seminar on food packaging to further her and her staff's expertise on food production. More so, they were able to upgrade their equipment which helped improve their production and product quality.

DOST also provided GCP with package assistance such as the Manufacturing Productivity Extension and Energy System Optimization and various technology trainings that helped them acquire certifications on Good Manufacturing Practice, Hazard Analysis and Critical Control Points, and Kosher—the standard for Jewish dietary regulation.

These certifications are important for Sado and her business since they also export their products. "Dahil sa SETUP mas dumami ang foreign clients namin (Because of SETUP, we gained more foreign clients)," she explained.

As of date, 80 percent of GCP's pastries and gum paste icing decorations are being exported to 18 countries across Asia, Australia, the United States, Europe, and Africa, while the remaining 20 percent of their production are distributed locally.

i-Provide Health Food Manufacturing

Sec. de la Peña, along with other DOST officials, also visited i-Provide Health

The SPInCart was unveiled during the opening ceremony of the RSTW.

Food Manufacturing, a known health and wellness provider in the country owned by Abelardo T. Balisi, Jr. Since 2013, I-Provide has been formulating health products like coffee, tea, and food supplements with its strong research and development team.

Through SETUP, they were able to acquire seminars on manufacturing processes as well as equipment intervention, such as automatic blister packing machine and bipyramid blender cone mixer, which helped them expedite their production process and meet a high quality standard for its products.

"Malaking bagay po sa amin yung tulong ng SETUP, lalo na yung mga equipment. For example po 'yung sa automatic blister packing machine, nakaka-produce kami ng 10,000 capsules per hour (SETUP's assistance was a big deal for us, especially the provision of equipment. For example, the automatic blister packing machine allows us to produce 10,000 capsules per hour)," Balisi explained.

Because of the SETUP assistance, the business was able to increase the number of their workers from seven to 22, as well as their production output by 48.79 percent.

Bicol showcases region's finest S&T projects, innovations

By Louella D. Labasbas, *DOST-STII*
Photos by Neil Anjo B. Bio, *DOST-STII*

Spicy is the first word that comes to mind when one talks about the Bicol region. Similarly, the Department of Science and Technology-Region V (DOST-V) spiced up their celebration of the 2018 Regional Science and Technology Week (RSTW) on 8-10 August 2018 at the Bicol University East Campus in Legazpi City, Albay.

Despite the inclement weather, there was no stopping the Bicolanos in showcasing their own flavor of science, technology, and innovation (STI) across the provinces of the Bicol region namely, Albay, Camarines Norte, Camarines Sur, Catanduanes, Masbate, and Sorsogon.

DOST Secretary Fortunato T. de la Peña delivers his keynote speech about the technologies and programs developed by the DOST.

True to the theme "Science for the People: Innovation for Collective Prosperity", DOST-V Regional Director Tomas B. Briñas expressed his elation on how STI touched the lives of his fellow Bicolanos. To him, it was a humbling experience to witness how everything that started from small steps of collaboration and initiative now brings benefits to the many communities that were reached by DOST's interventions.

Dir. Briñas highlighted that many communities in the region are benefiting from the various programs and projects of the DOST such as the provision and access to clean water and sustainable food production through the Community Empowerment through Science and Technology (CEST) program; improvement of livelihood among micro, small, and medium entrepreneurs through the Small Enterprise Technology Upgrading Program (SETUP); and the growing population of DOST scholars, to name a few.

At the RSTW Bicol opening ceremonies, DOST Secretary Fortunato T. de la Peña presented the various research and development programs (R&D) and technologies that the DOST is currently doing for the Filipino people. He particularly gave emphasis on the DOST's intervention in terms of education and how it contributes towards the attainment of collective prosperity.

"Isa sa mga resources natin sa Pilipinas ay human resource. Kaya ang edukasyon, lalo na ang higher education ay mahalaga. Sa mga university rin makikita na mayaman sa creativity at innovative capacity. [Kung] kaya't ang science and technology ay nagta-thrive scientifically and innovatively," said Sec. de la Peña.

["One of our resources in the Philippines is human resource. That is why education, particularly higher education, is important. We can also observe in the universities the richness in creativity and innovative capacity. Hence, science and technology is thriving scientifically and innovatively," said Sec. de la Peña.]

Scholar's Day

One of the highlights of the RSTW celebration is the assembly of DOST scholars.

DOST-V Regional Director Tomas B. Briñas talks about the many projects of DOST-V that benefits communities in Bicol area.

Ma. Katrine Louise Llaguno shares her family's humble beginnings in putting up Pares King and how it grew as exporter of bottled Bicol specialties.

"Mahalaga na magkaroon ng event na kagaya ng RSTW para mapakita namin sa public ang mga bagay na natutunan namin sa school, and at the same time nakikita namin ito na magiging technology," said Jann Angela Y. Sarcon, a Grade 10 student from the Philippine Science High School-Bicol Region Campus. [It is important that events like the RSTW are held so we can show to the public the things that we learn in school and at the same time, we see that it can be an emerging technology.]

A competition called "Tagisan ng Galing at Talino ng mga Iskolar" was participated in by students from different high schools in the Bicol Region to showcase their academic excellence.

Ka-Pares to Success

There is no shortcut to success. This is how Ma. Katrine Louise R. Llaguno, plant manager of Pares King Food House, described the company's journey to success.

Before becoming an international distributor of Bicol specialties, Llaguno recalled how Pares King started as a simple eatery in Bicol, serving pares as main dish. She also shared how her parents struggled to sustain the everyday life of Pares King before they discovered SETUP.

With perseverance, love for food, and assistance from DOST, their family was able to get through the hurdles and eventually, they were able to put up branches and a manufacturing office.

Pares King was hailed as 2018 Best SETUP Adoptor for Bicol and finalist for 2018 National Best SETUP Adoptor.

Apart from Pares King, graduated SETUP clients were also awarded with a plaque of ownership by Sec. de la Peña and Dir.Briñas during the opening ceremonies of the RSTW Bicol.

(L-R): Dr. Marieta B. Sumagaysay, executive director, DOST-National Research Council of the Philippines; Dr. Arnulfo M. Mascariñas, Bicol University president; Tomas B. Briñas, DOST-V regional director; DOST Secretary Fortunato T. de la Peña; Dr. Landrico U. Dalida Jr., deputy administrator for Operations and Services, DOST-Philippine Atmospheric, Geophysical and Astronomical Services Administration; Richard P. Burgos, director, DOST-Science and Technology Information Institute; and Elsie G. Ferrer, director, Philippine Science High School-Bicol Region Campus.

Fight the Bite!

For the past five years, the Bicol Region has been active in its fight against mosquito-borne diseases like dengue. Through the collaborative efforts of the DOST-V, communities, and schools, the fight against dengue has become a part of the Bicolanos' daily routine.

Schools in the Bicol region have been practicing the School-based Dengue Vector Surveillance–Aksyon Barangay Kontra Dengue (SDVS-ABKD) using the Mosquito OL Trap developed by the DOST-Industrial Technology Development Institute.

The OL Trap, or ovicidal-larvicidal trap, was designed to control the population of dengue-carrying mosquitoes by attracting female mosquitoes to lay eggs on the board saturated with organic solution. The organic solution used is potent against mosquitoes but safe for humans as it is composed of ingredients used for food preparation.

Primary schools in the Bicol region are teaching their pupils on how to use the OL Trap and on how to monitor daily the mosquito population collected from the trap. Aside from using the OL Trap, communities are taught to practice proper ways of cleaning their homes and surroundings.

During the RSTW closing ceremonies, the DOST awarded the Best Implementing Schools of the SDVS-ABKD program for SY 2017-2018.

Project Visits

As part of the RSTW celebrations in Bicol, Sec. de la Peña visited some of the DOST projects in the region, including the Bicol Regional Food Innovation and Commercialization Center and the Bicol University Fabrication Laboratory.

The Secretary also attended the inauguration of the CSet-Tissue Culture Laboratory and Food Processing Facility of the Philippine Coconut Authority-Albay Research Center and the launch of the Manufacturing Fabrication Laboratory at Bicol State College of Applied Science and Technology in Naga City.

'Tagay' in the valley: DOST Region-II banners SETUP and CEST projects

Text and photos by Rodolfo P. de Guzman, *DOST-STII*

We came, we saw, we conquered… and we experienced *tagay*.

Yes, after the 14 long hours of land trip, we finally experienced *tagay*. Ooops, don't be fooled by this word because we did not drink any alcoholic beverage (that night, at least). We, from the Department of Science and Technology-Science and Technology Information Institute (DOST-STII) and some media partners from Manila, finally reached Tuguegarao City, the capital of Cagayan, just after sunset — day one of our weeklong stay in the province.

The name of the province was said to be derived from the word *tagay*, a kind of plant that grows abundantly in the northern part of the province. So it was initially called Catagayan, which means a place where the *tagay* grows abundantly. It was later shortened to its present name, Cagayan.

Chicharabao delight. *The well-loved chicharon (pork crackling) is made differently by Lighthouse Cooperative as it is made of carabao skin and comes in different flavors that is processed to perfection with the use of modern technology provided by the DOST Region 2. Lighthouse Cooperative was assisted through SETUP, one of the flagship programs of the DOST to help micro, small ang medium enterprises improve their productivity and competitiveness. DOST Secretary Fortunato T. de la Peña (right) inquires about the increase in production due to the mechanization of the plant, while DOST Region 2 Director Sancho A. Mabborang (2nd from left) looks on.*

We were welcomed by our host, Vicky Mabborang, the better half of Sancho A. Mabborang, DOST-Region II (DOST-II) director, at the regional office together with some of the regional staff who prepared mouth-watering food that included the proverbial *pinakbet*.

Thereafter, our group went to Benjie's Place, a cozy boutique hotel some 480 kilometers from Manila, to give our tired bodies the much needed rest because we are to meet up with DOST Secretary Fortunato T. de la Peña the following morning.

The trip to Cagayan was part of the celebration of the Regional Science and Technology Week (RSTW) in Region II held from 13 to 17 August 2018 at the Gonzaga People's Gymnasium in Gonzaga, Cagayan, about an hour away from the capital.

SETUP projects that work

Our layover in Tuguegarao was worth the trip as we had breakfast at Kusina Cagayan with the Secretary and his entourage, who flew in that Sunday morning of 12 August 2018. Finally, we got to savor Ybanag *longganisa* and beef *tapa* with fried rice, egg, and a strong cup of Kalinga brew.

After breakfast, the DOST entourage headed by Sec. de la Peña and Dir. Mabborang led the convoy to visit the different projects of the DOST in the province, living examples of how science, technology, and innovation (STI) have improved the lives of its proponents.

The first stop was at the Lighthouse Cooperative (a SETUP adoptor) in Larion Bajo, Tuguegarao. The Center is known as the maker of the novelty food snacks called *chicharabao* and *chicharica*. Arturo B. Tabbu, one of its co-founders and current general manager, told the story of how the DOST through the Small Enterprise Technology Upgrading Program (SETUP) first gave assistance in 2006 to upgrade processing and packaging/labeling of its processed meat products.

Later in 2009, it upgraded its facilities to produce the chicharabao. In 2012, the Center

Fresh fruit juice from the north. *Norphil Healthy Foods Corporation from Sta. Maria, Lal-lo, Cagayan produces calamansi drinks in tetra packs that are now being marketed in Region 2 and neighboring provinces. The company received technical and financial assistance from DOST-II to improve its productivity through modern equipment and training in good manufacturing practices. Shown beside their product promotional material were Norphil owners Engr. Alfredo Collado (middle), Emilyn Collado (leftmost. With them are L-R0), Elaine Vanezza Collado, DOST Secretary Fortunato T. de la Peña, and DOST-Region II Director Sancho A. Mabborang.*

was awarded as the Best DOST SETUP Adoptor of Region II. After DOST's intervention, the company increased its production from 3.4 percent to 29.17 percent and increased sales from 15.4 percent to a staggering 800 percent.

