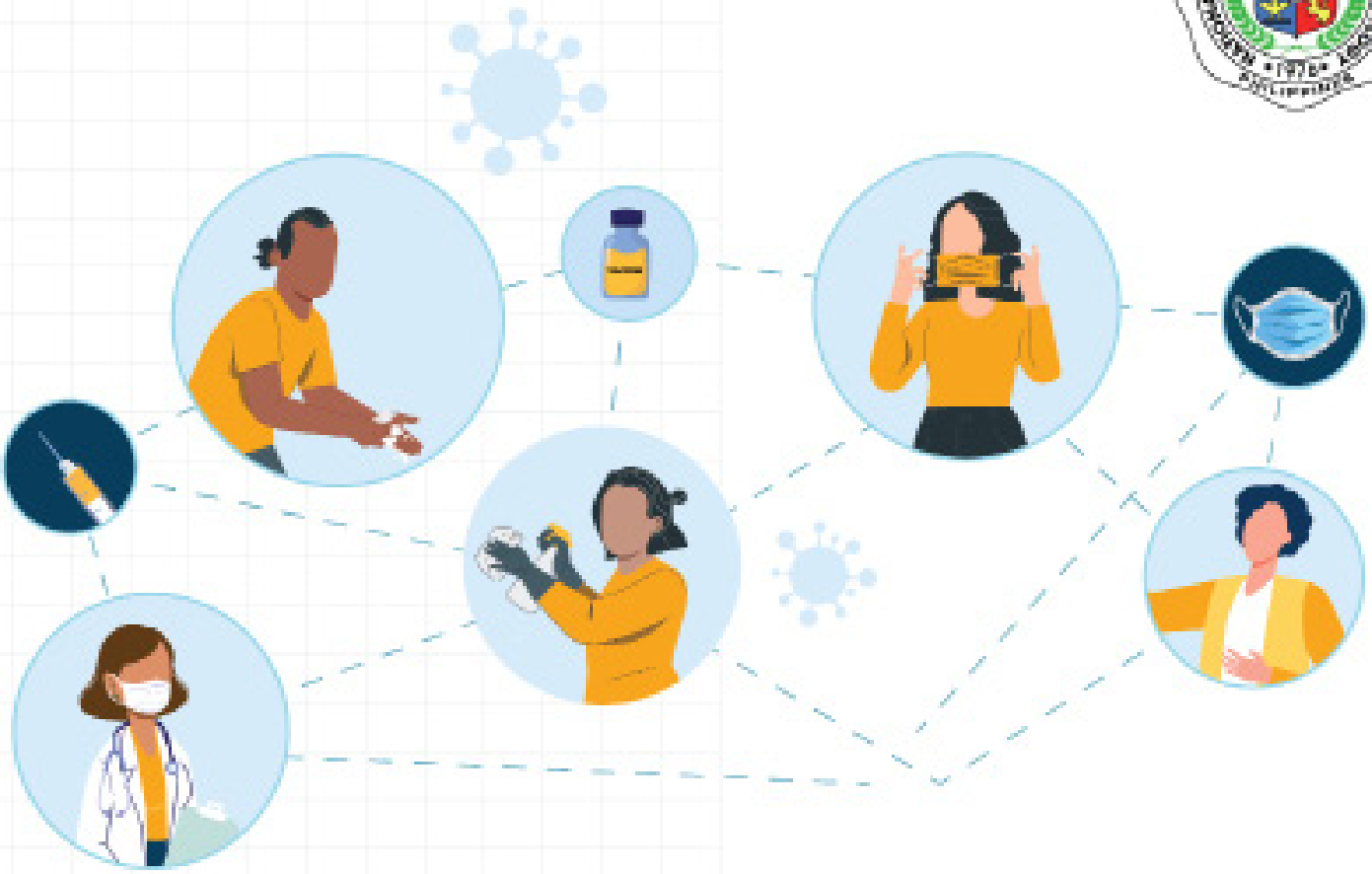

43RD

ANNUAL SCIENTIFIC MEETING

"COVID-19 PANDEMIC: LEARNING FROM THE PAST, COPING WITH THE PRESENT, MOVING TO THE NEXT"

12-15 JULY 2021

cover design & layout
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MESSAGE

OFFICE OF THE PRESIDENT

My warmest congratulations to the **National Academy of Science and Technology, Philippines (NAST PHL)** as it holds its 43rd Annual Scientific Meeting.

