2022 ACCOMPLISHMENT REPORT

National Academy of Science and Technology

RECOGNITION OF OUTSTANDING ACHIEVEMENTS IN SCIENCE, TECHNOLOGY, AND INNOVATION

The Academy recognizes and provides incentives to Filipino scientists for outstanding achievements in scientific research and development. Through the Recognition Function, it has contributed significantly in promoting and fostering excellence in science and technology research in the country.

ORDER OF NATIONAL SCIENTIST

The conferment of the Order of National Scientist by the President of the Republic of the Philippines is the highest honor given to a Filipino. Since 1978, 42 Filipinos have been conferred as National Scientist. To date, there are 11 living National Scientists.

NATIONAL SCIENTISTS	FIELD OF SPECIALIZATION
Angel C. Alcala	Biological Sciences
Clare R. Baltazar	Systematic Entomology
Mercedes B. Concepcion	Demography
Lourdes J. Cruz	Biochemistry
Ernesto O. Domingo	Internal Medicine / Gastroenterology
Raul V. Fabella	Economics
Emil Q. Javier	Plant Breeding and Genetics
Ricardo M. Lantican	Plant Breeding and Genetics
Bienvenido F. Nebres, SJ	Mathematics
Dolores A. Ramirez	Biochemical Genetics
Gavino C. Trono, Jr.	Marine Botany

MEMBERSHIP TO THE ACADEMY

Membership to the Academy is by peer recognition and carries with it the title of "Academician." Elected as members are resident Filipino scientists who have made exemplary contributions to science and technology and have advanced its cause in the Philippines. To date, there are 79 living members (11 of which are National Scientists).

Corresponding membership, on the other hand, is conferred on non-resident Filipino scientists who have made exemplary contributions to the advancement of science and technology, must have continuing connections and contributions to Philippine science, and regularly come to the Philippines to practice their field of expertise. Filipino citizenship and residency are waived as long as the three qualifications are met. To date, there are 19 living Corresponding Members.

MAJOR RECOGNITION AWARDS

Outstanding Young Scientist (OYS) Award

The Outstanding Young Scientist (OYS) award is given to young Filipino scientists (must not be 41 years old within January to December in the year of the award) who have made significant contributions to science and technology. Eleven (11) young Filipino scientists received the award.

DARLON V. LANTICAN, M.S. (Molecular Biology and Biotechnology)
University of the Philippines Los Baños

In recognition of his outstanding contributions in advancing Philippine agriculture research on major crop species, and their interacting pest and pathogens, through the utilization of genomics and bioinformatics research tools. He successfully led the genome assembly and annotation of economically-important genes in dwarf coconut, a pioneer scientific undertaking in international coconut genomics research. He also leads the most comprehensive genome-wide analysis of mango resistance gene analogs (RGAs), which are candidate resistance genes against insect pests and diseases. His research outputs provide the information needed to address crop production threats, which can help in future-proofing the country's food systems in the face of climate change.

ROSCINTO IAN C. LUMBRES, Ph.D. (Forest Resources)
Benguet State University

In recognition of his pioneering research on growth modeling of *Pinus kesiya* (Benguet pine), a very unique forest ecosystem in Philippines, and for his works on biodiversity and carbon stock assessment of unique forest ecosystems to better protect our biodiversity and mitigate climate change through forest protection. He fitted several models that can be used to easily determine the various parameters of the forest species, which is important in forest utilization, protection and conservation and in understanding the importance of *Pinus kesiya* stands in carbon sequestration needed in climate change mitigation and adaptation. He also assisted the Department of Agriculture in assessing the climate risk vulnerability of major crops in the Cordillera Administrative Region.

RICH MILTON R. DULAY, Ph.D. (Biology)
Central Luzon State University

In recognition of his pioneering and outstanding contribution in the field of mushroom science and biotechnology, particularly on the biology, conservation and myko-pharming of wild, edible and useful Philippine mushrooms. His extensive investigation on the profiling of six *Lentinus* species led to the successful development of production technologies that benefited the different stakeholders of the Philippine mushroom industry, and yielded novel functional mushroom-based food products. He initiated the establishment of the germplasm repository of the different species of Philippine *Lentinus* to ensure the conservation of these wild genetic myco-resources. His technical intervention in the community has significantly provided livelihood opportunities for the marginalized sectors of Philippine society through local enterprise development on mushroom farming.

NIKKI HEHERSON A. DAGAMAC, Dr.rer.nat. (Biology)
University of Santo Tomas

In recognition of his significant contributions to research on the biodiversity, distribution, and ecology of tropical myxomycetes, particularly the discovery of 13 new records of myxomycetes that updates the number of species known in the Philippines; in the development of the first bioclimatic distribution model of selected myxomycetes species in the country and in Southeast Asia; and, in providing endemism as biogeographical evidence for global protists and on the impact of disturbances on myxomycete communities. His research results significantly supported the moderate endemicity hypothesis as a global biogeographic pattern for eukaryotic protists refuting the popular ubiquitous model for microorganisms.

ARNEL B. BELTRAN, Ph.D. (Environmental Engineering)
De La Salle University

In recognition of his pioneering work on membrane science and technology, material engineering and water, and wastewater research that have led to several research publications and innovation projects, which respond to the United Nation's Sustainable Development Goal (SDG 6) on the provision of water and sanitation for all. His research results can be applied to address different environmental engineering problems such as wastewater treatment of sewage and acid mine drainage, disinfection using electrolyzed seawater, carbon dioxide capture using algae and resource recovery from waste. His leadership, commitment, and zeal in translating his knowledge and research work into valuable output can help uplift the quality of life of the community and the society.

JOHN FREDERICK D. TAPIA, Ph.D. (Chemical Engineering)
De La Salle University

For his outstanding contribution to the development of mathematical tools for planning and design, under uncertainties, of future low-carbon energy systems. His works incorporate decision-making under uncertainty, two of which apply a novel technique that extends our notion of uncertainty— to decouple the degrees of possibility, impossibility and indeterminacy of a given judgment or observation. Such a technique is called neutrosophic sets, and it has been applied to planning multi-product energy systems and selection of negative emissions technologies. His current research focuses on applying neutrosophic sets to address complexity, and ambiguity (VUCA).

RONNIE E. BATICULON, M.D. (Pediatric Neurosurgery)
University of the Philippines Manila

In recognition of his outstanding contributions in global neurosurgery, pediatric neurosurgery, and medical education. He has completed research projects in global neurosurgery that aim to estimate the burden of neurosurgical diseases and identify barriers to neurosurgical care worldwide. His aspiration to be able to provide essential neurosurgical care to all Filipinos who need it, particularly the underserved, underlies his research pursuits, and clinical practice and brings together activities to advance pediatric neurosurgery in the country. Ensuring that these congenital and acquired disorders of the nervous system are prevented and managed appropriately will have significant effects on the Philippine economy.

MARIA RUTH B. PINEDA-CORTEL, Ph.D. (Biological Sciences)
University of Santo Tomas

For her pioneering research contributions to the omic study on gestational diabetes mellitus (GDM) in the Philippines, and in particular, the Molecular Diagnostics and Therapeutics research agenda. Her study on the prevalence of and risk factors associated with GDM among Filipino women resulted in the identification of potential biomarkers for the early diagnosis of GDM. This improves diagnosis by providing a more useful and early biomarker of GDM.

ALLAN CHRISTOPHER C. YAGO, Ph.D. (Chemistry)
University of the Philippines Diliman

In recognition of his significant contributions to the local research and development of chemical and biochemical sensors for the detection of contaminants in food and biomolecules for health applications. He established the Sensor Materials Development and Electrochemical Analysis Laboratory (SMDEAL) at the University of the Philippines Diliman, which focuses on the development, fabrication, and fundamental studies on chemical and biochemical sensors for detecting target pollutants, contaminants, and essential bio-organic molecules. Since its establishment, SMDEAL has trained students in the areas of sensors and electrochemical analysis.

MICHAEL RALPH M. ABRIGO, Ph.D. (Economics)
Philippine Institute for Development Studies

In recognition of his significant contributions to the study of the welfare implications of population change, to the use of quasi-experimental techniques to evaluate government interventions, and to the development of statistical tools for the use of other researchers. He has contributed to the understanding of future opportunities and challenges from demographic change, in particular, population aging, in the Philippines. His studies on the impact of different government programs using quasi-experimental techniques have helped shed light on both intended and unintended consequences of public interventions. His suite of general-use statistical application programs implementing homogenous panel vector autoregression has allowed wider use of the technique in many different settings, including in economics, political science, and psychology.

PAUL GIDEON D. LASCO, M.D., Ph.D. (Anthropology)
University of the Philippines Diliman
Ateneo de Manila University

In recognition of his significant contributions in bridging the social sciences and medicine, in applying his research methods and perspectives to relevant medical and societal issues in the Philippines, and for effectively communicating scientific knowledge - both from the broader research community and from his own work - to the Filipino public. His ethnographic and analytical work on drug issues and contemporary health crises have been cited and used widely. He has published critical analyses of the COVID-19 pandemic and introduced the concepts of 'medical populism' and 'pharmaceutical messianism' to global public health.

Environmental Science Award

The NAST Environmental Science Award recognizes outstanding scientific and technological research works that contribute to environmental protection and conservation.

Winner
MARIA OBIMINDA L. CAMBALIZA, Ph.D. (Civil Engineering)
Ateneo de Manila University

In recognition of her outstanding research entitled "**Spatiotemporal Assessment of PM2.5 Exposure of a High-risk Occupational Group in a Southeast Asian Megacity**".

Her current research is focused on the science of aerosols and trace gases and their relation to urban air quality, as well as the interaction between air pollution and meteorology. The research has quantified the personal exposure to fine particulate pollution of public utility jeepney drivers in an urban area in the Philippines. It has revealed that the mean personal exposure of jeepney drivers during the sampling period and apparently throughout the year is about 7 times greater than the annual guideline value set by the World Health Organization for fine particulate pollution (PM2.5). Recommendations are made to improve air quality monitoring and information dissemination in the area to help in the promotion of health safety measures not only for the benefit of this high-risk occupational group.

Special Citations

BENJAMIN M. VALLEJO, JR., Ph.D. (Marine Biology)
University of the Philippines Diliman

In recognition of his transdisciplinal study entitled "**Pandemic, anthropause and healing the planet**", which reflects on the environmental effects of the COVID-19 pandemic, the environmentalist view of the planetary system's holism, and the anthropause.

The paper argues that indeed there might have been a "reset" of the planet's biosphere which is referred to as a "healing of the earth" during the COVID 19 pandemic. However, the apparent improvement of the quality of the global environment during the economic pause validates the predictions of the Gaia hypothesis but masks the other unexpected phenomenon of the anthropause such as more economic dislocation resulting in inequality, poverty, and more extractive use of the Earth's resources. It is recommended that a new global consensus on the nature of human and economic development is needed which will have to draw from science, the humanities, philosophy, and theological traditions.

AILEEN H. ORBECIDO, Dr. (Engineering)
De La Salle University

For her significant research contribution entitled **"Evaluation of Efficiencies of Locally Available Neutralizing Agents for Passive Treatment of Acid Mine Drainage"**.

The research has shown that Acid mine drainage (AMD) generated from the mining industry elevates environmental concerns due to the pollution and contamination it causes to bodies of water. Over the years, passive treatment of AMD using alkalinity-generating materials have been widely studied with pH neutralization as it is a commonly observed mechanism. Of the different materials used in the research, the concrete aggregate (CA) was found most effective. The study recommends the use of varying particle sizes with significant size differences and methods that can employ mechanical mixing during the treatment to improve the neutralizing capability of concrete aggregates.

Talent Search for Young Scientist

The NAST Talent Search for Young Scientist is a project of the Academy that encourages young people (must not be more than 35 years old within January to December in the year of the award) to pursue a career in science.

First Prize VIRGILIO D. EBAJO, JR., Ph.D. (Chemistry)
De La Salle University

In recognition of his outstanding scientific and technological research entitled: "Regenerable Acidity of Graphene Oxide in Promoting Multicomponent Organic Synthesis"

Second Prize: MELCHIZEDEK I. ALIPIO, Ph.D. (Electrical and Electronics Engineering)
De La Salle University
In recognition of his outstanding scientific and technological research entitled: "RT-CaCC: A Reliable Transport with Cache-Aware Congestion Control Protocol in Wireless Sensor Networks"

Third Prize: JAE JOSEPH RUSSELL B. RODRIGUEZ, M.S. (*Genetics*)
University of the Philippines Los Baños
In recognition of his outstanding scientific and technological research entitled: "An Integrated System for Forensic DNA Testing of Sexual Assault Cases in the Philippines"

Special Citations

MIRIAM F. BONGO, Ph.D. (Industrial Engineering)
De La Salle University
In recognition of her outstanding scientific and technological research entitled: "Effect of Fatigue in Air Traffic Controllers' Workload, Situation Awareness, and Control Strategy"

RENANN G. BALDOVINO, Ph.D. (Electronics and Communications Engineering)
De La Salle University
In recognition of his outstanding scientific and technological research entitled: "A Hybrid Fuzzy Logic-PLC-based Controller for Earthquake Simulator System"

Outstanding Book and/or Monograph Award

These awards are given annually for outstanding books and/or monographs published in the Philippines by Filipino authors or co-authors within five years preceding the award.