Next stop was at the DP Andal Metal Craft in Libag Norte, Tuguegarao. The company is a mom-and-pop operation engaged in metal fabrication. DOST-II provided technical and financial assistance for the company to acquire modern equipment, expand its product line, and improve its productivity.

Lastly, the group visited Norphil Healthy Foods Corp in Lal-lo, Cagayan with a tour of its facility that is now automated through the technical and financial assistance of DOST-II. The company produces different variants of fruit drinks like calamansi, mango-calamansi, apple, and orange in tetra packs.

Empowering rural communities

In the late afternoon, the science chief and his group went to Barangay Paranum, Lal-lo in Cagayan to formally inaugurate the Rural Improvement Club (RIC) Citronella Oil Processing Center.

By partnering with the local government unit of Lal-lo and RIC, DOST-II was able to implement the Community Empowerment through Science and Technology or CEST, another flagship program of the DOST that enables the department to touch base with the community with S&T interventions in health and nutrition, water and sanitation, basic education and literacy, livelihood/economic enterprise development, and disaster risk reduction and climate change adaptation.

Part of the program in Lal-lo is the establishment of livelihood projects that included the growing of citronella and processing it for its oil that is used for personal healthcare products like the mosquito repellent lotion, bath soap, scented candles, and others.

Strengthening Institutional partnerships

Also included in the visit of Sec. de la Peña were stops to other DOST development initiatives in the region such as partnership with state universities and colleges (SUCs).

The Food Innovation Center at the Cagayan State University (CSU)-Carig Campus was one example of the successful partnership. The facility serves as a food laboratory complete with locally fabricated food processing equipment like freeze dryer and spray dryer that are available to micro, small, and medium enterprises in the Cagayan Valley region. Displayed in the facility are innovative food products from the provinces of Batanes, Nueva Vizcaya, Cagayan, Isabela, and Quirino.

Sec. de la Peña also formally inaugurated the Metals and Engineering Research and Development Center inside the CSU Campus together with CSU President Dr. Urduja Tejada (former DOST-Region II director). The latter toured the Secretary around the facility which is used in providing training and technical assistance to the local metals and engineering sector.

S&T activities *pa more!*

To complete the RSTW celebration, there were several activities that highlighted the importance of STI and a lot more that were both informative and entertaining.

There were the S&T exhibits of different SUCs in the region, DOST agencies, and other stakeholders like the Filipino Inventors Society Producer Cooperative and the Philippine Science Centrum travelling exhibit. An Integrated Science and Math Quiz and the Search for Ginoo at Binibining Agham at Teknolohiya 2018 (now on its second year) were also held.

Several S&T forums were conducted on carrageenan (seaweeds) as plant growth enhancer, the Balik Scientist program, and the energy audit. Lastly, the host Municipality of Gonzaga joined DOST Region II in officially embracing the Juan Time Campaign of the DOST to promote the Philippine Standard Time with Mayor Marilyn Pentecostes and other local officials in attendance.

Visayas RSTW highlights latest in seafood culture

Text and photos by David Matthew C. Gopilan, *DOST-STII*

At the heart of the country's seafood capital, scientists and researchers from various research and development institutions in the Visayas shared the latest methods in growing mussels and oysters in a forum held on 30 August 2018 in Roxas City, Capiz. With a focus on science and technology based practices, the forum is part of the Regional Science and Technology Week held from 29-31 August 2018, hosted by the Department of Science and Technology-Region VI (DOST-VI).

Dr. Fiona L. Pedroso *represents their team consisting of Dr. Carlos C. Baylon, John Ray N. Moleño, Ivan Emmanuel A. Pineda, and Dominique P. Mediodia who all devised the longline method. They are all from the UP Visayas Institute of Aquaculture.*

Climate resilient longline method

Dr. Fiona L. Pedroso from the University of the Philippines (UP) Visayas proposed the use of the longline method. Practically like a clothesline, the longline method uses a 50-meter line with two anchors on its ends and floaters in between that is left to float on the sea. Attached on the floating line are the mussel hangers that are immersed in seawater. The hangers will be where the mussels will attach themselves on. At the bottom of the hangers are sinkers to ensure that the hangers would stay low in sea.

Dr. Pedroso explained that this method is climate resilient, considering the country experiences stronger and more frequent typhoons. "It can be [placed] offshore or estuaries especially when bamboos are shorter and the sea is deep," Dr. Pedroso said.

Dr. Ma. Junemie Hazel L. Ramos *of the Southeast Asia Fisheries Development Center (SEAFDEC) in Iloilo City explains that an oyster grower can produce 140 tons of oysters per harvest in one hectare through the pouch-and-tray method.*

The bamboos Dr. Pedroso mentioned refer to the stake method, the traditional way of growing mussels. With the stake method, the mussels attach themselves on the bamboos staked on the seabed. This method causes siltation on the seabed, thus disrupting the natural flow of seawater.

Staked bamboos can only be used in 1.5 years and is placed permanently. On the other hand, the longline method can last for 2.5 years and is cheaper as fisherfolk can use recyclable materials. The materials used in the longline method can also be relocated in case of strong typhoons. Lastly, bamboos have fixed length whereas the longline can be extended as long as the fisherfolk wants.

Based on Dr. Pedroso's pilot studies in Pangasinan, Capiz, and Sorsogon, the longline method stops competition among the mussels for food.

Rose M. Mueda, *researcher from UP Visayas, envisions "Safe Mussel for Every Juan." She also says that there is demand from the fisherfolk on the technologies and seafood but she emphasized the role of the local government in implementing the technologies and meet international standards through policies.*

Mussels that were grown in the longline method have the same shell sizes, whereas those in the stake method have highly varied sizes.

Oysters in pouches

These pouches look like big wallets. Only that instead of coins, each pouch has an oyster.

Dr. Ma. Junemie Hazel L. Ramos urged fisherfolk to use the "pouch-and-tray" method in coming up with what oyster growers want in their harvest: larger, heavier, and meatier oysters. Since every pouch is enough for only one oyster, the oysters will no longer clump together as clumping ends up with smaller and lighter oysters due to competition. The pouches are attached on multilevel trays submerged in the sea.

When Dr. Ramos and her team tried this method, 60 percent of their harvested oysters were graded as having "large" and "jumbo" meat, as per classification from the Pacific Oyster Grading System. Foreign importers like those in Australia and New Zealand use this system to command the price of oysters.

The pouch-and-tray method allows harvest in six months, four months earlier than the traditional methods that usually take 10 months to one year to harvest.

Depurate the mussels first efore selling

UP Visayas researcher Rose M. Mueda clarified that depuration simply means "*pagsusuka*" (expulsion). In this process, mussel growers place their harvest in a clean water environment for these bivalves to expel or vomit their intestinal content. Mueda added that the water should be replaced regularly to avoid recontamination and aerated so that mussels will not die immediately.

Mueda further explained that mussels need to be depurated because they are naturally filter-feeders – they eat anything. And if these mussels grow in coastal environments that are exposed to household and industrial discharges, they would most likely feed on bacteria, viruses, and pollutants.

"They're all in the gut," Mueda said while referring to the microbial, chemical, and marine biotoxins that may be present in mussels. She warned that mussels should be fully cooked especially the gut area, as Filipinos are fond of preparing mussels the "*malasado*" (half-cooked) way.

Her research team found that that even in just three hours of depuration, they have observed that *E. coli* contamination has significantly decreased. Food items that are contaminated with *E. coli* can cause diarrhea, among others.

"This forum is a technical demand of our stakeholders since our place is known as the country's seafood capital," said DOST-VI assistant regional director for Technical Operations ***Dr. Emelyn P. Flores*** *while pointing out that the forum is also a display of technologies ready for adoption of businesses.*

Dr. Rex Ferdinand M. Traifalgar *of UP Visayas discusses the application of probiotics in shrimp culture. Probiotics are live microorganisms that improve the gut of its host organism like Penaeus vannamei or the Pacific white shrimp. They are now seen as possible remedy to common shrimp diseases like white spot syndrome disease and early mortality syndrome.*

Victor Emmanuel J. Estilo *of SEAFDEC recalls the past and current practices in shrimp farming in the country. According to him, biosecurity measures like washing of hands and car tires, installing crab fences and cat/dog scares, and using pathogen-free post larvae are simple ways of preventing shrimp diseases.*

Joanna Joy Huervana *of SEAFDEC said that there is high demand for crabs both in local and international kitchens. There are at least four kinds of mangrove crabs being cultured in the country. One of which is the Scylla serrata or the king crab (encircled on the photo).*

DOST spurs CARAGA'S food manufacturing, ecotourism development

By Allan Mauro V. Marfal, *DOST-STII*
Photos by Gerardo G. Palad, *DOST-STII*

Caraga Region's rich natural resources are like a blank canvas that can be made alive and colorful through interventions and partnerships that can bring about inclusive growth and development throughout the region.

Department of Science and Technology (DOST) Secretary Fortunato T. de la Peña underscored how the available crops, facilities, and human resources in the Caraga Region can be enhanced by different DOST projects and services to bring inclusive and industry development.

"Different provinces or areas here in Caraga Region are rich in natural resources and raw materials that could be used in producing livelihood and job opportunities for the locals," said Sec. de la Peña during the opening ceremonies of the Regional Science and Technology Week celebration at Robinson's Place in Butuan City on 5 September 2018.

The Secretary also emphasized how sectoral partnerships in the region have strengthened science, technology, and innovation collaboration and governance in the region. This includes the creation of the Regional Research Development and Innovation Committee to bridge the gap and challenges of regional socio-economic development.

"DOST, through the efforts of our regional office here in Caraga, was able to increase the number of clients of various services and projects of DOST such as S&T (science and technology) scholarships, SETUP (Small Enterprises Technology Upgrading Program), and research and development (R&D) by SUCs (state colleges and universities)," Sec. de la Peña said.

He added that the DOST interventions will pave the way for the acceleration of efforts and focus towards addressing the existing challenges in the region.

Levelling up MSMEs' products and services

SETUP has always been at the forefront of the department's programs to help local micro, small, and medium enterprises (MSMEs) to make their products and services more competitive and marketable.

DOST-Caraga Regional Director Dominga D. Mallonga said that SETUP gained ground not only in the mainland, but also in neighboring islands. She said that the package of technologies and services have also been promoted and accessed by an increasing number of supported MSMEs in Siargao and Dinagat Islands.

In 2017, the number of SETUP assisted enterprises in Dinagat Islands has increased to 10 MSMEs from only five in 2016. Siargao which had zero SETUP beneficiaries in 2016 was able to engage five local firms to the said program in 2017.

Meanwhile, Ricardo Varela, assistant regional director of DOST-Caraga shared that 300 MSMEs have already benefited from the consultancy programs of DOST-Caraga. Under the guidance of industry experts, the SETUP beneficiaries learned how to boost their business productivity.

"Our R&D specialists and experts have guided our MSMEs along their journey,

equipping them with the right skills in reaching their business operations to their full potential," Varela said.

He added that their consultancy program is composed of five different components—manufacturing productivity extension, consultancy for agriculture productivity enhancement, cleaner production technology, energy audit, and food safety.

Caraga's SETUP success stories

In Caraga alone, from 2002 to 2017, 504 MSMEs have benefited from DOST interventions such as financial assistance to acquire needed equipment, machine, and facilities to enhance productivity and operations.