I commend NAST PHL for making this year's meeting a platform for leading scientists, academicians, and researchers to share crucial knowledge, skills, and resources on our concerted efforts to defeat the COVID-19 pandemic and other possible health crises that we may face in the future.

This collaboration is vital in providing dependable medical infrastructure and efficient healthcare services to our people.

May this gathering encourage the participants to provide inputs and undertake timely innovations that will sufficiently equip our frontliners to respond against all emerging health crises.

I hope that you will take this opportunity to improve and use your expertise to promote the improved well-being of our people as we continue to heal as a nation.

I wish you a productive and meaningful event.

RODRIGO ROA DUTERTE
President

DEPARTMENT OF HEALTH

My warmest greetings to the National Academy of Science and Technology, Philippines (NAST PHL) as you gather the science community, policymakers, stakeholders, and the public on the occasion of your 43rd Annual Scientific Meeting (ASM).

The outbreak of COVID-19 has placed extraordinary burdens upon the Philippines, especially in our healthcare system. In response to the crisis, the country implemented a whole-of-government, whole-of-society, and whole-of-system approach, with emphasis on quick response, resource management, and strategic communications through Prevent, Detect, Isolate, Treat, and Re-integrate (PDITR) Strategies.

The Department of Health (DOH) remains committed to providing science- and evidence- based responses to ensure the resiliency of our healthcare system, optimize the use of resources, and balance the health and economic needs of the country. The theme of this year's scientific meeting is very timely, as it reminds us that we should continue to build upon the learnings, experiences, and strategies from pandemics past and present, in order to prepare our systems and augment our capacity for the next. We know that demand for quality health service will only grow; hence, we are called to relentlessly advance the state of medicine and science in the country. This year, we welcomed the development of COVID-19 vaccines as our latest weapon to combat this pandemic. While the DOH continues to assure the public that science guarantees the safety and effectiveness of our COVID-19 vaccines, we are still tackling the realities of vaccine hesitancy in the country head on. We invite everyone to take part in addressing vaccine hesitancy and communicating the value of vaccines in cutting transmission, protecting our health system, and saving lives.

Most of all, allow me to extend my sincerest gratitude to all the health professionals and healthcare workers, researchers, scientists, and individuals who continue to respond selflessly and whole-heartedly to the call of service even during the trying times.

The DOH underscores that everyone has a role during the public health crisis. By dutifully and honestly fulfilling these roles, I am confident that we will endure, overcome, and heal as one. Let us all continue moving in one accord for the future of the Philippine public health, for an improved tomorrow of the Filipino nation.

Thank you very much. *Mabuhay tayong lahat*!

FRANCISCO T. DUQUE III, MD, MSc
Secretary of Health

MESSAGE

DEPARTMENT OF SCIENCE AND TECHNOLOGY

I congratulate the National Academy of Science and Technology, Philippines (NAST PHL) on its 43rd Annual Scientific Meeting (ASM) with the theme "COVID-19 Pandemic: Learning from the Past, Coping with the Present, and Moving to the Next."

The Department of Science and Technology (DOST) has been committed to bring science closer to the people towards the improvement of the quality of life. Through our flagship programs we were able to inspire our Filipino researchers and scientists to prove the value of their work not only to our fellow countrymen but also to the rest of the world.

The COVID-19 pandemic brought out gaps in our healthcare system, but at the same time, presented opportunities for research and collaboration. At the DOST, through the research and development (R&D) councils, R&D institutes, S&T service institutes, regional offices and provincial centers, and of course, NAST Philippines, we have lived up to our commitment.

We supported research projects to help the government in its efforts to manage the risks and uncertainties brought by the COVID-19 pandemic. We collaborated with Filipino scientists and researchers to be able to produce products, technologies, and systems that address needs brought about by the pandemic.

With the COVID-19 pandemic still here, we are doing our best to learn and to cope. We are continuously assessing that we have developed towards improvement and further innovations.

It has been said that pandemics would become more and more frequent in our lifetime. We should therefore not stop collaborating with each other so that we will be more prepared in the future.

NAST Philippines prepared a foresight document on science, technology, and innovation for the next 30 years, aptly titled PAGTANAW 2050. Let us study this document. I am sure that we will be able to pick up many interesting key points that we can use to manage our future better. Being concerned with our future and the future of our earth should always be kept in our consciousness.