1. Laureta, R.P., Regalado, R.R.H., Baldo, D.E.B. (ed.). (2021). The Bicol River Basin Project: Development of Comprehensive Early Warning System for Agri-Fishery Communities in the Bicol River Basin. Goa, Philippines: Partido State University.

2. Gutierrez, F.C. (ed.). (2020). Crime and Punishment in the Philippines: Beyond Politics and Spectacle. Quezon City, Philippines: Philippine Social Science Council.

3. Briones, R.M. (ed.). (2021). Revitalizing Philippine Irrigation: A Systems and Governance Assessment for the 21st Century. Quezon City, Philippines: Philippine Institute for Development Studies.

Outstanding Scientific Paper Award

The Outstanding Scientific Paper Award is given annually for papers published in Philippine scientific or technical journals within five years preceding the award.

1. Osio, C.A.L., Aquino, G.M.B., Aala, W. Jr. F., Lado, J.P., Tendero, B.J.T., Cueto, C.A., Diaz, M.G.Q. and Laude, R.P. (2019). Transcriptome analysis of 'Philippine Lono Tall' coconut (*Cocos nucifera* L.) endosperm reveals differential expression of genes involved in oil biosynthesis. *Philippine Agricultural Scientist*, 102 (Special Issue), 101–118.

2. Niones, J.M., Lipio, P.L.G., Cruz, A.S., Cabral, M.C.J., Hautea, D.M., Lucob-Agustin, N.B. and Suralta, R.R. (2021). Genome-wide association mapping for the identification of SNPs controlling lateral root plasticity in selected rice germplasms of the Philippines. *Philippine Journal of Science*, 150: 665 - 676.
3. Arceo, H.O., Cabasan, J.P., Luciano, R.M.A., Heyres, L.J.D., Mamauag, S.S., and Aliño, P.M. (2020). Estimating the potential fisheries production of three offshore reefs in the West Philippine Sea, Philippines. *Philippine Journal of Science*, 149 (3): 647-658.
4. Lado, J.P., Arellano, B.Z., Osio, C.A.L., Tendero, B.J.T., Dela Viña, C.B., Torio, M.A.O., Laude, R.P., and Diaz, M.G.Q. (2019). Early differential expression of galactomannan biosynthesis genes in 'Makapuno' coconut (*Cocos nucifera* L.) revealed by the *de novo* assembly and analysis of endosperm transcriptome. *Philippine Agricultural Scientist*, 102 (Special Issue): 6-24.
5. Manegdeg, F., Rollon, A., Magdaluyo, E. Jr., Ballesteros, F. Jr., de Sales-Papa, L, Clemente, E., Macapinlac, E., Ibanez, R., and Cervera, R.B. (2021). Waste profile and waste-to-energy conversion potential of medical, hazardous industrial, and electronic residual wastes in Metro Manila, Philippines. *Philippine Journal of Science,* 150(4), 611-623.
6. Acebes, R.A.N., Cuento, M.G.R., Serna, A.G.S., Gutierrez, T.A.D. and Papa, D.M.D. (2021). "Comparing the efficacy of bacteriophages and antibiotics in treating *Salmonella enterica* serovar Typhimurium on streptomycin-pretreated Mice". *Philippine Journal of Science*, 150: 1371-1381.
7. Salcedo, A.R.M., Morabe, N.C.F. and Sevilla III, F.B. (2020). Colorimetric detection of cadmium (II) using glutathione-capped gold nanoparticles. *Acta Manilana*, 68, 1-11.
8. Vilog, R.B.T. and Piocos, C.M. III. (2021). Community of care amid pandemic inequality: The case of Filipino migrant domestic workers in the UK, Italy, and Hong Kong. *Asia-Pacific Social Science Review*, 21(2), 184-201.
9. Shi, A.A., Ong Yiu, M.K.A., Ricafrente, L.A.S., Unite, A. A., and Sullivan, M.J. (2021). Women on boards of Philippine publicly traded firms: Does gender diversity affect corporate risk-taking behavior? *Asia-Pacific Social Science Review*, 21(2), 11-30.

Department of Science and Technology (DOST) Awards

National Science and Technology Week (NSTW) Awards

The National Science and Technology Week (NSTW) is an annual celebration of the Department of Science and Technology (DOST) that highlights the important contributions of science and technology to national development. During the NSTW, outstanding scientists and technologists are recognized. It also serves as a venue for scientists and researchers to interact with entrepreneurs and businessmen.

The NSTW Awards recognize individuals and institutions that have made significant accomplishments and contributions to the generation of knowledge and technologies, utilization of research results and promotion of S&T in the country. The NAST handles the awards on behalf of DOST.

The awards were given during the opening ceremony of the NSTW celebration on 23 November 2022 in Pasay City, Metro Manila. The ceremony was led by President Ferdinand R. Marcos, Jr. and DOST Secretary Renato U. Solidum.

Outstanding Technology Commercialization Award
Gregorio Y. Zara Medal

The Outstanding Commercialization Award is given in recognition of the efforts of technology generators and developers whose technologies have been commercialized. The award was named after National Scientist Gregorio Y. Zara, a renowned Filipino engineer and inventor. The Board of Judges did not declare a winner for 2022.

Outstanding Research and Development Award (for basic research)
Eduardo A. Quisumbing Medal

The award is given to an individual or group who has made outstanding contributions through basic research. The award was named after National Scientist Eduardo A. Quisumbing, the Father of Philippine Orchidology and a conservationist of the Philippine Herbarium.

DORALYN S. DALISAY, Ph.D.
University of San Agustin

In recognition of their outstanding scientific research entitled, "Unlocking the Potential of Philippine Marine Sediment-Derived Actinobacteria in Drug Discovery" that could help to find new antibiotics and potentially address the problem of drug-resistant pathogenic bacteria in the future.

She is currently the Director of the Center for Chemical Biology and Biotechnology, University of San Agustin, Iloilo City. She is a graduate of B.S. in Pharmacy from the University of San Agustin and M.S. in Microbiology from the University of the Philippines Visayas. She finished her Ph.D. in Microbiology from the University of New South Wales, Sydney, Australia.

Outstanding Research and Development Award (for applied research)
Julian A. Banzon Medal

The award is given to an individual or group who has made outstanding contributions through applied research. The award was named after National Scientist Julian A. Banzon, who dedicated a good portion of his life to scientific endeavors and concentrated his attention on coconut.

PIA MARIE S. ALBANO, Ph.D.
University of Santo Tomas

In recognition of her outstanding scientific research entitled "Predicting likelihood of cancer with artificial intelligence tools using FTIR signals obtained from tumor samples". The products of this study benefit both patients and clinicians. The AI-enhanced diagnostic tools based on spectral biomarkers are highly efficient yet less expensive and less time-consuming. Hence, the waiting time to confirm diagnosis is shortened and patient treatment can be immediately started. They can also be used as an adjunct method to the gold standard, providing second-hand interpretations for cases where microscopic readings are hard to interpret or when there is discordance among the pathologists.

Outstanding Science Administrator Award
Dioscoro L. Umali Medal

The Outstanding Science Administrator Award is given in recognition of S&T or R&D administrators who have made significant contributions to science and technology through effective management and implementation of plans and programs. The S&T or R&D administrator may come from the academe, private sector or government. This award was named after National Scientist Dioscoro L. Umali, the father of Philippine plant breeding.

In recognition of his exemplary leadership as President of the Batangas State University, The National Engineering University, exhibiting high standards of performance, and in bringing the University to prominence through effective management and implementation of its academic and research programs. The research portfolio of the University under his leadership has grown tremendously with significant scientific and technological contributions to society. During his leadership, research is assured of funding support and committed to capacitate and increase the number of researchers. Dr. Ronquillo spearheaded the following pioneering projects and endeavors: Revisiting of the Research Agenda of the University, the BRIDGES Program or the Bridging Research and Innovation Development Goals for Engineering SUCs; the Knowledge, Innovation and Science Technology (KIST) Park with industry - facing research programs and activities to address the needs of the community and the industry; and, the Science, Technology, Engineering and Environment Research (STEER) Hub that supports various niche research centers that respond to the sustainable development goals.

Intellectual Property Awards

The Academy, in partnership with the DOST, conducted the awarding ceremony on 23 November 2022 in Pasay City, Metro Manila.

For the International Publication (IPub) Award, 124 publications from 12 DOST agencies–Advanced Science and Technology Institute (ASTI), Forest Products Research and Development Institute

(FPRDI), Philippine Nuclear Research Institute (PNRI), Philippine Institute of Volcanology and Seismology (PHIVOLCS), Philippine Textile Research Institute (PTRI), Industrial Technology Development Institute (ITDI), Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD), Food and Nutrition Research Institute (FNRI), Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), Philippine Science High School (PSHS), DOST V, and DOST XI–were awarded.

For the Utility Model Registration Award, 53 recipients from FNRI, FPRDI, PNRI, PTRI ITDI, DOST II, DOST XI and Metals Industry Research and Development Council (MIRDC) were awarded.

The sole winner of the Industrial Design award came from the ITDI.

All the winners received a plaque together with a cash incentive. In addition, the PNRI and ITDI received cash incentives of ₱50,000.00 each for having the highest number of IPub awardees and highest number of granted patent awardees, respectively.

Magsaysay Future Engineers/Technologists Award

The Magsaysay Future Engineers/Technologists Award is an annual award that aims to recognize outstanding research outputs on engineering and technology at the collegiate level and encourage young Filipino students to pursue a career in science.

1st Prize Winner
GARRET WILKENSON C. SIA
De La Salle University Manila
In recognition of his outstanding scientific and technological research entitled:
"Numerical Investigation on the Effect of Infill Walls and the Short Column Effect on the Structural Performance of Reinforced Concrete Frames"

2nd Prize Winner
CLARICE ANN A. ARRIETA
University of the Philippines Los Baños
In recognition of her outstanding scientific and technological research entitled:

"Geographic Information System (GIS)-Based Assessment of Water Quality in Sual Mariculture Zone, Pangasinan, Philippines"

Special Citations

MARK RUDAN C. CONSULAR
University of the Philippines Visayas
In recognition of his outstanding scientific and technological research entitled:
"Artificial Neural Network Based Surrogate Modelling for Optimization of an Industrial Batch Fermentation Process"

ROBBY ANDRE T. CHING
De La Salle University - Manila
In recognition of his outstanding scientific and technological research entitled:
"Drying Kinetics Study of Medicinal Plants Used in Diabetes Treatment"

LORMAINE ANNE A. BRANZUELA
University of the Philippines Los Baños
In recognition of her outstanding scientific and technological research entitled:
"Virtual Process Hazard Analysis (PHA) of Bataan Nuclear Power Plant (BNPP) using What-If Technique"

PROVISION OF BENEFITS FOR THE MEMBERS OF THE ACADEMY

Aside from the recognition awards, the Academy also provides incentives, benefits, and privileges to Academicians and National Scientists. These are research fellowship grants, travel and publication assistance, monthly gratuities, among others.

Table 1. NAST members with Research Fellowship Grants for 2022.