Among them is Flora's Cakes and Pastries in Agusan del Norte. In 2012, owner Flora Martinez availed of the assistance from SETUP. This led to the upgrading of her production facility after she received baking equipment composed of a 12-plate gas oven, stainless steel table, mixer, bread proofing rack, and cassava grinder.

Because of the SETUP assistance, Flora's Cakes and Pastries was able to compete with established bakeshops in the province. In a short period of time, Martinez managed to open two more branches.

"SETUP is a great help. Preparation of my ingredients is now convenient and faster. We can now cater to more orders on a regular basis," said Martinez.

Flora's Cake and Pastries is the regular supplier of 140 to 150 pieces of cakes that are given to senior citizens by the provincial government of Agusan del Norte as part of its regular program for the province's elderly citizens.

In 2016, Flora's Cake and Pastries was hailed as the Best SETUP Adoptor for Caraga Region.

Meanwhile, Marbie's Store is known for Sayongsong, a native delicacy made from coconut milk and sticky rice that is often patronized by locals and tourists in Surigao del Norte.

Confronted with challenges in the production because of the high demand of its native delicacy products in souvenir shops, resorts, and other tourist areas in the province, proprietor Marbie Loayan has decided to avail of SETUP assistance. Through SETUP, they acquired an electric rice grinder and electric coconut presser. In less than a year, their production sales and processes improved.

"DOST's SETUP has made a significant change to our business. Little by little we are seeing that the business is growing and the demand is increasing, which made me seek for DOST assistance for the second time around," Loayan said.

Marbie's Store is set to acquire a second round of assistance this 2018. This is to fund the purchase of more equipment for the company's production facilities such as electric grinder, mechanical coconut presser, and a food preservation facility that is expected to improve the quality and shelf life of their products, improve productivity, and lessen production time.

Another SETUP adoptor is Hillsview Mangosteen Tea in Trento, Agusan del Sur whose products were able to penetrate different shopping malls nationwide, thanks to the four years of DOST assistance that helped the business upgrade its production and operation process.

In 2014, owner Irinea Hitgano applied for the SETUP program. Like any other entrepreneur, Hitgano was constantly challenged with difficulties in using manual production.

"It was rigorous and time-consuming. I remembered that we only used large pots to boil the leaves and barks of the mangosteen. It takes us almost a day to finish just a few bottles of mangosteen tea," recalled Hitgano.

With the assistance from DOST, Hillsviews Mangosteen Tea was able to acquire a juice extracting equipment, double jacketed kettle, filling tank, and ready to dispense dilution system to fully automate the process of producing mangosteen tea. Formulating a variety of mangosteen juice products also became easier because of the acquired equipment.

Hitgano shared that in two years time, the company was able to increase its mangosteen products sales up to four times upon embarking on the DOST SETUP intervention.

"The project was able to employ about 100 women from Trento [Agusan del Sur]. DOST helped us improve the quality and shelf life of our product through the provision of state-of-the-art equipment. Because of this, we became confident to penetrate bigger markets like SM, Ayala Malls, S&R, among others," said Hitgano.

Dir. Mallonga said that the impact of SETUP in the Caraga region goes beyond helping local MSMEs to improve their operations and sales. "The success of our SETUP beneficiaries could lead to more jobs for the locals and increased number of tourist arrivals in our region," she said.

(L-R) DOST PSTC-Bukidnon Director Virgilio M. Fuertes, Malaybalay City Assistant Administrator Mark Lemuel L. Garcia, DOST-X Director Alfonso P. Alamban, Bukidnon Provincial Administrator Atty. Nestor E. Cajes, Bukidnon Kaamulan Chamber of Commerce and Industry Vice President Robert V. Tinsay, DOST Secretary Fortunato T. de la Peña, Bukidnon KCCI President Roderico R. Bioco, and DOT-Region X Director Marie Elaine S. Unchuan led the ribbon cutting ceremony of the National Science and Technology Week sa Amihang Mindanao, with the theme "Innovation for Collective Prosperity."

DOST-X leads science, agriculture, tourism convergence

By Laurence M. San Pedro, *DOST-STII*
Photos by Gerardo G. Palad, *DOST-STII*

Dubbed as the "food basket of Mindanao," the landlocked province of Bukidnon is abundant in agricultural farms, making it a major producer of pineapple, tomato, rice, corn, sugar, coffee, rubber, flowers, cassava, and other fruits and vegetables. It is also a major producer of chicken, hogs, and cattle.

With a progressive agriculture-based economy, the province is home to some of the biggest food manufacturing companies in the country, with plantations scattered throughout the province.

Sec. de la Peña emphasizes the importance of expanding the country's research pool in accordance with one of the endeavors of President Rodrigo R. Duterte, which is to increase the country's growth potential through innovation.

Bukidnon is also known for its booming tourism. It is gifted with natural attractions such as the Kitanglad Mountain Range that includes Mt. Dulang-dulang, the second highest peak in the country. It has also been identified as one of the country's richest in terms of biodiversity and endemic species of flora and fauna.

The province's huge potential for agritourism paved way for the creation of the project known as "SciCAT" or Science for the Convergence of Agriculture and Tourism.

SciCAT is a partnership among the Department of Science and Technology-Region X (DOST-X), DOST Provincial Science and Technology Center (PSTC)-Bukidnon, Department of Tourism (DOT)-Region X, the local government unit of Malaybalay City in Bukidnon, and the Mt. Kitanglad Agri Eco-Tourism Farm. Funding for the project is from the DOST-Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD).

What is SciCAT?

SciCAT is a technological convergence that aims to improve productivity and capacity for sustainable farming practices while showcasing the beauty of a place. It aims to captivate curiosity and excitement among tourists with scenic attractions and recreational activities that offer unique experiences. It also targets to develop a generic and sustainable approach to manage the buffer zones in national parks and protected areas—something that can be adopted in other places.

"SciCAT is a new technology transfer modality of the DOST-PCAARRD, which is the funder [of this project], upholding the mandate of the Farm Tourism Development Act," said DOST PSTC-Bukidnon Director Virgilio M. Fuertes during the launch of SciCAT.

Republic Act (RA) 10816 or the "Farm Tourism Development Act of 2016" was enacted into law to recognize the importance of agriculture in making available food and other products necessary to sustain and enhance human life, and in providing livelihood to a major portion of the population.

RA 10816 also seeks to promote environment friendly, efficient, and sustainable farm practices; provide alternative recreation facilities and farm tourism activities for families, students and other clients; and promote health and wellness with high quality farm produced food.

"Also, the DOST has a very clear mandate that it has to coordinate and support research and development (R&D) activities," added DOST Secretary Fortunato T. de la Peña.

In line with the RA 10816, the Department through DOST-PCAARRD is mandated to establish and implement capability building programs for farm tourism development, as well as to include the technology needs of farm tourism camps in the R&D programs in agriculture, aquatic, and natural resources.

A glimpse of the Kitanglad Agri-Ecological Techno-Demo Center during the project visit of DOST Secretary Fortunato T. de la Peña.

Through SciCAT, the agritourism farm sites will serve as a venue to promote various science and technology based technologies that are developed through R&D. This will in turn help create employment and entrepreneurship in the community and showcase farm tourism activities such as farm tours, training, farm exhibits, pick-and-pay, and hands-on activities for tourists like actual planting, harvesting, and processing.

Making the most out of nature

The Mount Kitanglad Agri-Ecological Techno-Demo Center (MKAETDC) is a 22-hectare land that boasts of an improved upland farming system. It showcases high value vegetables, fruit-bearing trees and livestock.

As recipient of the SciCAT project, MKAETDC is projected to be fully developed by 2020 into an agritourism site dedicated for agricultural training, biodiversified recreation, environmental preservation, educational purposes, and tourism.

Among the farm's fast-moving products is the citronella oil, a popular insect repellent. It serves as a source of income for about 180 women in the eight sitios of Imbayao who are planting citronella grass.

The community benefits by harvesting and extracting citronella oil and selling it to local commercial distributors and manufacturers. The vast amount of citronella grass planted in the farm also helps to naturally protect the nearby community away from various pests.

The farm also came up with a new learning site after earning accreditation from the Department of Agriculture-Agricultural Training Institute (DA-ATI) in Region X. It has a training hall and offers accommodation for farmers, students, and other visitors.

With its aim to become a venue for biodiversity exposure, organic farming, and agroforestry learnings, the farm has started its journey towards being a DA-ATI Region X School of Practical Agriculture.

Through its president and owner, Benjamin T. Maputi, Sr., the interventions under SciCAT will be put into place with the synergism of DOST-X, DOT-Region X, and the local government of Malaybalay City.

These interventions include: startup assistance, consultancy services, assistance from DOST's SETUP (Small Enterprises Technology Upgrading Program), access to advance weaving technologies, access to DOT consultancy for facilities and tourist amenities improvement, and capability building on farm tourism operations and management.

The farm owned by Maputi's family sets as an example of why it is important to keep a balance by protecting and preserving nature while earning from it at the same time.

Maputi, who has led the cultivation of the upland farm for more than a decade now also hopes that his community and other upland farms will adopt his farm's natural methods to make sure that the produce are all organic and that it will benefit the community.

Maputi was appointed as Magsasaka Syentista or Farmer Scientist for Northern Mindanao Consortium for Aquaculture, Agriculture and Natural Resources Research and Development under the DOST-PCAARRD Techno Gabay Program (TGP) in 2006.

The same year, his family was named as the "Most Outstanding Farm Family of the Philippines" by the DA's National Gawad Saka Achievers Award. In 2015, he won another award as "Outstanding Syentistang Magsasaka" during the 1st Regional TGP.

The SciCAT project was officially launched during the Regional Science and Technology Week celebration in Region X held on 12-14 September 2018 at the Bukidnon State University, Malaybalay City, Bukidnon.

Mt. Kitanglad Agri-Ecological Techno-Demo Center with its president Benjamin T. Maputi (fourth from left), is the pioneer recipient of the Science for the Convergence of Agriculture and Tourism or SciCAT project.

2018 NSTW opens in Davao

By Allyster A. Endozo and Rosemarie C. Señora, *DOST-STII*
Photos by Henry A. de Leon and Gerardo P. Palad, *DOST STII*

Davao City 1st District Representative Karlo Alexei B. Nograles bangs the gong to formally open the NSTW Mindanao exhibit at the SMX Convention Center in SM Lanang, Davao City.

This year's celebration of the National Science and Technology Week (NSTW) opened with a bang as President Rodrigo R. Duterte led the ceremonies on 6 July 2018 at the SMX Convention Center in SM Lanang, Davao City.

It was a historic milestone as it was the first time that the NSTW was launched outside of Metro Manila, solidifying the administration's thrust of bringing inclusive growth in all regions.

President Duterte arrived on the evening of the opening day at the venue to view various scientific, technological, and innovative products and services featured at the exhibit. In his speech, he reiterated the government's long-term vision of *matatag*, *maginhawa*, *at panatag na buhay* for every Filipino.

"It is this administration's priority to provide comfortable and secure life for the Filipino. Rest assured that you have my full support in empowering individuals, in bringing our country towards better heights. I trust that you will be with me all throughout together in establishing a brighter and better future for all," he said.

DOST's nationwide interventions

In his speech at the opening ceremonies, Department of Science and Technology (DOST) Secretary Fortunato T. de la Peña revealed that he pitched the idea to hold the NSTW celebration in Mindanao to the President during the latter's speaking event in Bo'ao, China back in early April 2018. This was in line with the administration's emphasis on the "three I's"—infrastructure,

DOST Secretary Fortunato T. de la Peña (third from the right) with some of the recipients of the Youth Excellence in Science award from Mindanao's high schools who were recognized during the NSTW Davao ceremonies.

interconnectivity, and innovation.