We must further advance "Science for the People" to everyone's benefit.

FORTUNATO T. DE LA PEÑA
Secretary

NATIONAL ACADEMY OF SCIENCE AND TECHNOLOGY

The National Academy of Science and Technology, Philippines (NAST PHL) has been mandated to promote excellence in science and technology (S&T) and to encourage Filipino scientists' participation in the advancement of Science and Technology (S&T) for the development of the country. The Academy has proactively dedicated itself to these goals toward a progressive country anchored on S&T.

It is our yearly tradition that we gather the science community and meet with our private and public stakeholders and discuss timely and significant development issues and concerns through our Regional Scientific Meetings in Luzon, Visayas, and Mindanao, culminating with an Annual Scientific Meeting.

This year's 43rd Annual Scientific Meeting (ASM) focuses on the theme "*COVID-19 Pandemic: Learning from the Past, Coping with the Present, and Moving to the Next*."

It has been more than a year that the whole nation, including the rest of the world, have been coping with the tremendous impacts of COVID 19 pandemic. While it is true that this pandemic has revealed the country's already existing gaps and problems in the health sector, the government, our doctors, scientists, and experts have stepped up efforts to meet the continuing complex challenges.

The pandemic has affected almost all sectors of the society , hence the discussions in this annual scientific meeting will tackle related issues and concerns such as the connection among food, environment and health, viral evolution, dynamics and modeling interventions, systems approach to address present day hazards, impact of the pandemic to basic and higher education, balancing the economy and health, and health systems response and preparedness.

As we continue to fight off this pandemic, may we all learn from the "weight of the past" and use evidence-based action plans and strategies to cope with the "push of the present" for even now we can sense the "pull of the future."

Let us all move forward and build a better future for the next generation with science and technology as our strong base.

RHODORA V. AZANZA
President

RATIONALE

Reeling from the SARS epidemic in 2003, we were still inadequately prepared for the onset of the COVID19 pandemic, which was declared officially by the WHO in March 2020. The existing gaps and problems in health care delivery and health infrastructure were further aggravated by this global pandemic that has already affected almost all of the countries of the world, impacting on all sectors of society and national development. It has become imperative that we learn from these challenges, institute all of the needed health reforms and improvements to make our health and social systems resilient and responsive to emergent and emerging health crises. Another pandemic like COVID19 is inevitable in the future so we have to learn from what we have done in the past, assess where we are and address the current gaps and problems to prepare for such an occurrence.

PROGRAM

12 July 2021 (Monday)

10:00 Launching of the NAST Scientific Poster Session

ACD. EDWARD H.M. WANG
Chair, 43rd ASM Scientific Poster Review Committee
Member, Health Sciences Division
NAST Philippines

13 July 2021 (Tuesday)

OPENING PROGRAM

9:00 Start of the Opening Program

ACD. FABIAN M. DAYRIT
Vice President
NAST Philippines

9:02 Welcome Remarks

ACD. RHODORA V. AZANZA
President
NAST Philippines

9:07 Opening Message

SEC. FORTUNATO T. DE LA PEÑA
Department of Science and Technology

9:15 Keynote Addresses

DR. ANTHONY S. FAUCI
Director
US National Institute of Allergy and Infectious Diseases

DR. FRANCISCO Q. DUQUE III
Secretary
Department of Health

SECRETARY CARLITO G. GALVEZ JR.
Chief Implementer
National Policy Against COVID-19

9:55 Statement of the Objectives and Introduction on the theme:
COVID-19 Pandemic: Learning from the Past, Coping with the Present, Moving to the Next

ACD. JAIME C. MONTOYA
Chair, 43rd ASM Steering Committee
Chair, Health Sciences Division
NAST Philippines

PLENARY SESSION 1
FOOD, ENVIRONMENT, AND HEALTH: EXPLORING THE CONNECTIONS

10:00 Introduction of the Speakers

ACD. MUDJEKEEWIS D. SANTOS
Member, Agricultural Sciences Division
NAST Philippines

10:05 Impact of COVID-19 in the Philippine Food System

ACD. GLENN B. GREGORIO
Professor, College of Agriculture and Food Science, UPLB
Director, SEARCA
Member, Agricultural Sciences Division
NAST Philippines