RESEARCH FELLOW	PROJECT TITLE AND DESCRIPTION	PERIOD COVERED
Rhodora V. Azanza	**Hazards and Risks from Toxic Algal Blooms and Fish Kills in Major Aquaculture and Fisheries Sites in the Philippines in 2021 and Beyond** The project aimed to review the recent reports on HAB occurrences and their negative impacts in Philippine embayments and coastal waters; review the current R&D and networking on HABs in the country and the Southeast Asian Region; and provide policy and other recommendations relevant to the enhanced management of HABs in the country.	01 January to 30 November 2022

Allan B.I. Bernardo	**Exploring Predictors of Filipino Students' Cognitive Proficiencies in PISA 2018: The Roles of Non-Cognitive (Metacognitive, Motivational. School-focused Attitudes)** The project aimed to use student-level Philippine data from PISA 2018 to test hypotheses regarding the role of individual difference non-cognitive and dispositional factors in cognitive proficiencies; and test the hypothesis regarding how non-cognitive and dispositional factors interact with socioeconomic background factors to predict cognitive proficiency; use student-level data from the Philippines and selected countries from PISA 2018 to test hypotheses regarding the use of non-cognitive and dispositional factors in predicting cognitive proficiency in students assessed in the students' non-native language; and propose and discuss prospects for reforming instructional and schooling approaches that address the factors identified as important predictors of cognitive proficiency based on the analysis of PISA 2018 data.	01 January to 30 April 2022
	Lay theories of culture, intercultural attitudes, and global citizenship in the Philippine Basic Education Curriculum The project aimed to empirically investigate how lay theories of culture, especially the lay theory of polyculturalism, relate to Filipino students' intercultural attitudes, cognitions, and behavioral intentions that are related to global citizenship education competencies; and analyze the current Philippine basic education curriculum to identify learning competencies and curriculum elements that reflect different lay theories of culture, identify gaps in the current learning competencies that relate to current global citizenship education competencies, and discuss possible curriculum reforms in the current basic education curriculum pertinent to the emergent developments in global citizenship education.	01 June to 31 December 2022
Gisela P. Concepcion	**Study of the In Vivo Synergistic Antitumor Activity of Renieramycin M and Doxorubicin** The project aimed to demonstrate that the marine compound renieramycin M isolated from a blue Xestospongia sp. sponge acts synergistically with the clinically used anticancer drug doxorubicin to reduce and/or delay the growth of 4T1 mouse mammary tumor in BALB/c mice; optimize the various parameters and conditions, i.e. tumor cell concentration, drug doses, time parameters, etc. of the combination treatment components; and determine the general toxicity of the combination treatment on the BALB/c mice.	01 June to 31 December 2022
Jose B. Cruz, Jr.	**Controlling Pandemics to Progressively Reduce Deaths and Infections to New Target Levels** The project aimed to develop progressively more effective models to control pandemics of infectious diseases, extending previously completed work.	01 January to 31 July 2022
NS Lourdes J. Cruz	**Reformulation of the Socio-Cultural Development Index (SCDI) used for Magbukun Aytas of Kanawan, Bataan in View of Their History, Culture and Relevant SDG Targets** The project aimed to integrate data and create a timeline of reforestation, livelihood/job creation, and other development interventions done with the Magbukun Aytas of Kanawan, Morong, Bataan from 2001 to 2021; examine the 12 targets and 14 indicators of SDG 15 (Life on Land) and define the targets that are most relevant to the assessment of forest health in the Ayta's ancestral domain; and formulate a modified SCDI that would be more appropriate for the Aytas, in the context of their history, culture and the indigenous practices on forest management.	01 January to 31 December 2022

Virginia C. Cuevas	**Field Trials on the Use of Trichoderma Microbial Inoculant (TMI) as Biofertilizer, and Biocontrol Agent of Fungal Corn Pathogens with Special Emphasis on Aflatoxin-Producers and of Fall Armyworm** The project aimed to conduct field trials in two (or three) locations - UPLB, Isabela province, with possibility of 3rd location in Pangasinan, on the use of Trichoderma microbial inoculant for control of soil-borne corn pathogens especially Aspergillus flavus and Aspergillus parasiticus, pathogens producing aflatoxin in corn grains demonstrate in the field the efficacy of using TMI in combination with compost and other forms of organic fertilizer in reducing chemical fertilizer use in native corn cropping with corresponding yield improvement; and survey and monitor the effect of Trichoderma on the invasive insect pest of corn, the fall armyworm (Spodoptera frugiperda)	01 November to 31 December 2022
Antonio Miguel L. Dans	**Accessibility of Telemedicine Services in Urban, Rural, and Remote Settings** The project aimed to examine the accessibility of telemedicine services during the COVID-19 pandemic; and explore the perceptions of potential end-users in urban, rural, and remote settings about telemedicine services.	01 January to 31 October 2022
Fabian M. Dayrit	**Single-Use Plastic: Science-Based Strategies and Policy Recommendations** The project aimed to propose science-based strategies and policy recommendations regarding single-use plastic in the Philippines; provide advice on single-use plastic to various sectors and stakeholders, including the legislature, national government agencies, LGUs, industry, academe, NGOs, and civil society; and survey the state of the science and best practices on single-use plastic from the scientific literature, international organizations, and other countries.	01 January to 30 June 2022
NS Raul V. Fabella	**Investment and Inclusion in Low Income Countries: Highlighting the Role of Industrial Structure** The project aimed to pin down the important factors that advance the investment rate in low income countries with emphasis on industrial structure Manufacturing and Services.	01 October to 31 December 2022
Ceferino P. Maala	**Topographic Anatomy of the Carabao Foot for Medical and Surgical Procedures** The project aimed to characterize the gross anatomy of the bones, tendons, ligaments, nerves and blood vessels in the foot of the carabao; describe the appearance of these structures in radiographs and ultrasonographs; establish sites for effective or complete blocking of nerves in the foot of the carabao for nerve blocking purposes, and for other surgical procedures and acupuncture sites; and determine if there are superficially located veins for venipuncture in the foot**.**	01 June to 31 December 2022
Cristina J. Montiel	**Two Versions of Community Vulnerability During a Pandemic: Comparing Facebook Posts of Metro Manila Mayors and Their Followers** The project aimed to compare pandemic-related discourses between local government leaders and their followers on social media, contribute to building political psychological knowledge on public health crisis management; broaden the understanding of how local governments and followers interact during a deadly pandemic; examine leadership rhetoric that either evokes cooperation or contention between political actors; and provide systematic assessment of messages to find out what type of communication is efficient in times of a health crisis.	01 January to 31 August 2022

	Contested Portrayals of Martial Law Survivors: Social Representations of Historical Targets of Oppression Over Varying Democratic Conditions The project aimed to examine how democratic conditions shape social representations of historical targets of oppression.	01 October to 31 December 2022
Jaime C. Montoya	**A Molecular Epidemiologic Analysis of Drug-Resistant Mycobacterium Tuberculosis Isolates Derived from the Third Philippine TB Drug Resistance Survey 2018 and Community-Based Study (MERIT TB Study)** The project aimed to identify the molecular subtypes or strains of drug resistant M. tuberculosis derived from the 3rd Philippine TB Drug Resistance Survey of 2018 and the community-based study in Cavite using whole genome sequencing; and identify possible association of specific molecular subtypes or strains of M. tuberculosis that are multi-drug resistant with specific features of the disease and specific demographic characteristics of the host.	01 January to 31 December 2022
Benito M. Pacheco	**Futures of Disaster Risk Management** The project aimed to trace the historical evolution of theory and practice, nationally and internationally, from "disaster management" (DM) into "disaster risk management" (DRM) or "disaster risk reduction and management" (DDRM); and reveal, reframe, and consolidate alternative foresights of disaster risk management praxis through 2050.	01 January to 30 November 2022
Eufemio T. Rasco, Jr.	**Preparation of NAST Publications into a User-friendlier Online Format (Kindle)** The project aimed to maximize the visibility and accessibility of NAST publications and encourage Academicians to publish through NAST.	01 January to 31 May 2022
Evelyn Mae Tecson-Mendoza	**Completion of NAST Phl Transactions Issue No. 2 from 2016 to 2020** The project aimed to complete and publish the five backlog issues of NAST PHL Transactions Issue No. 2 from 2016 to 2020. Specifically, it aimed to put in place the steps in the preparation and production of Transactions issues; train NAST staff in the whole spectrum of the production of Transactions; and process, edit, and finalize papers for the five issues of NAST PHL Transactions from 2016 to 2020.	01 January to 30 June 2022
	Strengthening of Transactions NAST PHL towards sustained timely releases, wider readership, and accreditation" The project aimed to strengthen the Transactions NAST PHL journal to ensure timely, impactful, and sustained releases of issues and articles.	01 August to 31 December 2022
Filemon A. Uriarte Jr.	**Sustainable Solid Waste Management** The project aimed to write a book with the same title, which will present the latest developments in solid waste management in Metro Manila and selected cities, towns and island tourist sites in the Philippines using recently acquired primary data, scrutinize the impact of the COVID-19 pandemic on solid waste management, critically analyze the environmental impacts of landfills and waste incineration, and examine the political economy of solid waste.	01 March to 31 December 2022
Reynaldo B. Vea	**Digital Transformation and the Unbounding of the University** The project aimed to study how digital technologies are breaking down or changing the physical and institutional boundaries of universities.	01 January to 30 November 2022

Edward H.M. Wang	**Establishment of the Prevalence of Soft Tissue Sarcoma in the University of the Philippines - Philippine General Hospital (UP-PGH)** The project aimed to establish the prevalence of soft tissue sarcomas in the UP-PGH; and establish a collaborative group of clinicians and basic scientists in the UP-PGH who deal with or have a special interest in the treatment and study of sarcoma patients.	01 January to 31 March 2022

Table 2. Travel Assistance

NAST Member	Date and Place of Travel	Purpose of Travel
Rhodora V. Azanza	14-15 September 2022 Bangkok, Thailand	Attended the "Strategic Scoping Meeting on Operationalizing the ASEAN Circular Economy Stakeholders" as chair of the ASEAN Subcommittee on Marine Science and Technology
NS Lourdes J. Cruz	21-23 September 2022 Paris, France	Participated in the 2nd Future Earth Assembly (partial assistance)
Arnel N. Del Barrio	22-27 August 2022 Jeju, South Korea	Presented two (2) technical papers at the Asian-Australasian Association of Animal Production (AAAP) and Animal Science Congress
Ceferino P. Maala	29 October-01 November 2022 Chattogram, Bangladesh	Participated in the 8th Congress of the Asian Association of Veterinary Anatomists
Carmencita D. Padilla	21-24 October 2022 Houston, Texas, USA	Presented a paper on "Bridging Science and Research and Development (R&D) through Partnerships and Collaborations" at the University of the Philippines Alumni Association Houston (UPAAH) Gala

ADVISORY AND FORMULATION OF POLICY RECOMMENDATIONS

The Academy, through Executive Order No. 818, was mandated to advise the President and the Cabinet on matters related to Science and Technology. Through the different advisory activities, the NAST heightens public awareness, understanding, and appreciation of the role that science and technology play in national development.

For 2022, some of the policy resolutions and recommendations include the following:

1. NAST Executive Council (EC)-Health Sciences Division (HSD) Statement on Vaporized Nicotine Products Regulations Act;

2. 44th Annual Scientific Meeting Resolutions;

Republic of the Philippines
Department of Science and Technology
NATIONAL ACADEMY OF SCIENCE AND TECHNOLOGY

44th ANNUAL SCIENTIFIC MEETING
Theme: ***PAGTANAW* 2050: *Agham Tungo sa Mabuting Kinabukasan***
(FORESIGHT 2050: Science for a Sustainable Future)
13-14 July 2022

RESOLUTION

WHEREAS, a thorough understanding and appreciation by all Filipinos of the current and emerging developments in science and technology (S and T) are necessary to be economically competitive and to pursue sustainable development;

WHEREAS, "Foresight in science, technology, and innovation" is now being adopted by many countries to craft a forward-looking S and T agenda which anticipates trends that are driving the preparations for the challenges and opportunities of the future;

WHEREAS, the population of the Philippines is projected to reach 145 million by 2050 which along with other major challenges, such as climate change, serve as significant drivers for science, technology, and innovation;

WHEREAS, a foresight process should be conducted using systems thinking in the context of the aspirations of the Filipino people as expressed in the Philippine Constitution of 1987, AmBisyon Natin 2040, Republic Act No. 8425, Department of Science and Technology Harmonized National Research and Development Agenda, and the United Nations Sustainable Development Goals 2030;

WHEREAS, upon the initiative and with the support of the Department of Science and Technology (DOST), PAGTANAW 2050, "The Philippine Foresight in Science, Technology and Innovation," was completed by the National Academy of Science and Technology Philippines (NAST PHL), as the first multidisciplinary, interdisciplinary, and transdisciplinary endeavor in the Philippines to conduct foresight in science, technology and innovation;

WHEREAS, PAGTANAW 2050, is a living document that needs continuous updating in collaboration with local and foreign foresight expertise to create awareness of the current and emerging developments in science and technology that can be harnessed to achieve a "Prosperous, Archipelagic, and Maritime Nation by 2050;"

WHEREAS, NAST PHL in completing PAGTANAW 2050 harnessed the talents of relevant stakeholders by forming multidisciplinary, interdisciplinary and transdisciplinary teams to provide the information and insights to enhance the resilience and agility of the Filipino people towards the realization of its aspirations;

WHEREAS, the Strategic Investments Priority Plan, approved by President Duterte under Memorandum Order No. 61 dated 24 May 2022, has been aligned with PAGTANAW 2050, the Philippine Development Plan 2017-2022, and the Inclusive Innovation Industrial Strategy of the Department of Trade and Industry;

WHEREAS, there is an urgent need to increase the talent pool constituted into teams that will periodically update and implement PAGTANAW 2050 in the light of current and emerging challenges and opportunities;

WHEREAS, the shortage of expertise to deal with the local concerns related to the operational areas was identified during the Regional Science Meetings and discussions with selected Regional Research, Development, and Innovation Councils;

NOW, THEREFORE, BE IT RESOLVED AS IT IS HEREBY RESOLVED, that both the government and the private sector:

Take immediate steps to accelerate and increase investments in time, talent, and funding for PAGTANAW 2050 to enable a sustainable and inclusive development agenda that gives due consideration to the diversity of our maritime and terrestrial resources and opens the doors of opportunity to the scattered communities in the many islands of the archipelago.