He added that with the launch of the NSTW in Mindanao, he hopes to showcase the results of DOST's nationwide interventions during the past year. These include the rehabilitation of war-torn Marawi City, the Small Enterprises Technology Upgrading Program (SETUP) 2.0 for small and medium enterprises, and the human resource development program that produced scholars from 90 percent of municipalities nationwide.

However, Sec. de la Peña said that only 17 percent of the 20,000 science, technology, engineering, and mathematics or STEM scholars are from Mindanao, and that 46 out of 1,600 municipalities nationwide have yet to be reached by DOST's scholarship programs.

Sec. de la Peña also highlighted the Niche Centers in the Regions for R&D program as measure against regional inequality in research and development capabilities.

Meanwhile, Representative Karlo Alexei B. Nograles, Davao City 1st District representative, announced the scheduled approval of three pending bills to the House Committee on Appropriations, namely the Comprehensive Nuclear Regulatory Framework, the Philippine Space Development and Utilization Policy, and the Provincial S&T Directors Amendment.

Rep. Nograles also congratulated the DOST for the institutionalization of the Balik Scientist program and acknowledged the agency's role, through his Alma Mater--the Philippine Science High School -- for embodying in him "the core values of truth, excellence, and service to the nation."

The Balik Scientist Act signed by President Duterte on 15 June 2018 is expected to attract more overseas-based Filipino experts from 10 per year to an ambitious target of 40 by 2022.

During the opening ceremonies, Sec. de la Peña presented the Balik scientists who were in attendance, namely:

Dr. Jonel P. Saludes who came back from Washington State University now assists in enhancing the research program of the University of San Agustin in Iloilo City, particularly on soil-derived antibiotics against the so-called flesh-eating bacteria and other multidrug-resistant bacteria.

Dr. Louie Mar A. Gangcuangco, a research coordinator at the University of Hawaii came back to collaborate with University of the Philippines (UP) Manila-Philippine General Hospital in determining the neurological implications of HIV.

Dr. Gerard F. Dumancas was an assistant professor at the Louisiana State University Alexandria before returning to collaborate with University of San Agustin and Saint Paul University on molecular genetics and chemometrics (the application of mathematical and statistical data to extract chemical and physical information from complex data), particularly on predictive statistical modeling for

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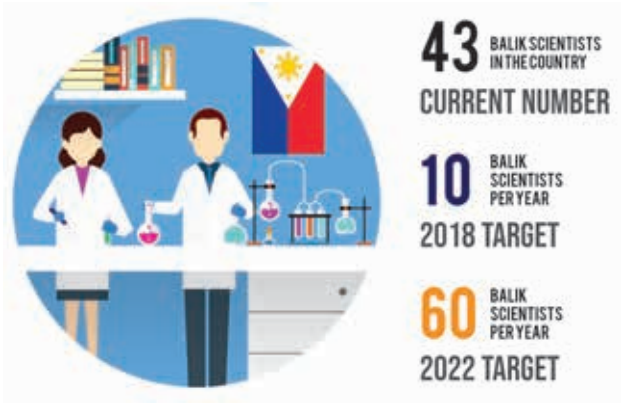
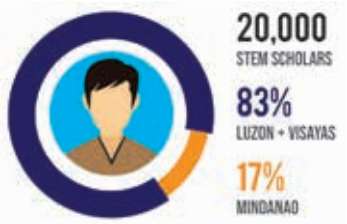


The Return of Balik Scientists



Opportunities for S&T

President Rodrigo Duterte, on stage with Sec. Fortunato T. de la Peña (center) and Mindanao Development Authority Chair Datu Abul Khayr D. Alonto (right), delivers his speech at the NSTW in Mindanao.

determining the authenticity of honey.

Dr. Eli Christopher I. Enobio who, after finishing his doctorate degree and post-doctoral fellowship at Tohoku University in Japan, came back as a full-time professor at the Mindanao State University-Iligan Institute of Technology to teach DOST scholars who were displaced by the Marawi siege.

Dr. Hernando P. Bacosa is a graduate of the Mindanao State University Marawi who had a brief stint at the DOST-Philippine Textile Research Institute before securing a research associate post at the Texas A&M University Galveston. He eventually returned to work on marine pollution and bioremediation research at the Western Philippines University.

Dr. Arnold A. Lubguban, now a full-time professor at the Mindanao State University-Iligan Institute of Technology, is working on lignocellulosic (referring to plant dry matter) biomass extracts derived from rice straws and pineapple leaves for recycling into insulative polyurethane foams. He is currently working with another Balik Scientist, Dr. Arnold C. Alguno, who is now a professor at the same university after his research fellowship at Tohoku University in Japan.

Dr. Raymond Francis I. Sarmiento who returned now his Alma Mater, UP-Manila to serve as director of the National Telehealth Center. He was able to implement a system that connects DOST-Philippine Council for Health Research and Development's RxBox flagship project with the electronic medical records systems of UP Manila and the Department of Health.

DOST-Davao's pride

The NSTW celebration also provided the DOST the opportunity to revisit SETUP adopters and be updated on some of the projects that were assisted by the department in the Davao region.

First stop was the famous Apo ni Lola Durian Delicacies located in San Miguel, Matina, Davao City. In its early stages, the shop was making durian candies with only few variants and basic flavors. It began with three workers including the owner himself, who was a third-generation descendant of Abondiadel Puerto Raakin or Lola Abon, from whom the business name was derived.

Apo ni Lola was provided assistance in the acquisition of the various machines it uses in making its products and in some training and consultancy services through SETUP.

After the DOST interventions, Apo ni Lola increased its production capacity and expanded its product line especially the baked goods, and the company was able to generate additional employment.

Now a popular Davao City *pasalubong* destination, the company's long-term plan is to transfer some of its production processes to a new production plant to be built near its current location.

Next stop was a tour at Porky Best Food, which uses the vertical helophyte filter system (a water filtration system), a technology introduced by the DOST-Davao Region.

Sean Ligvoet, a Dutch water engineering and waste management expert who introduced the technology to DOST, said that the vertical helophyte filter system is capable of treating wastewater in the site and that the technology is well known in Netherlands. Constructing the prototype will be done for only half a month, but it could last for 25 years.

Another gem in the Davao Region is the Halal Verification Laboratory. DOST-Davao Director Anthony Sales said that the laboratory plays a key role in the export and trade regulation of halal products, processes, and services by offering globally competitive laboratory tests and services relative to research and product development as well as quality assurance.

The last stop of the project visit was at the Malagos Garden Resort in Brgy. Malagos, Baguio District in Davao City.

Malagos Agri-Ventures Corp., which manages the Malagos Garden Resort, was likewise provided financial assistance through SETUP for the acquisition of a winnowing machine with electronic controls that serves as cracker and desheller. The company also benefited from food safety consultancy services provided by the Davao Food Safety Team.

The company reported a 40 percent increase in the recovery of cacao nibs during production trials of the new winnowing machine compared with the output of the manual winnowing. This improved performance of the production line allowed the company to expand its market distribution, supplying not only *pasalubong* centers and major malls in the Davao region but also in the entire country.

59th IMO Philippine team in Romania. *(L-R:) Carlo Francisco Adajar (trainer), Dr. Christian Paul Chan Shio (deputy team leader), Sean Anderson Ty (honorable mention), Andres Rico Gonzales III (honorable mention), Shaquille Wyan Que (bronze medal), Kyle Patrick Dulay (silver medal), Albert John Patupat (gold medal), Emmanuel Osbert Cajayon (bronze medal), and Dr. Richard Eden (team leader). (Photo courtesy of Shaquille Wyan Que)*

PH bags gold in international math contest

By Lovely B. Aquino, *DOST-SEI*

THE PHILIPPINES won its historic third gold medal in the prestigious International Mathematical Olympiad (IMO). Albert John Patupat of De La Salle University (DLSU) Integrated School gave the country its third gold medal in what is branded as "the Olympics of math competitions."

Aside from the gold medal, the Philippine team also bagged a silver medal, two bronze medals, and two honorable mentions in the 59th IMO held in Cluj-Napoca, Romania from 3 to 14 July 2018.

The country ranked 38th overall in the competition that was participated in by 107 countries. The IMO is the world championship mathematics competition for high school students and is considered as the most prestigious and the most challenging high school mathematics competition in the world.

Previous IMO gold medalist Kyle Patrick Dulay of the Philippine Science High School-Main Campus also won a silver medal this year. IMO first-timer Emmanuel Osbert Cajayon of Emilio Aguinaldo College, along with IMO veteran Shaquille Wyan Que of Grace Christian College, both secured bronze medals. Andres Rico Gonzales III of DLSU Integrated School and Sean Anderson Ty of Zamboanga Chong Hua High School each won an honorable mention award.

The team was headed by Dr. Richard Eden and deputy team leader Dr. Christian Paul Chan Shio, both from the Ateneo de Manila University. They were joined in Romania by trainer Carlo Francisco Adajar of the University of the Philippines Diliman.

The team's participation in the competition was made possible through the efforts of the Mathematical Society of the Philippines (MSP), with support from major sponsors Hyundai Asia Resources Inc. (HARI) Foundation and Manulife Business Processing Services, in partnership with the Department of Science and Technology-Science Education Institute (DOST-SEI).

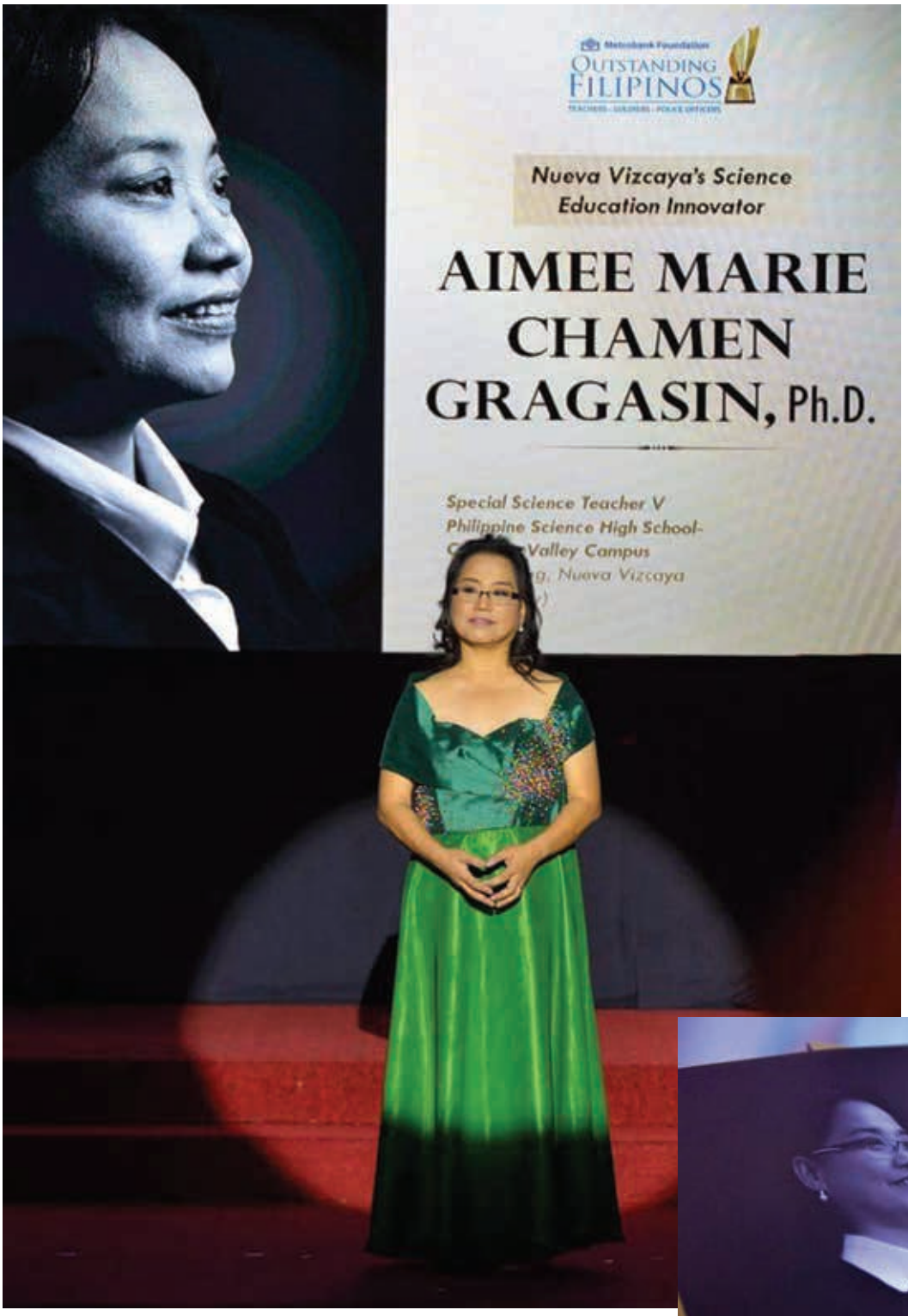
DOST-SEI Director Josette Biyo congratulated the team and lauded the MSP for tirelessly pursuing a stronger presence for the country in international mathematics competitions.