10:25 Nexus of Health Risk-Natural Resources Degradation

ACD. RODEL D. LASCO
Executive Director, Oscar M. Lopez Center
Member, Agricultural Sciences Division
NAST Philippines

10:45 Open Forum

11:45 Synthesis of the Discussion

DR. RICO C. ANCOG, OYS 2019
Associate Professor V and UP Scientist III
School of Environmental Science and Management
University of the Philippines Los Baños

Moderator:
ACD. MUDJEKEEWIS D. SANTOS
Member, Agricultural Sciences Division
NAST Philippines

12:00 Launching of NAST Digital Publications

ACD. EUFEMIO T. RASCO JR.
Chair, Agricultural Sciences Division
NAST Philippines

PLENARY SESSION 2
VIRAL EVOLUTION, DYNAMICS, AND MODELLING INTERVENTIONS

1:00 Introduction of the Speakers

ACD. VIRGINIA CUEVAS
Member, Biological Sciences Division
NAST Philippines

1:05 Biology and Evolution of Viruses like SARS COV 2

DR. CYNTHIA P. SALOMA, OYS 2004
Executive Director
Philippine Genome Center

1:25 Biosystems Modeling of Hazards and Risks

DR. JOMAR F. RABAJANTE, OYS 2021
Dean, Graduate School
University of the Philippines Los Baños

1:45 Open Forum

2:45 Synthesis of the Discussion

DR. MELBOURNE R. TALACTAC, OYS 2020
Vice President for Research and Extension
Cavite State University

Moderator:
ACD. VIRGINIA CUEVAS
Member, Biological Sciences Division
NAST Philippines

PLENARY SESSION 3
SYSTEMS APPROACHES TO ADDRESS PRESENT-DAY HAZARDS

3:00 Introduction of the Speakers

ACD. AURA C. MATIAS
Member, Engineering Sciences and Technology Division
NAST Philippines

3:05 Adaptive Control of Pandemics and Optimized Allocation of Health Resources

ACD. JOSE B. CRUZ JR.
Member, Engineering Sciences and Technology Division
NAST Philippines

ACD. RAYMOND GIRARD R. TAN
Member, Engineering Sciences and Technology Division
NAST Philippines

DR. TIRSO A. RONQUILLO
President
Batangas State University

3:25 Infrastructure and Management for Work-from-Home and Hybrid Systems in Industry

DR. RAMON B. SEGISMUNDO
President, People Management Association of the Philippines
Founder and CEO, 1-HR.X Pte. Ltd.

MS. GRACE ABELLA-ZATA
Chief Executive Officer
IRC Institute

3:45 Long-Term Regional Planning Systems for Balanced, Inclusive, Digitalized, and Low-Carbon Growth

DR. HUSSEIN SINSUAT "THO" LIDASAN
Dean
University of the Philippines Diliman School of Urban and Regional Planning (SURP)

EnP. CARMELI MARIE C. CHAVES
Assistant Professor, SURP and Project Leader,
University of the Philippines Diliman Planning and Development Research Foundation, Inc. (UP PLANADES)

4:05 Open Forum

4:45 Synthesis of the Discussion

DR. RYAN RHAY P. VICERRA, OYS 2019
Associate Professor, Department of Manufacturing Engineering and Management
De La Salle University, Manila

Moderator
ACD. AURA C. MATIAS
Member, Engineering Sciences and Technology Division
NAST Philippines

14 July 2021 (Wednesday)

PLENARY SESSION 4
EDUCATING FOR OUR FUTURE: RETRIEVING THE COVID-19 GENERATION

10:00 Introduction of the Speakers

ACD. FABIAN M. DAYRIT
Chair, Mathematical and Physical Sciences Division
NAST Philippines

10:05 *Basic Education*
Curriculum Induced Learning Loss Before and During a Pandemic

ACD. CHRISTOPHER C. BERNIDO
Founding Director, Research Center for Theoretical Physics
Central Visayan Institute Foundation
Member, Mathematical and Physical Sciences Division
NAST Philippines

10:25 Discussants
SENATOR SHERWIN T. GATCHALIAN
Chairman of the Senate Committee on Basic Education, Arts and Culture
Senate of the Philippines

ATTY. NEPOMUCENO A. MALALUAN
Undersecretary and Chief of Staff, Office of the Secretary
Department of Education