Institutionalize a foresight process at all levels of governance and to ensure continuity in the implementation of the PAGTANAW 2050 that will guide the transitions towards a truly sustainable development future such as the shift towards an inclusive and competitive maritime and circular economy.

Intensify and expand the development of highly trained and skilled workforce in STI, by ensuring that the basic needs of the Filipino youth are met, especially in food, nutrition, health, and access to quality basic, higher, graduate, and vocational-technical education.

Initiate immediate measures to improve the quality of teaching and learning in Science, Technology, Engineering and Mathematics (STEM) in basic, higher, graduate, and vocational-technical education, including in the training and recruitment of STEM teachers.

Exhort the relevant higher education institutions to initiate programs and establish academic units dedicated to maritime and oceanographic studies.

Institute measures to recruit, attract and retain talent that will assess, design, communicate, and implement, in a timely manner, the appropriate technologies and tools in science and technology and provide insights to anticipate and prepare to deal with complex problems in all the 12 operational areas through interdisciplinary and transdisciplinary endeavors:

Blue Economy
Governance
Business and Trade
Food Security and Nutrition
Health Systems
Energy
Water
Environment and Climate Change
Shelter, Transportation, and Other Infrastructure
Digital Transformation by Harnessing Information and Communications Technology
Science Education and Talent Retention
Space Exploration

Facilitate the deployment and presence of talent in the regions and the Local Government Units (LGUs) that will develop local versions of foresight, taking into account the unique local conditions as follows:

Plan and manage expertise development soonest by affirmative action in upskilling local talents preferably with full support of the local governments.

Organize consortia and networks to improve accessibility of quality basic, higher, graduate, and vocational-technical educational institutions to produce a workforce that can optimize the use of our terrestrial and maritime resources.

Upgrade the skills of LGU-based agriculture and fisheries extension workers and barangay health workers.

Establish an Industrial Extension Network especially for Micro, Small, and Medium Enterprises.

Ensure active engagement of the Social Sciences in foresight exercises and impact assessment.

Inculcate awareness of trends, shocks, risks, uncertainties and adjust foresight in a timely manner,

Operationalize a system of results-based monitoring and evaluation to keep track of the progress of PAGTANAW 2050 by the public and private sectors and Philippine society, in general.

FURTHER RESOLVED that copies of PAGTANAW 2050 and this resolution be furnished to all government departments and offices, the Philippine Senate and the House of Representatives, professional organizations, private business organizations, public and private higher education institutions, non-government organizations, civic and religious organizations.

DONE this 14th day of July 2022 in Manila, Philippines.

3. Commentaries or Recommendations on the following:
    a. Draft Philippines' Position on the Intergovernmental Conference (IGC) President's Proposal in relation to the resumed Fifth Session of the Intergovernmental Conference on an international legally binding instrument under the UN Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ IGC-5);
    b. House Bill (HB) Nos. 1378 and 3110 on the development of the onion industry in the Philippines;
    c. Extended Producer Responsibility;
    d. Use of regenerative agriculture concept in the Philippines;
    e. HB 440, 2328, 3139, 3570, 3777, 6057, 1378, 3110 and Senate Bill (SB) Nos. 139, 821, 1048, and 1297 - Livestock Development and Competitiveness Act;
    f. HB 69 or the Proposed Blue Economy Act;
    g. Proposed Executive Order on the Strengthening of the Crop, Livestock and Fisheries Biotechnology Centers, Establishments of the Food Safety and Microbial Biotechnology Center, and Institutionalization of Biotechnology Offices;
    h. HB 976 on the establishment of the Philippine Entrepreneurship Academy;
    i. SB 193, 465, 940, 1093, 1200, and 1652 on the establishment of evacuation centers in all cities and municipalities, proposed National Disaster Resilience Act, flood control, and disaster-related information in accessible language;
    j. SB 180 and 675 - Young Farmers and Fisherfolk Challenge Act;
    k. Integrated Coastal Management (ICM) and the National Coastal Greenbelt Program (NCGP) bills;
    l. HB 10, 47, 282, 308, 462, 528, 602, 1179, 1262, 1491, 1710, 1721, 1903, 2413, 2456, 2736, 2777, 2904, 2979, 3043, 3118, 3147, 3398, 3407, 3503, 3693, 3723, 4186, 4270, 4450, and 4862 on the establishment of a Virology Institute of the Philippines;
    m. Academic Recovery and Accessible Learning (ARAL) Program Act;
    n. Rollout of the DOST Smart, Resilient, and Sustainable Cities and Communities; and
    o. Single-Use Plastic Product Regulation Act;

4. Recommendations from various policy forums:
    a. Hearing Health:
        i. Hearing loss is recognized worldwide as a public health problem, with increasing burden among populations, hence researches on estimation of disease burden, identifying and targeting vulnerable populations are needed; public awareness needs to be promoted to institute a societal move towards addressing this health issue;
        ii. Addressing causes of hearing loss and deafness such as various genetic disorders, otitis media and other infections, and noise-induced hearing loss contributes to lessening the burden of disease – hence the need to continue collaborative studies in these areas;
        iii. Formulating hearing screening methods tailored to local conditions as what the Hele project is currently doing, and enhancing availability of definitive diagnostic services and training of hearing health professionals should be pursued;
        iv. Collaborative work among various disciplines on various prevention strategies to address gaps in hearing health care delivery, which the Hele project initiated with the development of a low-cost hearing screener

device, as well as the development of a system for electronic transmission of data in difficult-to-reach-areas should be pursued and supported;

v. National and local policies on the protocol for hearing screening among newborns to include routine or targeted genetic testing, universal hearing screening in children and workers in vulnerable occupations, may be refined and implemented;

vi. National and local policies on provision of methods for hearing amplification like hearing aids and hearing implants be made equitably accessible to the population; and

vii. Support for various researches to enhance the program for hearing health care be solicited from various government and non-government agencies, including philanthropic groups and individuals;

b. Cholesterol and Familial Hypercholesterolemia:

i. Continuing medical education on recognition and management of FH for primary care physicians, family med practitioners, pediatricians, internists and endocrinologists;

ii. Encourage cascade screening of family members of a proband or index patient;

iii. Consider doing universal screening of LDL-C or total cholesterol (TC) in children at 5-10 years old or at least selective screening of children with a strong family history of premature CVD;

iv. Consider universal screening of LDL-C or TC on college applicants since they will be 18 years of age by then, with personal consent needed only rather than parental consent;

v. Emphasize appropriate lifestyle behaviors such as maintenance of ideal body weight, observance of a proper diet, doing regular exercise and avoidance of smoking, specially to children and adolescents identified with FH;

vi. Support the establishment of a national FH registry by PLAS;

vii. Consider doing genetic analysis for FH mutations on patients identified with high DLCN scores (> 8) in the registry;

viii. Explore the possibility of putting up a FH support group consisting of FH patients and private philanthropic groups to help families with FH in providing medical information and to cope with potential problems.

c. Tuberculosis (TB) Elimination:

i. The government should continue supporting the transition to Universal Health Care (UHC) to strengthen primary care services including TB services, establish public-private health care provider networks, rationalize financing, and institute mechanisms for prioritizing health technologies and services as these will bolster TB elimination efforts;

ii. Enhance case finding, contact tracing, and advanced technologies should be employed to increase case detection and recover from the disruption due to COVID-19;

iii. Tap the professional and medical societies to serve as allies of the DOH-National TB Program;

iv. Tap also non-government organizations for effective, practical, and implementable TB care delivery systems for replication by government and other organizations.

v. Institutionalize childhood TB care and prevention in the medical curriculum, postgraduate residency training programs, and continuing professional education requirements.
vi. Empower community health workers and midwives for the implementation of TB care and control in the barangay. Actual experiences and models being utilized at the community level should be promoted to reach a broader perspective on TB control;
vii. Optimize the use of current and new tools and pursue universal health coverage and social protection;
viii. Develop new tools such as vaccines, new drugs, shorter and more effective treatment regimens for active TB and latent infection, and a point-of-care test;
ix. Create an enabling environment for high-quality TB research and innovation through a public-private partnership, open sharing of science and resources across sectors, and promoting multidisciplinary research through local and international research networks;
x. Continue to network with international partners such as the TB Report Consortium to facilitate specimen sharing and biomarker discovery;
xi. To hasten the uptake of science-based tools and innovations, there is a need to:
    1. Form a national TB technical group for policy review which can be done through the Health Technology Assessment Council (HTAC);
    2. Strengthen the legislative environment for technology registration and policy adoption and flexibility for the uptake of new tools;
    3. Identify early implementers or sites ready to be used as demonstration centers, or centers for excellence; and
    4. Develop flexible funding mechanisms;
xii. Develop an operational plan from within PhilSTEP1 to match elimination targets and test models and approaches prior to scaling up;
xiii. Introduce a merit good intervention other than defined financing patterns under the Universal Health Care (UHC) Act, that is individual-based but with externalities or positive effects that go beyond the individual, such as vaccination and screening.
xiv. Explore giving of grants to local government units (LGUs) to implement their elimination campaign;
xv. Tap non-political patrons and organizations into the TB elimination initiatives;
xvi. Convince the incoming administration and legislative supermajority to champion TB as the cornerstone health program; and
xvii. Increase the buy-in of elected officials at the community and provincial level because the political commitment of LGUs is necessary for data-gathering, financing, and localizing efforts, and innovations on TB elimination.

LINKAGES AND COORDINATION WITH OTHER SCIENCE ACADEMIES AND SOCIETIES

The NAST continuously explores and maintains linkages with foreign academies of science, technology, and engineering, as well as with international and regional networks and local science organizations, to promote close scientific cooperation. These linkages aim to: (1) promote collaborative efforts among Filipino scientists, and between Filipino and foreign scientists; (2) promote and encourage scientific cooperation through its Scientist Exchange Visit Program under the memorandum of agreement between NAST and a foreign science academy; (3) endorse participation in international conferences, meetings, fora, seminars, workshops, and similar scientific activities; and (4) publish and exchange scientific literature.

Through these scientific linkages, interested scientists may seek grants for scientific and technological undertakings, including fellowships, research grants, study visits, and grants for other collaborative projects from the academies associated with the National Academy of Science and Technology.

SCIENCE ACADEMIES AND SOCIETIES

- Academie des Sciences (French Academy of Sciences) - Ongoing agreement (2006-present)
- German Research Society (Deutsche Forshungsgemeinschaft) - Ongoing agreement (since 12 December 1983)
- Indian National Science Academy (INSA) - Ongoing agreement (since 08 July 1983)
- Academy of Sciences Malaysia (ASM) - Ongoing agreement (since 26 August 1997)
- The Royal Society of London (RSL) - Ongoing agreement (since 20 December 1980)
- The Royal Swedish Academy of Sciences - Ongoing agreement (since 6 March 2001)
- Turkish Academy of Science (TÛBA) – Ongoing agreement (since 18 October 2002)
- US National Academy of Sciences (US NAS) - Ongoing agreement (since 02 April 2002)

AFFILIATIONS TO INTERNATIONAL SCIENTIFIC ASSOCIATION

- InterAcademy Partnership (IAP)
- Association of Academies and Societies of Sciences in Asia (AASSA)
    - Women in Science and Engineering (WISE) Committee
- The World Academy of Sciences for the advancement of science in developing countries (TWAS)
- Third World Network of Scientific Organizations (TWNSO)

OTHER LINKAGES

- National Research Foundation of Korea
- Philippine-American Academy of Science and Engineering (PAASE)
- Philippine Association for the Advancement of Science and Technology (PhilAAST)
- The Outstanding Women in Nation's Service (TOWNS) Foundation, Inc.