"Our young math wizards made us proud today but I hope the claps and cheers for them in the future would come from Filipinos [whom] they've helped improve lives through their outstanding mathematical abilities," Biyo said.

PH IMO team arrival at NAIA. (L-R:) Carlo Francisco Adajar, Dr. Christian Paul Chan Shio, Emmanuel Osbert Cajayon, Shaquille Wyan Que, Albert John Patupat, Kyle Patrick Dulay, Andres Rico Gonzales III, Sean Anderson Ty, and Dr. Richard Eden. (Photo courtesy of the Mathematical Society of the Philippines)

Pisay teacher gets Outstanding Filipino award

By Kimberly Mae J. Agustin, *DOST-STII*



Aimee Marie C. Gragasin during the awarding ceremony of the 2018 Metrobank Foundation Outstanding Filipinos. (Photo from PSHS-Cagayan Valley Campus)

IT WAS just an ordinary day for Aimee Marie Gragasin or Ma'am Aimee to her students when the campus director called her to give her the good news.

Aimee, who teaches physics at the Philippine Science High School (PSHS) Cagayan Valley Campus, got the surprise of her life when she was handed an envelope with a letter inside congratulating her as one of the 2018 Metrobank Foundation Outstanding Filipino awardees.

Aimee is one of the four teachers who were recognized by the foundation for being an outstanding educator. She was named as Nueva Vizcaya's Science Education Innovator. Aside from the teachers, three soldiers and three police officers also received the award.

The Metrobank Foundation Outstanding Filipinos is a career service award given to those in the academe, military, and police sectors who have rendered service above and beyond the call of duty and who are active agents of positive change and influence in their communities.

Aimee said that she became aware of the award as early as the 1990s. Although she never really considered it as her target, she said, "It was more of a wish for me, not a goal."

When asked what she thinks was in her that made her win the award, she proudly said, "After 24 years in government service, I have committed myself to serve unselfishly. What consistently motivates me to do the best that I can in my work is believing that when I do good things for people, their lives would improve," she said. Aimee pursued all of her projects believing that she can do more over and above being a teacher.

Aimee said that having been recognized because of her accomplishments and efforts is

already a reward in itself. She also believes that she won the award because of the values that she always brings with her in her work, in the community and in her family. And these values, she said, are love of country, excellent service and social responsibility.

Her love for physics and teaching

As early as four years old, Aimee already knew that she wanted to be a teacher when she grows up. Back then, she and her friends would often play pretend school, with her acting as the teacher. When she grew older, she fell in love with science. The dream of becoming a teacher combined with her deep love for science urged her to take a Bachelor's Degree in Education major in Physics at the Ateneo de Davao University.

She chose to teach physics because of its unpredictability. She believes that, "When you are asked about a situation that entails physics concept, often times common sense doesn't work." For her, physics is the most interesting science of all.

With her strong desire to share her knowledge on physics and inspire more students, she pursued a master's degree in teaching physics in the same university where she took her bachelor's degree. She then earned her doctorate degree in Educational Management at the Saint Mary's University in Bayombong, Nueva Vizcaya.

Aimee also taught at the Philippine Science High School in Davao, where she graduated high school, before transferring to the Cagayan Valley campus. She also taught for a year at the Bukidnon Stage College before teaching in Cagayan Valley.

Aimee the teacher

She is not just a smart Physics teacher but a creative one as well. In her class, every student who gives extra effort and goes beyond what is expected of them wins a "star". This star is for students who deserve additional three points. She believes that by doing this she is not merely rewarding her students but motivating them as well. Aimee said that her students are her ultimate motivation in teaching because she knows that she plays a crucial role in their life as their teacher.

In all her years of teaching, teacher Aimee considers motivating underachieving students as her number one challenge. She admits that it frustrates her sometimes because she feels she has done everything yet there are still students who are not motivated. Coping with the latest trends is also another challenge for Aimee because she feels that she must keep up with what her high school students are interested in.

Aimee Marie C. Gragasin (front row, fourth from right) joins the other recipients of the 2018 Metrobank Foundation Outstanding Filipinos. (Photo courtesy of PSHS-Cagayan Valley Campus)

Aimee has reached the peak of her career when she became part of the PSHS, also known as Pisay. She said that Pisay has been very supportive of her that is why she was able to serve the school, her community and the whole Cagayan Valley region through several projects that she initiated.

In her desire to serve her school and community even more, Aimee organized a steering committee for the maiden implementation of the Science Internship Program in PSHS Cagayan Valley Campus. It was also through Aimee's efforts that the region-wide Pisay Quiz Show intended for PSHS National Competitive Examination (NCE) applicants was initiated.

When she first thought of holding the Pisay Quiz Show, she asked herself. "How can we help pupils in Region 2 pass the NCE?" And so she and her colleagues came up with a project for grade 6 pupils who are having difficulty in answering questions in science, mathematics, English, and abstract reasoning which are the key subjects in the NCE.

Aimee also spearheaded the implementation of the My Community Our Earth program in collaboration with the American Association of Geologists. In the said project, Aimee thought of the pressing issue of climate change. She said that at that time she asked herself, "How can we help educate the people in our community about this issue?" With the help of her Earth Science class, they came up with community-based researches that were showcased during the United Nations Convention on Environmental Sustainability in 2012.

Aimee's support system

To be able to strike a balance between her busy school work and community involvement is what Aimee considers as her greatest career accomplishment.

She attributes her winning the award not just because of her accomplishments but also because of her teaching experience in Pisay. She said that Pisay has given her all the opportunities to realize her career life goals.

Aimee says that Pisay has been generous in sending her to seminars and trainings even abroad for her professional development. The school has also been generous in giving her time to finish her master's and doctoral degree, and even allowed her to take a leave during her data gathering, thesis writing, and dissertation.

Teacher Aimee adds that her Pisay students also continuously motivate her to be excellent in her teaching. She added that her colleagues in Pisay have also been very cooperative in every project she implements.

Lastly, she said that she could not discount the support of her campus directors Dr. Rosita V. Fundador, Dr. Efren B. Mateo, and Dr. Salvador B. Romo whom she all thinks highly of and looks up to as the epitome of utmost service and commitment.

For her, without Pisay, she would not have won the award.

Aimee hopes that with the award she received she would be able to inspire Filipinos to love their work more, to strive more, and to not get tired of serving the Filipino people.

Dr. Gragasin proudly shows her trophy as one of the 2018 Metrobank Foundation Outstanding Filipinos. (Photo from PSHS-Cagayan Valley Campus)

PH team wins silver and bronze at International Physics Olympiad

By Lovely B. Aquino, *DOST-SEI*

Bearing the Philippine flag with pride. *The Philippine team at the International Physics Olympiad (L-R): Prof. Ian Vega, Mikhail Torio, Steven Reyes, Charles Bartolo, and Prof. Perry Esguerra. (Photo from DOST-SEI)*

THREE FILIPINO students took the country closer to gold than it has ever been at the 49th International Physics Olympiad (IPhO) by taking home a silver and two bronze medals at the annual worldwide competition.

Steven Reyes from St. Jude Catholic School (SJSC) bagged a silver medal, while Mikhail Torio from the Philippine Science High School-Main Campus (PSHS-MC) and Charles Bartolo from the PSHS-Central Luzon Campus (PSHS-CLC) each brought home a bronze medal.

Dr. Josette T. Biyo, director of the Department of Science and Technology-Science Education Institute (DOST-SEI), congratulated the team for placing 34th out of 87 delegations that participated in this year's IPhO—achieving the best ranking in 13 years of participation. Reyes, Torio, and Bartolo ranked in the 88th, 68th, and 58th percentiles, respectively, out of a total of 396 student delegates.

"The triumph of our IPhO team is nothing short of remarkable. Our latest science and technology human resource development stat updates reveal that the number of physicists in the country decreased significantly, yet technological advances are fueled by physics-based researches. We hope they will continue their interest in the field and soon pursue a career in physics. I cannot emphasize enough the need for skilled physicists and their innovative application of physics to enable our economy to move forward swiftly," said Biyo.

Each year, the IPhO gathers teams of secondary school students from around the world to compete against each other in a set of individual theoretical and laboratory physics exams.

This year's problems involved the detection of gravitational waves, the ATLAS instrument at the Large Hadron Collider, and the physics of blood flow and tumor growth for the theoretical exam. Meanwhile, the experimental exam centered on paper transistors and the viscoelastic properties of a polymer thread.

Accompanied by team co-leaders Prof. Perry Esguerra and Prof. Ian Vega (both from the University of the Philippines National Institute of Physics), the team competed in Lisbon, Portugal from 21 to 29 July 2018.

To prepare for the competition, Reyes, Torio, and Bartolo underwent intensive training under Prof. Esguerra, Prof. Vega, and Michael Solis of the Theoretical Physics Group and team co-leader Prof. Nathaniel Hermosa of the Photonics Research Laboratory at the National Institute of Physics. They also received training and guidance from coaches Russel Odi (SJSC), Vinni Dajac (PSHS-MC), Rex Forteza (PSHS-CLC), and Lemuel Pelagio Jr. (PSHS-CLC).

The team competed in the 2018 IPhO with generous support from Unilab Foundation, Philippine Science High School Foundation, Inc., PSHS-MC, PSHS-CLC, SJCS, and individual donors from the physics community. Dr. Reina Reyes, IPhO team co-leader, expressed hope for the team to gain more institutional and funding support.

The Philippine team plans to send another delegation to the 2019 IPhO, which will be held in Tel Aviv, Israel.

For more details, interested parties may contact the Philippine IPhO team at ipho.team.ph@gmail.com.

Young Pinoys win big in Singapore math competition

By Lovely B. Aquino, *DOST-SEI*

The Philippine team at the Singapore International Mathematics Olympiad Challenge. (Photo courtesy of Cecile Kasilag)

THE PHILIPPINE team collected 126 medals in the 4th Singapore International Mathematics Olympiad (SIMOC) held in Singapore on 7-8 July 2018. The team, composed of 116 Grade 2 to 11 students from various schools in the country, won 14 gold medals, 43 silver medals, and 69 bronze medals, with some students receiving multiple medals across three different categories.