10:40 *Higher Education*
Learning Loss in Tertiary Education

ACD. MARIBEL G. NONATO
Vice-Rector for Research and Innovation, University of Santo Tomas
Member, Mathematical and Physical Sciences Division
NAST Philippines

11:00 Discussants
DR. ESTER A. GARCIA
President and Chief Academic Officer
University of the East

ATTY. LILY FREIDA C. MACABANGUN-MILLA
Officer-In-Charge, Office of the Deputy Executive Director IV
Commission on Higher Education

11:15 Open Forum

11:45 Synthesis of the Discussion

DR. AARON JOSEPH L. VILLARAZA, OYS 2016
Professor, Institute of Chemistry
University of the Philippines Diliman

Moderator
ACD. FABIAN M. DAYRIT
Chair, Mathematical and Physical Sciences Division
NAST Philippines

12:00 NAST Philippines Director's Report

MS. LUNINGNING E. SAMARITA-DOMINGO
Director, NAST Philippines

PLENARY SESSION 5
BALANCING THE ECONOMY AND HEALTH

1:00 Introduction of the Speakers

ACD. CHRISTOPHER P. MONTEROLA
Member, Social Sciences Division
NAST Philippines

1:05 Balancing Health and Economy toward Sustainable and Inclusive Recovery

ACD. ARSENIO M. BALISACAN
Chairman, Philippine Competition Commission
Member, Social Sciences Division
NAST Philippines

1:25 Learning Losses

DR. DIOSDADO M. SAN ANTONIO
Undersecretary for Curriculum and Instruction
Department of Education

1:45 Vaccine Cynicism
ACD. MAHAR K. MANGAHAS
President, Social Weather Stations
Member, Social Sciences Division
NAST Philippines

2:05 Open Forum

2:50 Synthesis of the Discussion

DR. MAJAH-LEAH V. RAVAGO, OYS 2016
Associate Professor, Department of Economics
Ateneo De Manila University

Moderator
ACD. CHRISTOPHER P. MONTEROLA
Member, Social Sciences Division
NAST Philippines

PLENARY SESSION 6
HEALTH SYSTEMS RESPONSE AND PREPAREDNESS

3:00 Introduction of the Speakers

ACD. CARMENCITA D. PADILLA
Member, Health Sciences Division
NAST Philippines

3:05 The Health System Response

DR. MARIA ROSARIO S. VERGEIRE, MPH, CESO IV
OIC-Undersecretary of Health
Public Health Services Team

Discussants

3:25 Social Scientist

ACD. MICHAEL L. TAN
Member
Social Sciences Division

3:40 Clinician

DR. MARISSA M. ALEJANDRIA, MD, MSC, FPCP, FPSMID
Director, Institute of Clinical Epidemiology (ICE)
University of the Philippines

3:55 Policy Maker/Health Technology Assessment Expert

DR. TEODORO J. HERBOSA
Professor, Emergency Medicine and Trauma Surgery, UP-Philippine General Hospital
Medical Adviser, National Task Force Against COVID-19

4:10 Open Forum

4:50 Synthesis of the Discussion

DR. NATHANIEL S. ORILLAZA JR., OYS 2019
Associate Professor
University of the Philippines Manila

Moderator
ACD. CARMENCITA D. PADILLA
Member, Health Sciences Division
NAST Philippines

15 July 2021 (Thursday)

PRESENTATION OF RESEARCH RESULTS OF NAST AWARDEES
(Funded by the Department of Science and Technology)

10:00 Introduction of the Speakers

MR. RICHARD P. BURGOS
Director
Science and Technology Information Institute

10:10 Department of Science and Technology Grants in Aid Program

DR. ROWENA CRISTINA L. GUEVARA
Undersecretary for Research and Development, Department of Science and Technology, Philippines

10:30 *Agricultural Sciences Division*
Characterization of Maize Haploid Inducer and Initial Assessment of Haploid Inducibility under Philippine Condition

DR. TONETTE P. LAUDE
Outstanding Young Scientist 2016
Associate Dean and Assistant Professor, College of Agriculture
University of the Philippines Los Baños

10:40 *Biological Sciences Division*
From Input to Output: Model towards a decision-support system for Harmful Algal Blooms

DR. ALETTA CONCEPCION T. YÑIGUEZ
Outstanding Young Scientist 2017
Associate Professor, The Marine Science Institute
University of the Philippines Diliman