S&T ENGAGEMENT AND PROMOTION

Management of the Philippine Science Heritage Center (PSHC)

The Philippine Science Heritage Center (PSHC) was established in 1998 to honor Filipino scientists and their contributions to the world of science. It was institutionalized through Republic Act 9107, or the Philippine Science Heritage Center Act (2001). The law mandated the Academy to manage, operate, and maintain the Center to serve as the main repository of the country's contributions, achievements, and accomplishments in the field of science and technology.

The Center has a total of 3,063 sq. m. and occupies the first and second floors of the Science Heritage Building inside the DOST Compound. The PSHC is also called *Salinlahi*, which means "Heirloom of a Generation".

Conduct of S&T Activities

For 2022, the NAST conducted 59 activities composed of scientific meetings (including the 44th ASM and three RSMs), legislative and policy fora, focus group discussions (FGDs), workshops, paper presentations, Speakers Bureau, symposium, information fora or *kapehan*, launching, and science career orientation.

1. Scientific Meetings
    a. 44th Annual Scientific Meeting
    City of Manila and virtual; 13-14 July 2022
    Host Division: Mathematical and Physical Sciences Division (MPSD)

Keynote Speaker: Dr. John L. Anderson, president, US National Academy of Engineering; *Scientific Addresses*: On Climate Change - Dr. Joy Jacqueline Pereira, research fellow, Universiti Kebangsaan Malaysia and vice-chair, Working Group II on Impacts, Adaptation, and Vulnerability, Intergovernmental Panel on Climate Change; On Coastal and Ocean Sustainability - Dr. Reniel B. Cabral, senior lecturer, College of Science and Engineering, James Cook University, Australia and member of the Expert Panel, High Level Panel for a Sustainable Ocean Economy; *Plenary Speakers*: Acd. Rhodora V. Azanza; Acd. William G. Padolina; Shermon O. Cruz, chief futurist and executive director, Center for Engaged Foresight, Ilocos Norte; Dr. Emma E. Porio, professor, Ateneo de Manila University; *Presenters of Research Results:* Acd. Rafael D. Guerrero III; Acd. Reynaldo B. Vea; Acd. Carmencita D. Padilla; Acd. Fabian M. Dayrit; Acd. Allan B.I. Bernardo; Dr. Pia D. Bagamasbad, OYS 2019 and director, UP Diliman-National Institute of Molecular Biology and Biotechnology (NIMBB); *Presenter of Resolutions*: Acd. William G. Padolina; *Responders to the Resolutions*: Ray Anthony Roxas-Chua III, chair, Science and Information Technology Committee, Federation of Filipino-Chinese Chamber of Commerce and Industry, Inc. (FFCCCII); Secretary Arsenio M. Balisacan, NEDA; Undersecretary Renato U. Solidum, Jr., DOST; *Moderators:* Acd. Fabian M. Dayrit; Acd. Maribel G. Nonato; Acd. Arnel A. Salvador; Acd. Jose Maria P. Balmaceda; Acd. Aura

C. Matias; *Rapporteurs/Synthesizers*: Dr. Tonette P. Laude, OYS 2016 and associate professor, UPLB-College of Agriculture and Food Science (CAFS)-Institute of Crop Science; Dr. Erika Fille T. Legara, OYS 2020 and associate professor, Asian Institute of Management (AIM); Dr. Jason Vincent A. Cabañes, OYS 2020 and professor, De La Salle University (DLSU); Dr. Rico C. Ancog, OYS 2019 and dean, UPLB School of Environmental Science and Management (SESAM); Dr. Aimee Lynn Barrion-Dupo, OYS 2015, UP Scientist III, and professor, UPLB-College of Arts and Sciences (CAS)-Institute of Biological Sciences

b. Luzon Regional Scientific Meeting
Virtual; 29-30 March 2022
Hosts: HSD, SSD, and DOST Region V
Keynote Speaker: Acd. William G. Padolina; *Plenary Speakers*: Dr. Federico M. Macaranas, retired professor, AIM and program director, CHED Global Academic Leadership Program; Luis G. Banua, regional director, NEDA Calabarzon; *Synthesizers*: Dr. Krista Danielle S. Yu, OYS 2017 and full professor, DLSU; *Focus Group Discussion (FGD) Lecturer*: Dr. Segundo Joaquin E. Romero, Jr., professorial lecturer, Ateneo de Manila University; *FGD Facilitators*: Acd. Benito M. Pacheco; Prof. Desiree A. Vilar, director, Don Mariano Marcos Memorial State University (DMMMSU)-Institute of Environmental Studies; Dr. Julius T. Capili, university research director, Cagayan State University; Engr. Pacifico T. Sariego, provincial director, Palawan Science and Technology Center; Jayson M. Bimuyag, research coordinator, Easter College, Inc.-Department of Nursing; *FGD Synthesizers*: Dr. Laura T. David, OYS 2007 and director, UPD-Marine Science Institute (MSI); Dr. Aimee Lynn Barrion-Dupo, OYS 2015 and professor, UPLB-CAS-IBS; Dr. Michael Angelo B. Promentilla, OYS 2013 and professor, DLSU; Dr. Aristotle T. Ubando, OYS 2016 and professor, DLSU; Dr. Rico C. Ancog, OYS 2019 and dean, UPLB-SESAM (*Presenter of FGD Results)*; Dr. Patricia Ann J. Sanchez, OYS 2019 and professor, UPLB-SESAM; *Panel Discussants*: Acd. Mudjekeewis D. Santos; Acd. Gisela P. Concepcion; Acd. Manolo G. Mena; Acd. Charlotte M. Chiong; Acd. Alfredo Mahar Francis A. Lagmay; Dr. Geoffrey M. Ducanes

c. Visayas Regional Scientific Meeting
Virtual; 28-29 April 2022
Hosts: ESTD, MPSD, and DOST Region VI
Keynote Speaker: Acd. William G. Padolina; *Plenary Speakers*: Dr. Federico M. Macaranas, retired professor, AIM and program director, CHED Global Academic Leadership Program; Hon. Leopoldo Dominico L. Petilla, governor of Leyte and chairperson, Regional Development Council - Visayas Area Committee; *Plenary Synthesizer*: Dr. Adrian P. Ybañez, OYS 2020 and vice president for research and development, Cebu

Technological University (CTU); *Focus Group Discussion (FGD) Lecturer*: Dr. Segundo Joaquin E. Romero, Jr., professorial lecturer, Ateneo de Manila University; *FGD Facilitators*: Acd. Benito M. Pacheco; Dr. Encarnacion Emilia S. Yap, dean, UP Visayas-College of Fisheries and Ocean Sciences; Dr. Ramer P. Bautista, dean, UPV School of Technology; Dr. Noel Peter B. Tan, *Balik* Scientist, University of San Agustin; *FGD Moderator:* Maerell Love C. Senalista, DOST Region VI; *FGD Synthesizers*: Dr. Laura T. David, OYS 2007 and director, UPD-MSI; Dr. Aimee Lynn Barrion-Dupo, OYS 2015 and professor, UPLB-CAS-IBS; Dr. Michael Angelo B. Promentilla, OYS 2013 and professor, DLSU; Dr. Aristotle T. Ubando, OYS 2016 and professor, DLSU; Dr. Rico C. Ancog, OYS 2019 and dean, UPLB-SESAM (*Presenter of FGD Results)*; Dr. Marvin A. Villanueva, senior SRS, Philippine Carabao Center (PCC); *Panel Discussants*: Acd. Ruben L. Villareal; Acd. Jurgenne H. Primavera; Acd. Alvin B. Culaba; Acd. Camilo C. Roa, Jr.; Acd. Alfredo Mahar Francis A. Lagmay; Acd. Agnes C. Rola; Dr. Rosslin John Robles, education supervisor, CHEd Region VI

d. Mindanao Regional Scientific Meeting
Virtual; 05-06 April 2022
Hosts: ASD, BSD, and DOST Region IX
Keynote Speaker: Acd. William G. Padolina; *Plenary Speakers*: Dr. Federico M. Macaranas, retired professor, AIM and program director, CHED Global Academic Leadership Program; Phlorita A. Ridao, regional director, NEDA Region IX; *Plenary Synthesizer*: Dr. Pierangeli G. Vital, OYS 2021 and head, Biological Research and Services Laboratory, UP Diliman; *Focus Group Discussion (FGD) Lecturer*: Dr. Segundo Joaquin E. Romero, Jr., professorial lecturer, Ateneo de Manila University; *FGD Facilitators*: Acd. Benito M. Pacheco; Dr. Renato O. Arazo, chancellor, University of Science and Technology of Southern Philippines Claveria; Dr. Mary Ann F. Daclan, chair, Research Ethics Committee, Mindanao State University Marawi; Dr. Della Grace G. Bacaltos, professor, Davao del Sur State College; Dr. Servando D. Halili, Jr., associate professor, Zamboanga State College of Marine Sciences and Technology; *FGD Synthesizers*: Dr. Rachel June Ravago-Gotanco, OYS 2010 and professor, UPD-MSI; Dr. Aimee Lynn Barrion-Dupo, OYS 2015 and professor, UPLB-CAS-IBS; Dr. Michael Angelo B. Promentilla, OYS 2013 and professor, DLSU; Dr. Aristotle T. Ubando, OYS 2016 and professor, DLSU; Dr. Rico C. Ancog, OYS 2019 and dean, UPLB-SESAM (*Presenter of FGD Results)*; Dr. Marvin A. Villanueva, senior SRS, Philippine Carabao Center (PCC); *Panel Discussants*: Acd. Rodel L. Lasco; Acd. Marie Antonette Juinio-Meñez; Acd. Guillermo Q. Tabios III ; Acd. Charlotte M. Chiong; Acd. Alfredo Mahar Francis A. Lagmay; Acd. Christopher P. Monterola

2. Science Legislative and/or Policy Forum
   a. Science Legislative Forum (SLF) on Philippine Virology Science and Technology Institute
   Virtual; 10 October 2022
   Focal Persons: Acd. Arvin C. Diesmos and Acd. Jaime C. Montoya
   Speaker: Dr. Annabelle V. Briones, director, DOST-Industrial Technology Development Institute (ITDI); *Reactors*: Prof. Phillip A. Alviola, OYS 2017, associate professor, Institute of Biological Sciences (IBS), College of Arts and Sciences (CAS), UPLB; Dr. Noel Lee J. Miranda, independent regional consultant; Dr. Theresa Mundita S. Lim, executive director, ASEAN Centre for Biodiversity; Dennis I. Salvador, executive director, Philippine Eagle Foundation, Inc.; Dr. Rainelda C. Dela Peña, chief, Veterinary Laboratory Division, DA-BAI; *Moderator*: Dr. Nikki Heherson A. Dagamac, OYS 2022, assistant professor, Department of Biological Sciences, UST;

Rapporteur: Dr. Maria Ruth B. Pineda-Cortel, OYS 2022, associate professor, Department of Medical Technology, Graduate School, UST

b. Science Policy and Information Forum (SPIF) on Program Development for Hearing Health

Virtual; 01 March 2022
In partnership with the Philippine National Ear Institute (PNEI), the Newborn Hearing Screening Reference Center, and the University of the Philippines-Philippine General Hospital (UP-PGH) Department of Otolaryngology-Head and Neck Surgery
Focal Person: Acd. Charlotte M. Chiong
Keynote Speaker: Xingkuan Bu, Nanjing University, China; *Speakers*: Dr. Regielyn Santos-Cortez, associate professor, University of Colorado School of Medicine; Dr. Cesar Anthony P. Yabut, consultant, Southern Philippines Medical Center; Dr. Patrick John Labra, clinical lead researcher, Hearing for Life (HeLe) project; *Reactors*: Dr. Maria Rina Reyes-Quintos, chair, Department of Otolaryngology-Head and Neck Surgery, University of the Philippines Manila-College of Medicine (UPM-CM); Dr. Rose Alcances-Inocencio, head, Occupational Health and Medical Services, Energy Development Corporation (EDC); Dr. Ma. Teresita S. Cucueco, assistant secretary for labor standards, special concerns, and regional operations and director, Bureau of Working Conditions, Department of Labor and Employment (DOLE); Dr. Luis G. Sison, director, Technology Transfer and Business Development Office (TTBDO), UP System; *Moderator*: Dr. Christopher Malorre E. Calaquian, clinical associate professor, UPM-CM-Department of Otorhinolaryngology; *Synthesizer*: Dr. Erasmo Gonzalo DV. Llanes, director, PNEI

The forum aimed to provide an avenue for healthcare professionals to discuss selected topics on hearing health that will allow policymakers to form programs or fund further research to enhance hearing health. The webinar covered congenital hearing loss, hearing conservation programs for noise-exposed workers, and harnessing technology for hearing health.