Sixteen countries including the Philippines participated in the competition. The Philippine team joined the Olympiad through the efforts of the Asian MathSci League Inc. (AMSLI).

During the competition, the SIMOC group, headed by Executive Director Henry Ong, kept the teacher-coaches busy with a day-long training aimed to improve the teaching of mathematics.

Invited representatives from the Department of Education and the Department of Science and Technology-Science Education Institute (DOST-SEI) likewise attended mathematics-related seminars conducted by professors from the National Institute of Education of Singapore.

DOST-SEI Director Josette T. Biyo congratulated all the winners and thanked the AMSLI for their efforts in introducing young Filipinos to international math and science competitions.

"Here's a fresh crop of math champions that we eagerly look forward to welcoming in the science community. At an early age, they have made the country proud. We hope the SIMOC competition ignited their passion and talent for mathematics in as much as it instilled in them the value of collaboration, hard work, and patriotism," Biyo said.

The awarding ceremony was held on 8 July 2018 at the National University of Singapore Cultural Centre Theatre. Among those who attended the ceremony were AMSLI President Rechilda Villame and Philippine Ambassador to Singapore Joseph Del Mar Yap.

The SIMOC is a unique concept of mathematics competition, which, according to its website, not only tests the contestants' ability to solve mathematical problems but also tests their ability to work as a team in playing interactive mathematical games and solving puzzles.

Philippine Ambassador to Singapore H.E. Ambassador Joseph Del Mar Yap (4th from left) with Laarni Zorayda S. Gandarosa, Karen Louise Villas of DOST-SEI, Rechilda Villame of AMSLI, and the Philippine team in their traditional attire during the awarding ceremony at the National University of Singapore Cultural Center. (Photo courtesy of Miguel Mondy Mendoza)

Science Centrum awarded for advocating science education in Mindanao

By Kimberly Mae J. Agustin and Carlo B. Canlas, *DOST-STII*

THE PHILIPPINE Science Centrum will receive for the second time a prestigious award for its project that gave spotlight to propagating science education in geographically isolated areas in Mindanao.

The project, Science Works for Peace in Mindanao, won for the Science Centrum the Roy L. Shafer Leading Edge Award for Visitor Experience. The awarding ceremony was held at the 2018 Association of Science-Technology Centers (ASTC) Annual Conference in Hartford, Connecticut in the United States on 28 September to 2 October 2018.

The Visitor Experience award is given to an ASTC member institution whose science centrum and museum visitor experience demonstrated creativity and exceptional application of new ideas. To qualify for the award, the institution also has to show extraordinary performance in achieving a lasting effect on visitor experience, something that will also serve as a model for best practices for the field in general.

According to the ASTC, the awarded project of Science Centrum exemplifies these qualities in its effort to promote equity and inclusion in STEM (science, technology, engineering, and mathematics) in underrepresented and trauma-impacted areas in Mindanao.

The Philippine Science Centrum is the country's pioneer interactive science museum and a flagship program of the Philippine Foundation for Science and Technology that aims to promote science education in the country.

The Science Centrum was previously awarded the Roy L. Shafer Leading Edge Award for Business Practice in 2011 for its remarkable hard work and perseverance in rebuilding and restoring the science center after the destruction caused by Typhoon Ondoy. The typhoon sent nine-foot-high flood waters in the science center and destroyed its exhibits. Within 24 hours, their staff and trustees planned a fundraising campaign called Project 926 for the renovation of the center and in less than six weeks it was reopened to the public and was fully restored after four and half months.

The Roy L. Shafer Leading Edge Awards is presented annually to ASTC members and/or their employees in recognition of extraordinary accomplishments that enhances the performance of their own institution and progresses the mission of science centers and museums.

The award was in commemoration of the late Roy L. Shafer, a former ASTC president for two years and a member for 11 years of the ASTC Board of Directors. Shafer became the ASTC's organizational coach who helped the association develop its mission, strategic plan and core values.

ASTC is a global organization that provides voice, support and opportunities for science centers, museum and institutions that strive to impart knowledge and awareness in the field of science to the public.

Virus detector captures top award in DOST's invention tilt

By Jund Rian A. Domingo, *DOST-TAPI*

THE LAMP primer, a technology that detects the presence of the deadly white spot virus in cultured shrimp, took home the first prize for the Outstanding Invention (Tuklas Award) Category during the 2018 National Invention Contest and Exhibit (NICE) held on 14-16 August 2018 at the Le Pavillon Metropolitan Park in Pasay City.

Prof. Mary Beth B. Maningas and Dr. Benedict A. Maralit of the University of Santo Tomas took home P300,000.00 for their entry "LAMP Primers for White Spot Syndrome Virus". They also took home a plaque and certificate of recognition from DOST-TAPI, and gold medals from the World Intellectual Property Office (WIPO) and International Federation of Inventors Associations (IFIA).

For the Outstanding Utility Model, first prize went to the "Portable Unihoused Water Purification and Sterilization Apparatus" that provides instant source of safe drinking water through filtration by Engr. Rodrigo P. Duque, a mechanical and electrical engineer from the Cordillera Administrative Region. While the "Interlocking Block (Ecoblock)" that maximizes flexibility in creating a total matrix within a system when completed, won for Justino R. Arboleda of Quezon City the first prize for the Outstanding Industrial Design Category.

The Outstanding Utility Model and Outstanding Industrial Design first prize winners took home P200,000.00, plaque and certificate of recognition from DOST-TAPI, and WIPO and IFIA gold medals each.

The Likha Award for Creative Research Category which is given to a research and development that has a potential to develop into a reliable and relevant commercial viable technology was given to the "Impeller Compact Rice Mill" by Dr. Michael A. Gragasin, Dr. Romualdo C. Martinez, and Jayvee P. Illustrisimo, all from the Philippine Center for Postharvest Development and Mechanization in Nueva Ecija. They took home P100,000.00, plaque and certificate of recognition from DOST-TAPI.

For the Sibol Award (Student Creative Research for College), the "Flame Emission Photometric Determination of Iron via Digital Imaging-Based Detection" bagged first prize for Sandra Mei M. Branzuela of the Pamantasan ng Lungsod ng Maynila. While first prize for the Sibol Award (Student Creative Research for High School) went to the "Pectin-carboxymethyl Cellulose Biocapsule for Potential Colon Targeted Oral Drug Delivery" by Felix Arthur C. Dioso, Jeremae Aira M. Moderno, and Coleen A, Quirim, all from the Philippine Science High School Southern Minadanao Campus.

The Sibol awardees received PhP100,000.00, plaque and certificate of recognition from DOST-TAPI.

The qualifiers for the 2018 NICE are winners of the Regional Invention Contest and Exhibit conducted all over the regions in 2017. Previous finalists of the NICE were able to take advantage of the comprehensive programs of the Department of Science and Technology-Technology Application and Promotion Institute (DOST-TAPI) specifically tailored for the needs of the inventors and researchers in whichever commercialization phase they are in.

"Since all of the finalists of the 2018 NICE are considered winners, all of them are entitled to avail of the numerous programs and assistance provided by DOST-TAPI from intellectual property rights protection to technology commercialization," said DOST-TAPI Director Edgar I. Garcia.

"When introducing a new invention, one must have a strong will and determination to defend your inventions to the stakeholders, including your possible competitors," said DOST Secretary Fortunato T. de la Peña, who also reiterated the contribution of inventions and innovations to economic progress and social development.

Spearheaded by the DOST-TAPI, NICE is held annually pursuant to Republic Act 7459 or the "Inventors and Invention Incentives Act of the Philippines" to showcase the Filipino's innovative nature and to recognize these innovations.

DOST Secretary Fortunato T. De La Peña (sixth from left, 2nd row) and DOST-TAPI Director Edgar I. Garcia (3rd from left, 3rd row) with the winners of the 2018 NICE during the Closing and Awarding Ceremonies on 16 August 2018 at the Le Pavillon Metropolitan Park, Pasay City. (Photo from DOST-TAPI)

DOST honors outstanding science reportage

By Rosemarie C. Señora and Allyana A. Almonte, *DOST-STII*

The power of the media in shaping and creating a culture of science, technology, and innovation (STI) in the country was celebrated in the first ever Bantog Media Awards.

Journalists covering, reporting and writing stories about STI, as well as media institutions giving valuable airtime, print space or online presence to said stories were presented with the distinction of being the first recipients of the Bantog: The Science for the People Media Awards.

Presented by the Department of Science and Technology (DOST) through its information and marketing arm, the DOST-Science and Technology Information Institute (DOST-STII), the awarding was held on 28 September 2018 at the Philippine International Convention Center in Pasay City. DOST Secretary Fortunato T. de la Peña led the awarding ceremony.

Patterned after the first S&T Media Awards or the Dr. Jose L. Guerrero Media Awards held in 2012, the Bantog Media Awards is given in recognition of the important role of media practitioners in government and private practice who made significant contributions in the promotion of STI information in the country through outstanding science reporting and coverage. The award also aims to encourage the media to continue

fostering a culture of science in the country.

Bantog awardees

After careful evaluation of the distinguished panel of judges, 16 individuals and four institutions stood out from the 47 entries received under the four categories of the Bantog Media Awards, namely: Institutional Media Award, Outstanding S&T Journalist Award, Outstanding Regional Media Practitioner Award, and Outstanding Information Officer Award.

The Institutional Media Award is given to an institution or organization that has served as a vital link between the science and technology (S&T) sectors and its clients through informative advocacy. The four recipients of the Institutional Media Award were Panahon TV for television, DZEC Radyo Agila for radio, Business Mirror for print, and GMA Social Media Section for online.

Meanwhile, the Outstanding S&T Journalist Award is given to an individual media practitioner who has been an ardent advocate of S&T in print, broadcast, or online. Three winners were selected for the following sub-categories: Outstanding S&T Journalist Award for Radio, Outstanding S&T Journalist Award for Television, Outstanding S&T Journalist Award for Print, and Outstanding S&T Journalist Award for Online. The Outstanding S&T Media Practitioners received P100,000 for the first prize, P50,000 for the second prize and P25,000 for the third prize.

For television, Connie Sison of GMA Network bagged the first place, Bettina Magsaysay and Michael Joe Delizo, both of ABS-CBN got the second and third place, respectively. In the radio category, Custer Deocaris, Josephine Agapito and Anabelle Surara all from DZEC Radyo Agila, placed first, second and third, respectively.

Meanwhile, Outstanding S&T Media Practitioners for print category went to Stephanie Tumampos (first place) of Business Mirror, Henrylito Tacio (second place) of Marid Agribusiness Digest, and Paul Icamina (third place) of Malaya Business Insight. For online, Mikael Angelo Francisco of GMA News Online emerged as winner, with Ruby Shaira Panela and Angela Yang, both freelance journalists and Rappler contributors as second and third place, respectively.

Ian Flora of Sun Star Pampanga was the recipient of the Outstanding Regional Media Practitioner Award, which is given to a region-based media personality who has shown strong support in promoting STI information. He received P50,000.

DOST also recognized home-grown talents with the Outstanding Information Officer Award, which is given to exemplary information officers in DOST working in the areas of communication production and dissemination. First prize for the Outstanding Information Award was given to Maria Elena Talingdan of the DOST-National Research Council of the Philippines; Hans Joshua Dantes of DOST-Philippine Nuclear Research Institute placed second, and Sheila Marie Claver of DOST-Cordillera Administrative Region placed third. The Outstanding S&T Information Officers received P30,000, P20,000 and P10,000 respectively.