10:50 *Engineering Sciences and Technology Division*
Development of next generation all-solid-state Li-ion batteries and future prospects

DR. RINLEE BUTCH CERVERA
Outstanding Young Scientist 2018
Professor, Department of Mining, Metallurgical, and Materials Engineering
University of the Philippines Diliman

11:00 *Mathematical and Physical Sciences Division*
Resolution Limit of Fourier Transform Profilometry for Various Applications

DR. NATHANIEL P. HERMOSA II
Outstanding Young Scientist 2017
Associate Professor, National Institute of Physics
University of the Philippines Diliman

11:10 *Mathematical and Physical Sciences Division*
Paleoseismic investigation along the Leyte segment of the Philippine fault

MR. JEFFREY S. PEREZ
Outstanding Young Scientist 2017
Supervising Science Research Specialist, Philippine Institute of Volcanology and Seismology
Department of Science and Technology

11:20 *Engineering Sciences and Technology Division*
Hydrothermal Synthesis of Hierarchical Hematite (α-Fe2O3) Nanostructures for Environmental Cleaning

DR. MARY DONNABELLE L. BALELA
Outstanding Young Scientist 2016
Professor, Department of Mining, Metallurgical and Materials Engineering
University of the Philippines Diliman

11:30 Open Forum

Moderator
MR. RICHARD P. BURGOS
Director
Science and Technology Information Institute

CLOSING PROGRAM

1:00 Recap

ACD. EDWARD H.M. WANG
Member, Health Sciences Division
NAST Philippines

1:10 Report on Past Resolutions

MS. LUNINGNING E. SAMARITA-DOMINGO
Director, NAST Philippines

1:20 Presentation of the NAST 43rd ASM Resolutions

ACD. JAIME C. MONTOYA
Chair, Resolutions Committee

1:40 Response from the Department of Health

SECRETARY FRANCISCO Q. DUQUE III
Department of Health

Response from the National Economic and Development Authority

USEC. ROSEMARIE G. EDILLON
National Economic and Development Authority

1:50 Response from the Department of Science and Technology

SEC. FORTUNATO T. DE LA PEÑA
Department of Science and Technology

2:00 Awarding Ceremony

Best Scientific Poster

NS ERNESTO O. DOMINGO
Chair, Scientific Poster Board of Judges

Outstanding Book/ Monograph Award

Outstanding Scientific Paper

NAST Award for Outstanding Research in Tropical Medicine

NAST Talent Search for Young Scientists

Outstanding Young Scientist Award

Oath Taking of New Academicians

SEC. FORTUNATO T. DE LA PEÑA
Department of Science and Technology

3:45 Closing Remarks

ACD. FABIAN M. DAYRIT
Vice President, NAST Philippines

Master of Ceremony
ACD. JAIME C. MONTOYA
Secretary, NAST Philippines

PROFILES
ABSTRACTS

KEYNOTE SPEAKER

PROFILE

DR. ANTHONY S. FAUCI

Director
US National Institute of Allergy and Infectious Diseases

Dr. Fauci was appointed director of NIAID in 1984. He oversees an extensive portfolio of basic and applied research to prevent, diagnose, and treat established infectious diseases such as HIV/AIDS, respiratory infections, diarrheal diseases, tuberculosis and malaria as well as emerging diseases such as Ebola and Zika. NIAID also supports research on transplantation and immune-related illnesses, including autoimmune disorders, asthma and allergies. The NIAID budget for fiscal year 2021 is an estimated $6.1 billion.

Dr. Fauci has advised seven presidents on HIV/AIDS and many other domestic and global health issues. He was one of the principal architects of the President's Emergency Plan for AIDS Relief (PEPFAR), a program that has saved millions of lives throughout the developing world.

Dr. Fauci also is the longtime chief of the Laboratory of Immunoregulation. He has made many contributions to basic and clinical research on the pathogenesis and treatment of immune-mediated and infectious diseases. He helped pioneer the field of human immunoregulation by making important basic scientific observations that underpin the current understanding of the regulation of the human immune response. In addition, Dr. Fauci is widely recognized for delineating the precise ways that immunosuppressive agents modulate the human immune response. He developed effective therapies for formerly fatal inflammatory and immune-mediated diseases such as polyarteritis nodosa, granulomatosis with polyangiitis (formerly Wegener's granulomatosis), and lymphomatoid granulomatosis. A 1985 Stanford University Arthritis Center Survey of the American Rheumatism Association membership ranked Dr. Fauci's work on the treatment of polyarteritis nodosa and granulomatosis with polyangiitis among the most important advances in patient management in rheumatology over the previous 20 years.