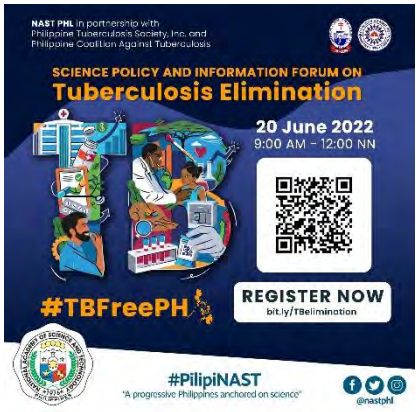
c. The Cholesterol Dilemma: A Possible Family Affair (An SPIF on Cholesterol and Familial Hypercholesterolemia)

Virtual; 12 April 2022
Focal Person: Acd. Rody G. Sy
Speakers: Acd. Rody G. Sy; Dr. Jose Donato A. Magno, executive director and chief, Cardiovascular Institute, Angeles University Foundation Medical Center (AUFMC); Dr. Lourdes Ella G. Santos, lipidologist/cardiologist and president, Philippine Lipid and Atherosclerosis Society (PLAS); Dr. Cecilia A. Jimeno, endocrinologist and chair, FH Registry, PLAS; *Reactors*: Dr. Ninfa J. Villanueva, pediatric cardiologist, Davao Doctors Hospital and associate professor, Davao Medical School Foundation; Dr. Sioksoan C. Cua, pediatric endocrinologist and consultant, PGH; Dr. Ruth Divine D. Agustin, medical officer and Standards of Care subunit lead, Disease Prevention and Control Bureau, Department of Health (DoH); *Moderator*: Dr. Leslie Michelle M. Dalmacio, OYS 2012, professor, UPM-CM-Department of Biochemistry and Molecular Biology; *Rapporteur*: Dr. Jaime C. Aherrera, OYS 2020, medical specialist, UP-PGH

d. SPIF on Bird Flu
Virtual; 18 May 2022
Focal Person: Acd. Ceferino P. Maala
Speakers: Dr. Dennis V. Umali, professor, Department of Veterinary Clinical Sciences (DVCS), College of Veterinary Medicine (CVM), UPLB; Dr. Nathaniel Tablante Jr., professor, University of Maryland; *Synthesizer*: Dr. Michelle Grace V. Paraso, OYS 2012, professor, UPLB-CVM-Department of Basic Veterinary Sciences (DBVS); *Moderator*: Dr. Remil L. Galaxy, associate professor, UPLB-CVM-DVCS

The forum aimed to determine the status of the confirmed bird flu outbreaks in the Philippines; find out the preventive measures that have already been undertaken here and abroad to control the spread and recurrence of avian influenza; and gather inputs for the creation of a NAST Science Advisory to complement the efforts made by government and other sectors to contain the outbreak.

e. SPIF on Tuberculosis (TB) Elimination
Virtual; 20 June 2022
In partnership with the Philippine Tuberculosis Society, Inc. (PTSI) and the Philippine Coalition Against Tuberculosis (PCAT)
Focal Person: Acd. Camilo C. Roa, Jr.
Speakers: Acd. Camilo C. Roa, Jr.; Dr. Mary Ann D. Lansang, clinical professor, UPM-CM; Dr. Ronald Allan M. Fabella, technical adviser, Disease Prevention and Control Bureau, DoH; Dr. Kalpeshsinh Rahevar, medical officer for tuberculosis, World Health Organization (WHO) Western Pacific Region; Dr. Elizabeth V. Cadena, chair, Council on Tuberculosis, Philippine College of Chest Physicians (PCCP); Dr. Cleotilde Hidalgo-How, chair, Committee on Handbook on Tuberculosis, Philippine Pediatric Society (PPS); Benjamin Q. Avanceña, PTSI vice president; Governor Dakila Carlo E. Cua, Quirino; Dr. Marissa M. Alejandria, professor, UPM-CM-Department of Clinical Epidemiology (DCE); Dr. Lalaine L. Mortera, private sector adviser, United States Agency for International Development (USAID) TB Innovations and Health Systems Strengthening (TB IHSS) project; Dr. Carlo Irwin A. Panelo, professor, UPM-CM-DCE; Teofisto D. Guingona III, PTSI board member; *Moderators*: Dr. Jubert P. Benedicto, PCAT past chair; Dr. Anjanette R. de Leon, PCAT board member; Dr. Janice C. Caoili, PCAT board member; *Rapporteur*: Dr. John Mark S. Velasco, OYS 2014, clinical associate professor, UPM-CM-Department of Clinical Epidemiology



The forum aimed to discuss the current TB epidemiology, elimination goals, government and private sector collaborative program, and strategic enhancements and necessary activities for the Philippines to attain TB elimination targets, particularly during and after the COVID-19 pandemic.

f. SPIF on Marine Ecosystems and Policies
Virtual; 24 June 2022
Focal Persons: Acd. Marie Antonette Juinio-Meñez and Acd. Jurgenne H. Primavera
Speakers: Acd. Jurgenne H. Primavera; Nieva T. Natural, director, Agriculture, Natural Resources, and Environment Staff, National Economic Development Authority (NEDA); Dr. Severino G. Salmo III, associate professor, Institute of Biology, College of Science, UP Diliman; *Reactors*: Atty. Gloria E. Ramos, vice president, International Advocacy Group, OCEANA, Dr. Marian S. De Los Angeles, board member emeritus and senior advisor, Resources, Environment, and Economics Center for Studies, Inc. (REECS); *Moderator*: Acd. Marie Antonette Juinio-Meñez; *Rapporteur*: Dr. Rico C. Ancog, OYS 2019 and dean, UPLB-SESAM

The forum aimed to increase awareness of the goods and services from marine ecosystems to promote protection and improved management; review key existing national policies and implementation; showcase good practices and innovations; and identify strategies for scaling impacts.

g. Science Policy Forum (SPF) on Nuclear Energy: Competitiveness and Sustainability in the Philippines
Quezon City, 02 June 2022
Focal Person: Acd. Filemon A. Uriarte, Jr.
Speakers: Acd. Filemon A. Uriarte, Jr.; Acd. Alvin B. Culaba; Dr. Carlo A. Arcilla, director, DOST-Philippine Nuclear Research Institute (PNRI); Dr. Jose T. Yap, former senior technical advisor, School of Government, Ateneo de Manila University (AdMU); *Moderator*: Dr. Aristotle T. Ubando, OYS 2016 and professor, DLSU

This forum aimed to discuss the determinants of competitiveness in the adoption of nuclear energy in the country, determine the life cycle impacts and environmental sustainability of nuclear energy use in the country, and craft a white paper on nuclear energy programs in the Philippines.

3. Focus Group Discussions (FGDs)
   a. Green Technology for the Food System
   Focal Persons: Acd. Eufemio T. Rasco, Jr. and Acd. Virginia C. Cuevas
   The objectives of the FGD are to present information on the green technology available in the food system in the country, generate support for their adoption, and draft appropriate policy recommendations.

   Crop Production
   Virtual; 12 August 2022
   Speakers: Acd. Virginia C. Cuevas; Acd. Rafael D. Guerrero III; Acd. Marco Nemesio E. Montaño; Cielo Luz C. Mondejar, science research specialist, Department of Agriculture (DA)-Philippine Rice Research Institute (PhilRice) Negros Branch Station; Dr. Marilyn B. Brown, director, National Institute of Molecular Biology and Biotechnology (BIOTECH), UPLB; Dr. Lilia M. Fernando, assistant professor, Institute of Crop Science, College of Agriculture and Food Science (CAFS), UPLB;

Reactors: Dr. Reynaldo V. Ebora, executive director, DOST-Philippine Council for Agriculture, Aquatic, and Natural Resources Research and Development (PCAARRD); Amavel A. Velasco, OIC, Research Coordination Division, DA-Bureau of Agricultural Research (BAR); Dr. Rosana P. Mula, director, DA-Agricultural Training Institute; *Moderator*: Dr. Thomas Edison E. Dela Cruz, OYS 2012, professor, Department of Biological Sciences, Research Center for Natural and Applied Sciences

(RCNAS), University of Santo Tomas (UST); *Synthesizer*: Dr. Pierangeli G. Vital, OYS 2021, university researcher and head, Biological Research and Services Laboratory, UP Diliman; *Rapporteur*: Dr. Ian A. Navarrete, OYS 2016 and associate professor, College of Agriculture, Food, and Environmental Sciences (CAFES), Southern Leyte State University

Animal and Fish Farming
Virtual; 07 September 2022
Speakers: Dr. Noel B. Lumbo, assistant professor and head, Nutrition Division, Institute of Animal Science (IAS), UPLB-CAFS; Dr. Rommel C. Sulabo, OYS 2014, professor, UPLB-CAFS-IAS; Dr. Joel L. Adorada, senior agriculturist, Bureau of Plant Industry (BPI), Los Baños National Crop Research, Development, and Production Support Center; Dr. Rodney H. Perez, OYS 2020, university researcher, UPLB-BIOTECH; Dr. Billy P. Divina, professor, UPLB-CVM-Department of Veterinary Paraclinical Sciences (DVPS); Dr. Rosette Angelie R. Arca, business planning manager, San Miguel Foods, Inc.; *Reactors*: Dr. Reildrin G. Morales, OIC, Office of the Director,

Bureau of Animal Industry (DA-BAI); Dr. Casiano H. Choresca, Jr., senior science research specialist and Career Scientist I, DA-National Fisheries Research and Development Institute (NFRDI)-Fisheries Biotechnology Center (FBC); Dan Dennis Dizon, president, Philippines Society of Animal Nutritionists (PhilSAN); *Moderator*: Acd. Mudjekeewis D. Santos; *Rapporteur*: Dr. Adrian P. Ybañez, OYS 2020, vice president for R&D, Cebu Technological University (CTU)

Biodegradable Packaging
Virtual; 17 October 2022
Speakers: Acd. Fabian M. Dayrit; Dr. Deo Florence L. Onda, associate professor, deputy director for research, Marine Science Institute (MSI), UP Diliman; Dr. Rico J. Cabangon, deputy director, DOST-Forest Products Research and Development Institute (FPRDI); Dr. Florentino O. Tesoro, chairman, Board of the Bamboo Professionals, Inc.; Lizette D. Cardenas, municipal environment and natural resources office (MENRO), Los Baños, Laguna; Atty. Dilbert N. Quetulio, committee secretary, Committee on Ecology, House of Representatives; *Discussant*: Engr. Patrick Henry P. Decena, environmental management specialist, City Environment & Natural Resources Office, City of San Fernando, La Union; *Moderator*: Dr. Dixon T. Gevaña, OYS 2018, professor and director, Forestry Development Center (FDC), UPLB-College of Forestry and Natural Resources (CFNR); *Rapporteur*: Dr. Frolan A. Aya, OYS 2019, associate scientist, Southeast Asian Fisheries Development Center (SEAFDEC)

Green Energy
Virtual, 17 October 2022
Speakers: Dr. Manuel Jose C. Regalado, chief science research specialist, DA-PhilRice; Dr. Michael Angelo B. Promentilla, OYS 2013, professor, Department of Chemical Engineering (DCE), DLSU-Gokongwei College of Engineering (GCE); Craig Jamieson, director and founder, Straw Innovations, Ltd.; *Discussants*: Acd. Alvin B. Culaba; Dr. Shirley C. Agrupis, president, Mariano Marcos State University (MMSU); *Moderator*: Dr. Rey Donne S. Papa, OYS 2021, professor, Department of Biological Sciences (DBS), UST-College of Science; *Rapporteur*: Dr. Arnel B. Beltran, OYS 2022, associate professor, DLSU-GCE-DCE

b. Carbon Dioxide Removal with Negative Emission Technologies
Virtual, 03 November 2022
Focal Person: Acd. Raymond Girard R. Tan
Speakers: Dr. Beatriz Belmonte, professor, Chemical Engineering Department, UST; Engr. Maria Victoria Migo-Sumagang, assistant professor, UPLB; Dr. John Frederick Tapia, OYS 2022, associate professor, DLSU-GCE-DCE; *Moderator*: Dr. Ivan Henderson V. Gue, chair, Department of Mechanical Engineering, DLSU

The objectives of the FGD were to discuss the viability of integrating NETs into a multi-decade national climate change mitigation plan and draft appropriate policy recommendations at different (e.g. corporate, regional, or national) levels.