The panel of judges was composed of Commissioner Raymund Liboro of the National Privacy Commission; Ramon "Bong" Osorio, columnist at the Philippine star; Reynaldo Hulog, executive director of Kapisanan ng mga Brodkaster ng Pilipinas; Ma. Theresa Velasco, dean of the College of Development Communication at the University of the Philippines Los Baños; Queena Lee-Chua, Professor of the School of Science and Engineering in Ateneo de Manila University, and Erwin Lemuel Oliva, head of Content Management for Digital Marketing at Metropolitan Bank & Trust Co.

The next Bantog Media Awards will be held in 2020.

STARBOOKS partners launch

The awarding ceremony also became a venue for the signing of partnership agreements by the DOST-STII with four institutions for the Science and Technology Academic and Research-Based Openly Operated Kiosks or STARBOOKS, which is dubbed as the country's first-ever digital library that offers thousands of S&T information even without internet connection.

First among the memorandums of agreement that DOST-STII entered into was with IBM Philippines. Under the said agreement, IBM representatives will provide advisory services to the DOST-STII on a voluntary basis in developing a prototype system for scaling up STARBOOKS.

Specifically, the partnership will focus on enabling DOST-STII's technical staff to establish and operate scalable systems for STARBOOKS that will make it more accessible, replicable, and cost-effective to disseminate to underserved regions/communities.

DOST-STII also entered into an agreement with the Department of Energy which will provide DOST-STII the digital copy of their information resources to be included in the STARBOOKS database without cost.

Meanwhile under the partnership agreement with Enchanted Kingdom (EK), the theme park will provide space for STARBOOKS in the park's Agila Area and provide DOST-STII 360 regular day-pass park tickets valued at P900.00 each. Thirty tickets will be distributed monthly for 12 months to support the promotion of STARBOOKS.

The partnership will also provide support to DOSTv: Science For The People, the official weather and science program of the DOST. Under the agreement, EK will allow the programs' plugs and teasers to be played in an identified area in the theme park. In return, EK will enjoy media exposure at DOSTv with a 15-seconder TV commercial.

Finally, a partnership with the Philippine Cyber Institute (PCI) will promote the STARBOOKS National Convention through pre-event and post-event write-ups and stories that will be posted online on their social media outlets. PCI will also allow DOST-STII to use its equipment such as drone, 360 camera, other video and photography equipment for the event's coverage subject to the equipment's availability and guidelines for use issued by the company. Lastly, PCI will provide education technology experts upon request by DOST-STII.

DOST to lead 2018 Nat'l Biotech Week festivity

By Allan Mauro V. Marfal, *DOST-STII*

For this year, the Department of Science and Technology (DOST) will be at the forefront of staging an event that would help increase public awareness on the benefits of biotechnology.

DOST, together with various national government agencies, non-government organizations, and academe will hold the 2018 National Biotechnology Week (NBW) celebration on 13-17 November 2018 at the World Trade Center in Pasay City.

Carrying the theme "Pambansang Hamon, Pambansang Solusyon," this year's NBW will highlight how various biotechnology products, researches, and services could help address the challenges and limitations that exist in different areas in the country.

"In recent years, our scientists and different R&D (research and development) institutions have managed to discover new knowledge, products, and services on how different applications of biotechnology could help in various sectors such as agriculture, healthcare services, disaster preparedness management, and environmental conservation," said DOST Secretary Fortunato T. de la Peña.

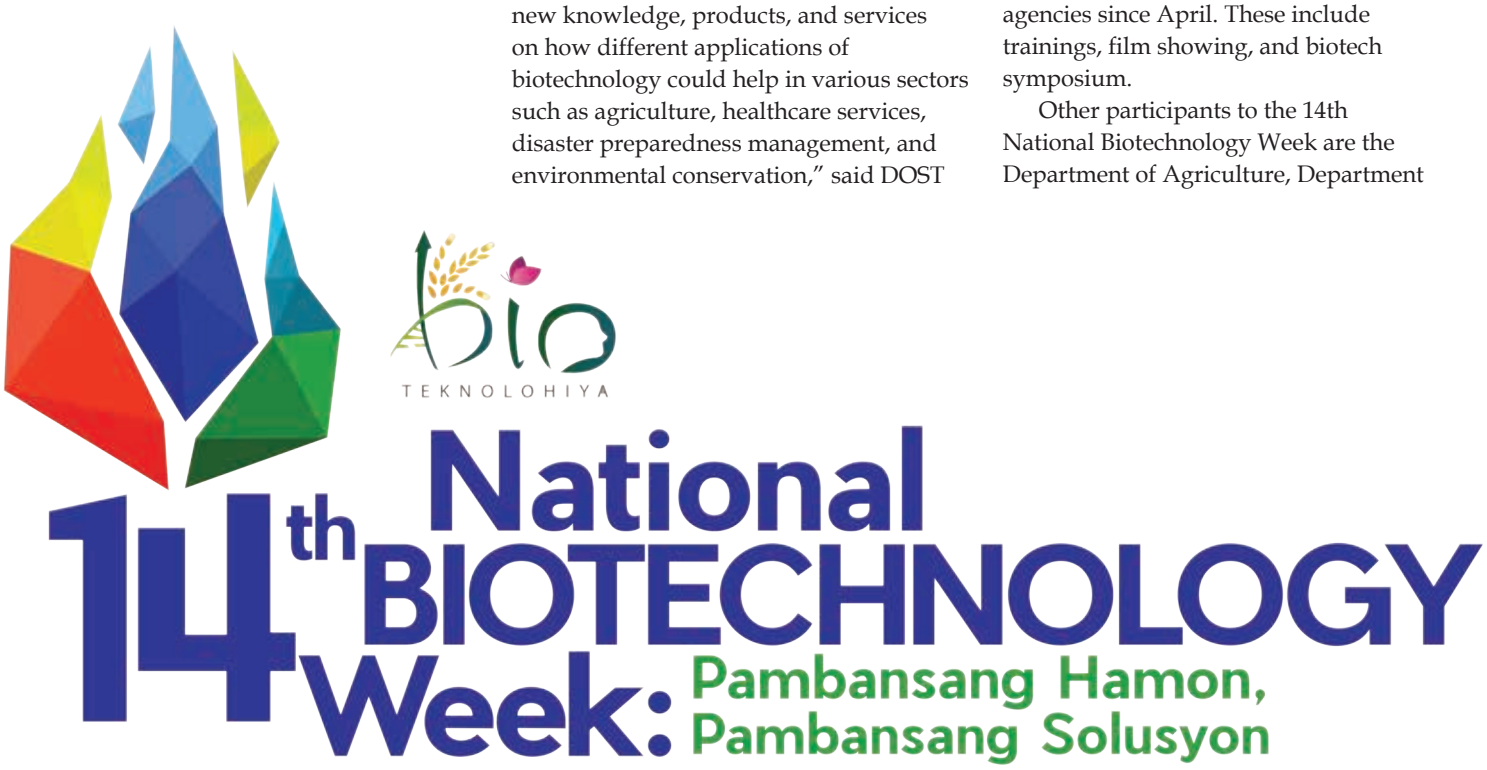
Sec. de la Peña also said that celebrating NBW will give opportunity for everyone to demonstrate how collaboration among universities, the private sector, other government agencies, and the public can create new products and services that can benefit everyone.

During the five-day celebration, participating agencies will mount interactive exhibits that will feature different biotechnology researches and projects.

Various science and technology (S&T) fora, biotech jingle and Sabayang Bigkas competitions, S&T career talk, science journalism writeshop, National Farmers' Congress, biotech fun art, and a healthcare forum will be also conducted during the 2018 NBW.

Meanwhile, to herald the NBW, various activities were conducted by participating agencies since April. These include trainings, film showing, and biotech symposium.

Other participants to the 14th National Biotechnology Week are the Department of Agriculture, Department



Photos from the National Biotechnology Week facebook page

of Education, Department of Health, Department of Environment and Natural Resources, International Rice Research Institute, Southeast Asian Regional Center for Graduate Study and Research in Agriculture, UP Los Baños, Biotechnology Coalition of the Philippines, Commission on Higher Education, and the University of the Philippines Diliman-National Institute of Molecular Biotechnology and Biology.

Created by virtue of Presidential Proclamation No. 1414, NBW is being celebrated every third week of November to highlight the many contributions of biotechnology to agriculture and food security, equitable health care services, development of industries and business enterprises, sustainable environment, economic development, among others.

For more information, visit and like NBW's Facebook page https://www.facebook.com/nbwphilippines/.

DOST-Pisay eyes Palawan students for S&T scholarship

By Rodolfo P. De Guzman, *DOST-STII*
Photos by Neil Anjo B. Bio, *DOST-STII*

Usec. Carol M. Yorobe enjoins Pisay students to make good use of their talents.

In a bid to draw elementary students to take science scholarship and go the STEM (science, technology, engineering, and mathematics) track when they get to high school, the Philippine Science High School (PSHS) or more commonly known as Pisay held a research summit in Palawan. Called the 2018 Science Research Summit, the event was held from 28 September to 1 October 2018 at the Skylight Convention Center in Puerto Princesa, Palawan.

During the summit, Pisay students from various campuses presented research studies—one for inter-Pisay completion and another for presentation to Palawan students. Teachers, meanwhile, were engaged not only as guides in the fair but also as participants to a seminar on Zika mosquito protocol training sponsored by the Global Learning and Observations to Benefit the Environment or GLOBE.

There were 63 student-prepared research papers presented out of the 107 submitted systemwide, covering six areas, namely biology, chemistry, material science, engineering, environmental science, and computational science.

"This four-day summit is designed to provide and share the latest information and to highlight numerous scientific discoveries of PSHS students and enable them to embrace the culture of scientific inquiry and share their experiences with co-Pisay students," said Department of Science and Technology (DOST)-PSHS Executive Director Lilia T. Habacon. Pisay, which is under the DOST, has its own special curriculum that is designed to develop students holistically but with strong emphasis on science and technology.

One of the special features of the summit was Hillary Diane A. Andales, a Pisay alum from the Eastern Visayas campus in Palo, Leyte, who shared her experience as a Pisay student and as the winner of the 2017 Breakthrough Junior Challenge held in the United States.

The team building session enabled participants to meet and play together with students of other Pisay campuses.

"When I was just an elementary student, I have always wanted to be part of the cream of the crop, of studying in Pisay whenever I see the three-storey building (in Palo) even if I have to sacrifice fun," Andales said. She underscored the importance of having a dream and setting clear goals to be able to achieve success.

"For me it is important to have a dream, and my dream then was to enter Pisay but later I realized that Pisay is not the dream itself but one of my goals. Pisay is just a stepping stone to achieve my ultimate dream of creating a world that value learning; to change the world through science," added Andales.

Also, during the opening ceremonies, Dr. Foong Tse Foon, chief executive officer of Nanyang Polytechnic International Singapore, one of the invited speakers, higlighted the importance of identifying the three D's, namely dream, difficulty and destiny in order to succeed. He further said that Singapore, a couple of decades ago, invested in human capital by sending 1,000 scholars in different top universities in the world to learn new technologies that they brought back home.

The need to invest on the youth was echoed by DOST Undersecretary Carol M. Yorobe who represented Secretary Fortunato T. de la Peña. Usec. Yorobe urged the Pisay students to strive harder because they are the next generation of scientists, engineers, and mathematicians that the country will need in the future.