4. Workshops
   a. Brownbag Sectoral Workshops on Drug Demand Reduction
   Virtual; 08, 09, 10, 15, 16, and 18 March 2022
   In partnership with the Asian Center for Drug Policy (ACDP)
   Focal Person: Acd. Carmencita D. Padilla
   Workshop Facilitator: Dr. Elmer S. Soriano, ACDP co-convenor, managing director, Civika Universal Health Care Lab; *Breakout Session Facilitators*: Prof. Katrina Evangelista-De Mesa, Marinduque State College; Prof. Portia R. Hermosa, Marinduque State College; Ana Loren B. Durana, NAST PHL Secretariat; and Ryan John P. Pascual, NAST PHL Secretariat

   The Drug Demand Reduction 2030 Roadmapping Workshop discussed themes specific to the invited stakeholder groups that included professional and stakeholder associations, their government counterparts, and academic partners. The participants were given time to identify the signals they observe in their field related directly or indirectly to substance use. Signals were defined as something that indicates things might become different in the future. After scanning for signals, the group built scenarios, namely (1) continued growth "business as usual", (2) collapsed "systemic collapse/ *pagguho*", (3) disciplined "control measures applied", and (4) transformation "*bagong anyo*".

b. Interdisciplinary and Culminating Workshop for the Development of a Philippine Drug Demand Reduction 2030 Roadmap
Virtual; 21 March 2022
Focal Person: Acd. Carmencita D. Padilla (HSD)
Speakers: Dr. Joselito C. Pascual, head, Division of Addiction Medicine, UP-PGH and UPM-CM; and Dr. Francisco Magno, OYS 2000, project director, SDG City Lab, De La Salle University (DLSU); *Workshop Facilitator*: Dr. Elmer S. Soriano, ACDP co-convenor, managing director, Civika Universal Health Care Lab; *Group Discussion Facilitators*: Atty. Jocelle Batapa-Sigue; Prof. Katrina Evangelista-De Mesa, Marinduque State College; Prof. Portia R. Hermosa, Marinduque State College; *Moderator*: Dr. Ma. Regina M. Hechanova-Alampay, OYS 2005 and professor, Department of Psychology, Ateneo de Manila University

c. *Salinlahi Guro ng Siyensiya:* Understanding the Students' Mental Health
Virtual; 17 August 2022

5. Paper Presentations
   a. NESA Paper Presentation and Awarding Ceremony
   Virtual; 26 April 2022

   b. 2022 NTSYS Virtual Paper Presentation
   Virtual; 11 April 2022

c. DOST-NSTW Awards: Outstanding R&D Award Paper Presentation
Virtual; 30 September 2022

d. MFET Paper Presentation and Awarding Ceremony
Muntinlupa City; 02 December 2022

6. Speakers Bureau, Science Information Forum, Symposium, Webinars
    a. Speakers Bureau: Technology Transfer and Technology-based Enterprise Development
    Virtual; 23 February 2022
    In partnership with DOST V

    b. Salinlahi Symposium Series: Role of Science and Technology in Disaster Risk Reduction and Management
    Virtual; 23 February 2022

    c. Women: Where Are You and Where Do You Want To Be? Women as Biomedical and Biotechnology Innovators
    Virtual; 31 March 2022

    d. Women as MSM Entrepreneurs: Challenges in Building Back Better after COVID-19
    Virtual; 14 December 2022

    e. Future Earth Philippines: The Filipino SDG Action Hour: *Kamustahan para sa Mabuting Kinabukasan* (Episodes 1-13)
    f. Science Information Forum on the Collaboration between the DOST Regional Offices and NAST
    In partnership with the Office of the DOST Undersecretary for Regional Operations
    Virtual; 14 March 2022
    Speakers: DOST Secretary Fortunato T. de la Peña; Undersecretary Sancho A. Mabborang, Acd. Rhodora V. Azanza, NAST PHL president; and NS Lourdes J. Cruz, project leader, Future Earth Philippines; *Reactors*: DOST Regional Directors; *Moderator*: Mheljor General, DOST Region V

    g. *Kapehan* with Awardees
    h. *Kapehan*: ASM
    i. *Kapehan* with MFET and NSTW awardees

7. Launching of Programs, Projects, Activities, and Publications
    a. PAGTANAW 2050 Grand Launching
    Manila and Virtual; 01 April 2022

    b. PAGHAHANDA PILIPINAS Book Launch
    Pasay City; 23 November 2022
    Focal Person: Acd. Jaime C. Montoya
    Reactors: Dr. Renato U. Solidum, Jr., DOST Secretary; Assistant Secretary Bernardo Rafaelito R. Alejandro IV, Civil Defense Deputy Administrator for Operations, Office of Civil Defense (OCD), Department of National Defense (DND); Dr. Arsenio M. Balisacan, Socio-economic Planning Secretary, NEDA director-general, and member,

NAST-SSD; *Moderators*: Dr. Merlyn S. Mendioro, OYS 1995; Dr. Ronilo Jose D. Flores, alumnus, NAST Future Science Leaders Forum

c. Grand Launching of FLExPHD: Food is Life Exemplified, a mobile app development competition for planetary health diet
Virtual; 16 November 2022
Focal Person: Acd. Eufemio T. Rasco, Jr.

8. Science Career Orientation
    a. Meet Your Scientist: Game-changing Women of Science
    Virtual; 22 March 2022

    b. Meet Your Scientist: Checking-up with Health Sciences
    Virtual; 25 May 2022

    c. ScienTeach: A Virtual Symposium for the Youth

    Camarines Norte; 28 March 2022
    Virtual
    In partnership with DOST Region V and Provincial Science and Technology Center (PSTC) Camarines Norte
    Speakers: Acd. Rivera; Dr. Arnold R. Salvacion, OYS 2021; Dr. Marvin A. Villanueva, OYS 2021; *Moderator*: Dr. Victor Marco Emmanuel N. Ferriols

    Capiz; 27 April 2022
    Virtual
    In partnership with DOST Region VI, PSTC Capiz, and Department of Education (DepEd) Region VI
    Speakers: Acd. Padilla, Dr. Jomar P. Rabajante, OYS 2021; Dr. Krista Danielle S. Yu, OYS 2017; *Moderator*: Dr. Jolleen Natalie I. Balitaan

    Rizal; 31 August 2022
    Virtual

    Sarangani; 03 November 2022
    Virtual

    Eastern Samar; 04 November 2022
    Virtual
    In partnership with DOST VIII and PSTC Eastern Samar
    Speakers: Acd. Dayrit; Acd. Montaño; Acd. Culaba; *Moderator*: Dr. Paul Gideon D. Lasco, OYS 2022, senior lecturer, UP Diliman, and research fellow, Ateneo de Manila University

    National Capital Region; 03 December 2022
    University of Caloocan City- North Congressional Campus
    In partnership with DOST NCR
    Speakers: NS Raul V. Fabella; NS Lourdes J. Cruz; Acd. Mudjekeewis D. Santos; *Moderator*: Dr. Jomar F. Rabajante, OYS 2021

SCIENTIFIC CAREER SYSTEM

The Scientific Career System (SCS) is a system of recruitment, career progression, and recognition that rewards scientists rank in the government service to develop a pool of highly qualified and productive scientific personnel. The system is co-implemented by the Civil Service Commission (CSC) and the DOST, with the CSC Chairman and DOST Secretary serving as Co-chairs of the Scientific Career Council.

The SCS held its 2022 Oath Taking of Newly Conferred and Upgraded Career Scientists on 02 September 2022 in Bagumbayan, Quezon City and online via Zoom and SCS Facebook Page. The newly conferred and upgraded Scientists sworn in were as follows:

Dr. Riza G. Abilgos-Ramos, Scientist I, from Philippine Rice Research Institute (PhilRice) of the Department of Agriculture (DA), pioneered research projects and studies related to nutrition, health, and wellness; consumer-centric product development and value-adding enterprise for Rice Business Innovation Program (Rice BIS); measurement of secondary metabolites for rice stem borer resistance, and market studies to guide product developers, among others at PhilRice. She was recognized as Distinguished Alumna of UPLB in 2014, as an International Fellowship Program Alumni Awardee in 2015 of the Ford Foundation Institute of International Education, and as Gawad Saka Outstanding Agricultural Researcher Regional winner and national finalist in 2016.

Dr. Angel T. Bautista VII, Scientist I, from Philippine Nuclear Research Institute (PNRI) of the Department of Science and Technology (DOST), is a Supervising Science Research Specialist and the current Section Head, specializes in the environmental aspects and applications of nuclear energy, science, and technology. He has published more than 20 Web of Science/Scopus-indexed scientific articles on environmental radioactivity and environmental forensics (i.e., measuring and tracing pollution and contaminants back to their sources). His current research involvements and interests include the Food Authenticity and Traceability Program (as Program Leader), investigating the elevated radioactive iodine-129 in the West Philippine Sea (as Project Leader), addressing arsenic contamination in Luzon (as Co-Project Leader), Philippine Remediation of Mine Tailings (as Study Leader), reconstruction of paleoenvironments using natural archives such as coral and sediment cores, radiometric age dating (e.g., radiocarbon), and uranium exploration and recovery in the Philippines.

Dr. Casiano H. Choresca, Scientist I, from National Fisheries Research and Development Institute of DA, known for his major projects on the molecular detection of the emerging aquatic viruses specifically on the Tilapia Lake Virus (TiLV) in the Philippines which causes mass mortality in tilapia fry and fingerlings and molecular detection emerging bacterial pathogens in Tilapia and other freshwater and marine fish using molecular diagnostics as a platform in developing protocols in the identification of pathogens such as bacteria, viruses and parasites in cultured high valued finfishes and other aquatic species. He also worked on the establishment and cryopreservation of fin explants and somatic cells as donor cells and induce spawning in fish as he focused on the induced breeding of mudfish or 'dalag' (*Channa striata*) and climbing perch or 'puyo, martiniko or liwalo' (*Anabas testudineus*). He recently trained researchers, extensionists, technicians and farmers on how to breed these species under controlled conditions using induced spawning hormones.

Dr. Lucille Elna P. De Guzman, Scientist I, from the Institute of Crop Science (iCrops), University of the Philippines Los Baños (UPLB), specializes in seed technology, organic agriculture, climate change adaptation (CCA), and indigenous knowledge systems (IKS). She investigated the socio-cultural aspects of organic agriculture, the constraints to its adoption, and the local or indigenous knowledge for CCA of agri-fisheries communities. Her research has contributed to the body of knowledge on the CCA of indigenous communities as well as established a link to biodiversity conservation through the identification and documentation of several species of famine food used and conserved by these communities. Dr. de Guzman is the project leader that generated relevant information on the non-destructive method of corn seed moisture content determination and the quality maintenance and storage of *Jatropha curcas* and hydro-primed rice seeds. She has effectively integrated the technical aspects of agronomy with the social features of CCA and IKS. Her current research projects are on the development of postharvest handling and storage protocols of organically-produced corn and on the costs and valuation of conversion from conventional to organic agriculture which target to increase the number of organic agriculture practitioners in the country.

Dr. Evelyn F. Delfin, Scientist I, from the Institute of Plant Breeding (IPB) of UPLB, hopes to help improve the local crop varieties through enhanced abiotic stress tolerance that will enable the crop to endure the challenges brought about by climate change through her work in crop stress physiology and plant-microbe interaction. Her work on drought tolerance in eggplant identified the promising accessions for eggplant drought tolerance improvement while the identification of polymorphic SSR markers helped establish the genetic relationship among eggplant accessions with varying responses to drought. Her team also reported the differential responses to drought of the 29 *Musa* sp. germplasm from the Philippines and Southeast Asia at the seedling stage. Her research collaboration with BIOTECH, UPLB contributed to the identification of the most compatible plant-microbe interactions and characterization of promising

plant growth promoting bacteria strains specific for crops grown in acidic, saline, and *Fusarium*-infested soils.

Dr. Chitho P. Feliciano, Scientist I, from the DOST-PNRI, founded the Radiation Research Center (RRC) that conducts research and development projects on wide range of radiation research innovations involving radiation biology, radiation oncology, drug discovery and development, cellular radiobiology, tumor radiotherapy, low-dose effects, dosimetry methods, and health physics research. His research focuses on the development of protection measures against the unwanted effects of ionizing radiation for the safety of the radiotherapy patients, radiation workers, and the public. He bagged awards and won prestigious recognitions from both international and national award giving bodies especially his collaborated work on the use of nanomedicine in radiation protection. On top of his research works, he also supervises the overall operation and maintenance of the environmental radiation monitoring stations installed nationwide for the safety of the environment and the public.

Maria Luisa D. Guevarra, Scientist I, from University of the Philippines Los Baños, a field-based researcher and has her contributions rooted in developing new varieties of vegetables and ornamental crops. Her work has contributed to a total of 25 registered new varieties of crops including Hoya, Mussaenda, Eggplant, Garden Pea, Pole Snap Beans, Bush Snap Beans, Squash and Cucumber; and also in the discovery of 20 new Hoya species and subspecies endemic to the Philippines. She is currently working on varietal development in Philippine native Hoyas, development of new Hibiscus varieties, genetic diversity conservation, utilization and improvement of Mussaenda and Medinilla, varietal improvement in guava, dragon fruit and other minor fruit crops, and breeding and selection in papaya.

Dr. Leila D. Landicho, Scientist I, from the Agricultural Systems Institute of the College of Agriculture and Food Science (CAFS-IAS) of UPLB, has made significant contributions to agroforestry research and development that helped address crucial environmental and socioeconomic issues affecting the livelihoods and overall well-being of the upland farming communities in the Philippines and Southeast Asia. Her researches centered on agroforestry education, as well as the assessment of agroforestry models in the Philippines, particularly their roles in climate change adaptation, sustainable upland development, and food security. Her research and development outputs have contributed significantly to the generation of new knowledge on agroforestry, the establishment of platforms for enhancing agroforestry education, improvement of agroforestry practice, as well as linking her institution with the universities and research institutions in the country and in Southeast Asia.

Rosaly V. Manaois, Scientist I from DA-PhilRice, has been actively engaged in researches focusing on evaluation of grain quality, nutritional and functional properties of rice in support of breeding of new varieties. She has been involved in the development of food products from rice and other crops and their processing by-products for nutrition improvement and waste minimization and as potential income source for farmers, for which she has generated three registered utility models from the Intellectual Property Office of the Philippines. Her works on antioxidant properties of various rice-based crops help in identifying potential dietary sources of antioxidants to combat non-communicable diseases and suitable raw materials for food applications with improved health and nutritional quality. She developed popular publications to encourage consumption of underutilized rice-based crops among the general public and received local and international awards for her accomplishments.

Dr. Maria Theresa M. Mutia, Scientist I from DA-NFRDI. Her research is focused on aquaculture and inland fishery resources conservation and management. One of her most significant accomplishments is the development of the induced breeding protocol of Maliputo (*Caranx ignobilis*), a high-value fish found in Lake Taal. This is the first record of captive breeding and a major scientific breakthrough in Philippine aquaculture. Dr. Mutia also dedicated her research work to the conservation and management of the endemic freshwater sardine, Tawilis (*Sardinella tawilis*) which was recently declared endangered by the International Union for Conservation of Nature (IUCN). After several years of research on population dynamics, reproductive biology, and ichthyoplankton assessment, one of the most significant findings of her research includes the determination of the Tawilis spawning season and spawning grounds in Lake Taal. These findings were used as a basis for formulating science-based policies on the declaration of the Closed Fishing Season of Tawilis and the Establishment of Tawilis Reserve Areas as measures to re-populate the fish stocks in the lake. These policies were both approved by the DENR-Protected Area Management Board and implemented by the local government units and the fisherfolk. As the Chief Science Research Specialist, Dr. Mutia has provided dedicated government service resulting in a growing culture of research in NFRDI that has been instrumental in the government's efforts of strengthening its agri-industrialization and fisheries program.

Dr. Marilyn O. Quimado, Scientist I, from UPLB-CFNR, focused her research on the conservation of native forest species such as metallophytes and mentoring thesis students on plant anatomy and tissue culture. Specifically, through various research grants that she led, botanical surveys were conducted in Palawan, Surigao, and Zambales that resulted in discovery of new records of nickel hyperaccumulators. She developed micropropagation protocols for Calophyllum

soulattrii, Dillenia luzoniensis, Lunasia amara, Samadera indica, among others, and macropropagation of nickel hyperaccumulators such as Nymphanthus balgooyii, Dendrophyllanthus securinegoides, Rinorea bengalensis, and Rinorea niccolifera. She also led the establishment of germplasm collection of native metallophytes in the Department of Forest Biological Sciences (FBS), CFNR, UPLB and in some nickel mining companies, increased the awareness and involvement of various stakeholders (staff and officials of nickel mining companies, host communities, and local government officials), replacement of exotic species with native metallophytes in reforestation of nickel mined-out areas in collaborator mining companies, and mentored students on various aspects of metallophytes.

Dr. Lourdes D. Taylo, Scientist I, from UPLB-IPB, works primarily on Host Plant Resistance (HPR) of vegetables with insect resistance traits. She was also actively involved in the development of the four National Seed Industry Council (NSIC)-registered first hybrid eggplant varieties developed at UPLB, and registered under the Plant Variety Protection (PVP), two eggplant hybrids and two inbred lines. More importantly, she was involved in the research, development, and regulation of Event EE-1 eggplant possessing Bt Cry1Ac insecticidal protein that targets the eggplant fruit and shoot borer. This product is UPLB's first genetically-engineered vegetable crop aimed to reduce farmers' dependence on the use of insecticides thus maintaining an eco-friendly and healthy environment while providing increase crop productivity to eggplant farmers.

Dr. Marvin A. Villanueva, **Scientist I,** from the Philippine Carabao Center (PCC) of DA focused his researches in generating updated information on several zoonotic diseases in livestock such as bovine leptospirosis and bovine tuberculosis that are often neglected in the country; and other livestock diseases of economic importance such as trypanosomiasis, theileriosis, neosporosis, caprine arthritis encephalitis and food safety issues particularly on antimicrobial resistance. He also developed advanced/molecular-based diagnostic tests for sensitive detection of livestock diseases such as interferon gamma-release assay for bovine tuberculosis and loop-mediated isothermal amplification (LAMP) test for bovine leptospirosis. These sensitive and rapid diagnostic tests are currently used in the country for faster disease detection and initiation of treatment and control measures. Currently, he spearheads the upscaling of production of QuickCArE® Dry LAMP CAEV Test Kit for expanded field trial, product registration and commercialization.

Dr. Imelda Angeles-Agdeppa, **Scientist IV,** from the Food and Nutrition Research Institute (FNRI) of DOST has conducted numerous community trials that contributed significantly to the improvement in nutritional status of Filipinos. Among her greatest accomplishments are the researches translated into laws and policies which includes the "Integrated Model on School-Based Gardening, Nutrition Education and Supplementary Feeding" became the basis of the recently released National Supplementary Feeding Law; "Evaluation of Dietary Section of DOH Hospitals" has been used as the basis of DOH to release an Administrative Order (AO) to increase the budget from Php 30.00/day to Php 150.00/day cost of meals of in-patients in charity wards; "Pilot – Scale Commercialization Iron Fortified Rice (IFR)" led to the release of local ordinances for the sale and consumption of IRF in numerous Local Government Units and has been fully adopted for implementation in different parts of the country; Research on food fortification of beverages also benefited Industries to make their products more nutritious for the Filipino population; and "Evaluation on the quality of life of Patients with Chronic Kidney Disease (CKD) after Consuming Low Protein Rice" has helped patients with kidney disease enjoy quality meals and improved quality of life. During this pandemic, her research in the effectiveness of Virgin Coconut Oil as an adjunction therapy for faster recovery from COVID-19 has helped in the government's response on mitigating the transmission of the virus. She has been a short–term consultant in Indonesia and in the National Institute of Nutrition, Hanoi, Vietnam, and a project leader in the conduct of National Nutrition Surveys. She also received a number of awards: PAGASA which was awarded by the President of the Philippines, the Alberto Romualdez Outstanding Health Research Award (National Category) and the Clara Ruth Darby Award (Nutritionist – Dietitians Association of the Philippines).

Dr. Nelly S. Aggangan, **Scientist II,** from the National Institute of Molecular Biology and Technology (BIOTECH) of UPLB has concentrated her research on finding mycorrhizal fungi that help plants thrive in adverse conditions such as thin top soil, low nutrients, very acidic to slightly acidic pH, and mine tailing and abandoned mined-out areas as an alternative to pricey inorganic chemical fertilizers for reforestation, crop production, improving growth and yield in unproductive agricultural soil, and restoring soil productivity and sustainability. Her researches have led to the discovery of 12 species that are now in the MYKOVAM, MYKORICH and MYKOCAP mycorrhizal inoculants. Furthermore, numerous farmers around the country have attested that these mycorrhizal inoculants may replace 65–85% of the chemical fertilizers needed by plants to achieve normal growth, particularly in infertile soil, and can enhance yields by up to three times depending on the crop. Also, the rehabilitation of a three-decade-old mined-out and abandoned land in Mogpog, Marinduque, is Dr. Aggangan's high impact initiative. The 3-hectare experimental area is currently covered with green, healthy young mini-forests that can absorb heavy metals from the soil thanks to her leadership and collaboration with the communities and LGUs, creating a cleaner and safer environment. Her outstanding work on mine tailings bioremediation has greatly decreased the effects of environmental (soil, air, and water) degradation and educated the locals.

Dr. Maria Corazon A. De Ungria, **Scientist IV,** from the Natural Sciences Research Institute (NSRI) of the University of the Philippines Diliman (UPD) is a molecular biologist that focused her research on human genetic diversity and maximizing the use of DNA as a forensic tool for human identification in criminal investigations. Her work involves discovering how science can help address societal concerns in the Philippines. Currently, she is the Head of the DNA Analysis Laboratory of the NSRI and the Director of the Program on Biodiversity, Ethnicity, and Forensics at the Philippine Genome Center. Dr. De Ungria's valuable contribution to

Philippine governance was her work on the Rule on DNA Evidence with the Research Group of the Philippine Judicial Academy. After more than six years of continuous technical exchange, the Supreme Court finally promulgated the Rule on DNA Evidence in 2007. Since then, all Philippine courts have followed the Rule when DNA evidence is presented in any given case. She has passionately worked for more than 23 years as the longest-serving head of the DNA Analysis Laboratory, where she earned various awards. These recognitions include the Outstanding Woman in the Life Sciences from the Third World Organization of Women Scientists and Elsevier in Kuala Lumpur, Malaysia, in 2009; a National Fellow of the L'Oreal -UNESCO Women in Science Program in 2011; and the Most Outstanding Alumni from the Australian Embassy in the Philippines in 2017. For her strict observance of the "Code of Conduct and Ethical Standards for Public Officials and Employees" or RA 6713 and exemplary service to the country, Dr. Cora received a Dangal ng Bayan award from the Civil Service Commission also in 2017. In 2019, the Association of Academies and Societies of Sciences featured her as one of the two Filipinas in "Profiles of Women Scientists in Asia". Dr. De Ungria identifies herself as a changemaker who uses "DNA" as her catalyst for change.

Ms. Marcela M. Navasero, **Scientist II,** from the National Crop Protection Center (NCPC) of UPLB specializes in biological control, Integrated Pest Management (IPM), and pest biology. Her notable achievements include the detection of invasive pests: onion armyworm, fall armyworm, coconut leaf beetle; elucidated the behavioral mechanisms behind adverse effect of brown seaweed to Asian corn borer, a major pest of corn; and developed cost effective and easy to adopt mass production techniques for pest and natural enemies, eg. *Brontispa longissimi* (pest) and *Chelisoches morio* (predator) and utilization of the predator to control the pest in coconut – infested farms (due to *Brontispa*).

IN MEMORIAM

Filomena F. Campos

Dr. Campos was renowned for her pioneering research in plant breeding and cytogenetics, which contributed to the successful revitalization of the Philippine cotton industry and the development of local sunflower and castor bean varieties. Her work on translating laboratory research into viable agricultural technologies has contributed to the livelihood and economic upliftment of countless Filipino farmers and rural communities.

She was known as very committed, innovative, hard-working, and passionate about work. She inspired and encouraged a lot of students by being a great mentor who taught not only the technical content of the biological and agricultural sciences but has gone further by teaching good moral values and preparing the students for challenges they will face in the future. Because of this, she received many prestigious awards including the Rizal Pro Patria Award, the Ten Outstanding Women of the New Society (TOWNS) Award, the Philippine Association for the Advancement of Science (PhilAAS) Award, and many more. In 1987, she was elected as an Academician by the National Academy of Science and Technology.

Eliezer A. Albacea

Dr. Albacea was renowned for his discovery of the leapfrogging sample sort contributed to a large amount of savings in computing time for most data processing applications. His work on web-based online databases has contributed to the efficiency of many government agencies involved in data generation and data collection.

He was known as very committed, innovative, hard-working, and passionate about work. He inspired and encouraged a lot of students by being a great mentor who taught not only the technical content of computer science but has gone further by teaching good moral values and preparing the students for challenges they will face in the future. Because of this, he received many prestigious awards including the Outstanding Young Scientist Award in 1996, TWAS Science Prize for Mathematics in 2000, Outstanding Senior Staff in UP Los Baños, and many more. In 2006, he was elected as an Academician by the National Academy of Science and Technology.