"As young scientists you must make good use of your talents for society and as you proceed in your career always remember your fellowmen, whether you are in the field of nuclear science, space technology, and data science. But with limited institutions offering these courses, we also consider sending scholars in institutions abroad. And with the Balik Scientist Program, our scientists and engineers can share their talents to benefit government, industry, and other sectors," said Dr. Yorobe.

Aside from the orientation on the first day, the Pisay students also had a team building for them to meet other students from other Pisay campuses and build friendships and networks. Various campuses of Pisay have been established in all regions, namely Pisay Main Campus in Quezon City, CALABARZON, Eastern Visayas, Central Visayas, Western Visayas, Southern Mindanao, Zamboanga, Cordillera Administrative Region, Central Luzon, and MIMAROPA, the youngest campus which was established just this year. The establishment of Pisay campuses and having Pisay scholars all over the country is in pursuit of the DOST's goal of bringing science to the people.

Winners of research paper presentations beam with pride and joy of having their hard work recognized.

Bringing STARBOOKS up the mountains

Photo by Rosemarie C. Señora, DOST-STII

By Rosemarie C. Senora, *DOST-STII*

After almost five hours of land travel from Baguio City to Kabayan, Benguet, two solar-powered STARBOOKS team arrives at Tawangan-Lusod National High School. (Photo by Ceajay N. Valerio, DOST-STII)

It was an exceptional parade of modern *bayanihan* when the Science and Technology Academic and Research-Based Openly Operated Kiosks (STARBOOKS) was brought to two schools up the mountains of Cordillera.

A total of four units of the solar-powered digital library in a box donated by the Telstra Foundation Philippines were literally carried up the mountain through slippery, mountainous road to reach the two beneficiary schools. In these schools, STARBOOKS will serve as a convenient source of science and technology (S&T) information for both students and teachers.

The "bayanihan" team was composed of staff from the Department of Science and Technology-Science and Technology Information Institute (DOST-STII)—the developer of STARBOOKS, DOST-Cordillera Administrative Region (DOST-CAR) staff, local officials from the Department of Education (DepEd) Benguet, and local residents who volunteered to help carry the kiosks.

Day 1: Yabyabuan Multi-Grade School in Sablan, Benguet

From our lodging in Baguio City, two hours away from the foot of the mountain, dark clouds with soft drizzle were already threatening our morning climb to Yabyabuan Multi-Grade School in Sablan, province of Benguet. Nonetheless, the prospect of seeing the faces of young children lit up in excitement when they see and use the STARBOOKS for the first time overpowered our nervousness to face the almost two-hour travel on a muddy and slippery trail.

Little did we know that the challenge does not end with traversing the treacherous road, as halfway through our land travel to the jump-off site, our rented van cannot pass through the flooded and blocked portions of the road due to side mountain erosions. Thankfully, the DepEd offered its pickup truck to carry the two kiosks, and the DOST-STII staff happily joined the other service cars up to the jump-off site.

Upon reaching the site, we were warmly welcomed and were amazed when the parents of the students of Yabyabuan

Multi-Grade School volunteered to carry the two kiosks.

After the almost two-hour climb consisting of many life-threathening slides on literally the side of the mountains, tripping over rocks, getting wet with occasional rainshowers, and crossing small rivers, we finally reached the school where we were welcomed with a sumptuous meal of traditional dishes.

A simple program commenced shortly after the feast with a prayer of thanksgiving for the safe hike of the team.

"I hope that the teachers will maximize the use of these computers," said Nilo Uyam, principal of the school, who also expressed thanks to Telstra Foundation Philippines and DOST-STII and said that they are fortunate enough that they finally have STARBOOKS that will help enhance the knowledge of the students.

DepEd Benguet Education Program Supervisor Wilfred Bagsao said that they will maximize the use of STARBOOKS and is hopeful that in the coming years, a scientist will soon emerge from the school.

Through a message that she sent, DOST-CAR Regional Director Dr. Nancy Bantog likewise thanked Telstra and DOST-STII for the collaboration. She said that the deployment of the STARBOOKS to the recipient schools is important as it will help enhance the development of science and technology in the region.

According to DOST-CAR, the region now has 118 STARBOOKS units—82 of which were provided with only the software, while the remaining were provided with full computer sets with STARBOOKS installed.

Further, of the 77 municipalities and cities in the region, 33 have already been given STARBOOKS units including the beneficiaries of the Community Empowerment through Science and Technology (CEST) program of the DOST. This year will also be a landmark year for DOST-CAR as a memorandum of agreement with DepEd will provide more opportunities for STARBOOKS.

DOST-CAR also hopes that more people will benefit from DOST developed technologies, particularly STARBOOKS.

After the program, the teachers and students were oriented on how to use the STARBOOKS.

Pastora Cosisi, a teacher of kindergarten and grade 2 students, said that among the challenges she faced prior to receiving STARBOOKS is the scarcity of learning materials and resources. Oftentimes, the teachers have to go to Baguio City just to acquire the right teaching materials, which is quite challenging because it would take them almost two hours to go down from the mountains and travel for another two hours from Sablan to Baguio City. This is the reason why she is thankful for the STARBOOKS deployed in their school, adding that DOST-STII is the only national government agency to have set foot in their school.

Group photo with school administrators, teachers, and students of Tawangan-Lusod National High School. (Photo by Ceajay N. Valerio, DOST-STII).

Likewise, Resty D. Soltero, teacher of grades 5 and 6 students, said that there are no books available in the school especially with the introduction of the K-12 curriculum. He said that teachers like them have to personally print activity sheets in their own homes to aid them in the teaching-learning process.

Both teachers said that STARBOOKS will definitely help in increasing the proficiency of the students in science and mathematics, especially as the first batch of elementary students will be graduating at the end of the current school year.

Day 2: Tawangan-Lusod National High School, Kabayan, Benguet

The next day's travel proved to be equally challenging as the first day. Though it no longer involved a mountain hike, the travel from Baguio City to Kabayan-Benguet was almost five hours, plus another five hours going back to Baguio City.

Situated on top of a hill, Tawangan-Lusod National High School was established in 2003 and has a current population of 119 students, 10 teachers and three non-teaching faculties.

School Head Arnold L. Manio welcomed and thanked the team for coming despite the weather and the distance. He said that the two solar-powered units of STARBOOKS will be extremely helpful because their library does not have an electricity, their school library contains old reference materials and contains only a few teaching modules.

He said that they were advised by their division office to download additional reference materials from the Internet but the problem for them is the slow internet connectivity.

With STARBOOKS, students and teachers can access thousands of S&T information materials even without Internet connection.

Denny Queen Lepi, the school's librarian, said that STARBOOKS will be of great help especially to the organization of their library.

As for the teaching-learning process, Nene P. Dimot, a science teacher of grades 7, 8, and 10 students, said that STARBOOKS will be the solution to the teachers' dilemma of students being visually inclined when it comes to learning their lessons.

"Makatutulong talaga lalo sa mga teachers na maipahatid sa kanila ang lessons (It would be really helpful especially for the teachers to relay the lessons [to the students])," Dimot said.

Science empowered women

By Laurence San Pedro and Rosemarie C. Señora, *DOST-STII*

Engr. Myra Ruth S. Poblete

Hillary Diane A. Andales

Karen S. Ibasco

It was an afternoon full of joyous laughter, animated talks and ignited dreams as three exceptional women whose lives were touched by science in one way or another shared their worthwhile journey as scholars of the Department of Science and Technology (DOST).

Held on 16 August 2018 at the Philippine International Convention Center (PICC), a crowd of young women, mostly senior high school students, were inspired in the Women Inspiring Women Forum that was spearheaded by the DOST-Science Education Institute, to pursue careers related to science and technology. The forum also aimed to diminish the stereotyping of careers to certain gender.

The kick-ass engineer

A former DOST scholar and now an Assistant Professor at the Department of Mining Metallurgical and Materials Engineering at the University of the Philippines in Diliman, Engineer Myra Ruth S. Poblete wowed the crowd as she recounted that back in high school, she was just an average student. She recalled having failing grades in various subjects.

When she applied for DOST scholarship for college, she said that she just picked the course she thought sounded nice, so she took up Bachelor of Science in Materials Engineering. "I did not even know such scholarship existed [back then]," she added.

A materials engineer like Engr. Poblete works on the improvement of what things are made of and how things are made. They create and study materials at the atomic level and understand and model the characteristics of materials and their components.

As a female engineer in a field dominated by mostly men, Engr. Poblete said that fear of failure should not be a hindrance for young women to pursue the things that they think only men are capable of doing. Instead, they should be inspired to take the higher path of leveraging the fields of science, technology, engineering, and mathematics (STEM) as equal grounds of opportunities, regardless of gender.

The breakthrough girl

Hillary Diane A. Andales, a Philippine Science High School Eastern Visayas Campus alumna is also known as the 'Breakthrough Girl' for having won the top prize of the 2017 Breakthrough Junior Challenge and for putting the Philippines on the worldwide map of excellent and innovative science communicators.

Andales shared her experience of how, from her humble home in Abuyog, Leyte, she came to love the wonders of science. "The view made me really love science," she said referring to the pure and serene view of the ocean near their house.

Andales expressed her sentiments that only few women study STEM, and said that this should be a reason why people, especially young women like her, should be encouraged to start appreciating science.

Realizing how winning the Breakthrough Junior Challenge inspired her to become what she is today, she made it her advocacy to campaign for the elimination of inequality and close the gender gap in the field of science, which she says should remain as an ungendered enterprise.

The beauty queen

Miss Earth 2017 Karen S. Ibasco, a practicing medical physicist, inspired the young women with her more than just beauty story.

A former scholar under the DOST Accelerated Science and Technology Human Resource Development Program, Ibasco holds a master's degree in Medical Physics.

She said that the purpose of her joining the Miss Earth pageant goes beyond winning it and becoming a beauty queen. "I wanted to show people what I do in life and hoped that I would be able to share a message to the public," she added.

Ibasco also inspired the audience wiith what she does as a medical physicist, and shared the benefits of nuclear technology in the field of medicine.

DOSTv

Science For The People

DOSTv is the official weather and science program of the Department of Science and Technology (DOST) to communicate Science For The People, promote a culture of science and technology, and raise the aspirations of the youth to pursue careers in Science, Technology, Engineering and Mathematics (STEM) and be leaders of the future.

The program airs at 11:00 a.m. from Monday to Friday at the www.dostv.ph and on the new DOSTv mobile app. Its daily broadcast of livestreaming can also be accessed via www.facebook.com/DOSTvPH and www.dostvph/youtube.

Catch DOSTv from Monday to Friday, on PTV4 at 9:30 a.m. and on GNN at 11:00 a.m. and 4:00 p.m.!

Balitang RapiDOST

A flash report segment that showcases events, programs, and services of the DOST agencies and regional offices, as well as other news and updates on science and technology

DOST-PHIVOLCS update

A segment that showcases news and information related to earthquakes, volcanic eruptions, and natural hazards in collaboration with the DOST-PHIVOLCS

NegoSiyensya

A segment that showcases the success stories of micro, small, and medium enterprises and assisted communities that adopted the technology-based livelihood programs of the DOST

SineSiyensya

A documentary segment which features inspiring stories of individuals or groups benefiting from the DOST interventions

Sustansyarap

A segment that features nutritious Filipino recipes and cooking tips for a healthy lifestyle in collaboration with the DOST-FNRI

Sci-Facts

A segment that showcases facts and trivia related to science, technology, engineering, and mathematics

Weather Report

A day-to-day weather update and information in collaboration with the DOST-PAGASA

Global Science

A news segment about updates on science and technology (S&T) around the world

ExperTalk

A segment that showcases various interviews with experts in the field of S&T

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