Dr. Fauci has made seminal contributions to the understanding of how HIV destroys the body's defenses leading to its susceptibility to deadly infections. Further, he has been instrumental in developing treatments that enable people with HIV to live long and active lives. He continues

to devote much of his research to the immunopathogenic mechanisms of HIV infection and the scope of the body's immune responses to HIV.

In a 2021 analysis of Google Scholar citations, Dr. Fauci ranked as the 35th most-cited living researcher. According to the Web of Science, Dr. Fauci ranked 9th out of 2.5 million authors in the field of immunology by total citation count between 1980 and January 2021. During the same period, he ranked 20th out of 2.4 million authors in the field of research & experimental medicine, and 132nd out of 992,000 authors in the field of general & internal medicine.

Dr. Fauci has delivered major lectures all over the world and is the recipient of numerous prestigious awards, including the Presidential Medal of Freedom (the highest honor given to a civilian by the President of the United States), the National Medal of Science, the George M. Kober Medal of the Association of American Physicians, the Mary Woodard Lasker Award for Public Service, the Albany Medical Center Prize in Medicine and Biomedical Research, the Robert Koch Gold Medal, the Prince Mahidol Award, and the Canada Gairdner Global Health Award. He also has received 50 honorary doctoral degrees from universities in the United States and abroad.

Dr. Fauci is a member of the National Academy of Sciences, the National Academy of Medicine, the American Academy of Arts and Sciences, and the American Philosophical Society, as well as other professional societies including the American College of Physicians, the American Society for Clinical Investigation, the Association of American Physicians, the Infectious Diseases Society of America, the American Association of Immunologists, and the American Academy of Allergy, Asthma & Immunology. He serves on the editorial boards of many scientific journals and as an author, coauthor, or editor of more than 1,300 scientific publications, including several textbooks.

FOOD, ENVIRONMENT, AND HEALTH: EXPLORING THE CONNECTIONS

SPEAKER

PROFILE

Acd. Glenn B. Gregorio is a professor at the Institute of Crop Science, College of Agriculture and Food science UPLB and currently the Center Director of Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEAMEO-SEARCA). Recently appointed as Chairman Technical Panel for Agriculture by the Commission of Higher Education (CHED), and steering committee member of the Department of Agriculture Biotechnology program.

His career was developed at the International Rice Research Institute (IRRI) as Plant Breeder and Sr. Scientist of IRRI's Plant Breeding Genetics and Biotechnology Division. He worked on rice breeding and genetics for tolerance to abiotic stresses and research management. He had a 3-year experience as crop breeding manager in a private Seed Company. He is an agri-entreprenuer as co-Founder of Binhi Inc, an agri-research start-up company on micropropagation and seed business.

He published more than 120 scientific journals, Book Chapter, Policy papers and manuals. His numerous awards include the following: Ten Outstanding Youth Scientists of the Philippines (TOYS) during his high school time; Outstanding Young Scientist (OYS) in the field of Genetics; Honorary Foreign Scientist of the Rural Development Administration of Korea; The Outstanding Young Men (TOYM) Philippines; Ho Chi Minh Medal award for "Having Great Contribution to the cause of Agriculture and Rural Development of Vietnam"; Crop Science Achievement Awards in Crop Research, R&D Management, and honorary fellow in various years.

Dr. Gregorio was also conferred the rank of Academician by the National Academy of Science and Technology (NAST)-Philippines. Recently recognized as 2020 UPLB College of Agriculture and Food Science Distinguished Alumnus for Rice Genetics and Breeding. He is now one of the 2021 UN Food Systems Summit champions.

ACD. GLENN B. GREGORIO

Professor, College of Agriculture and Food Science, UPLB
Director, SEARCA
Member, Agricultural Sciences Division, NAST Philippines

IMPACT OF COVID-19 IN THE PHILIPPINE FOOD SYSTEMS: SECURING THE "FOOD PANTRY" OF TODAY AND THE FUTURE

Our experience of COVID-19 pandemic highlights the importance of strengthening academe-industry-government interconnectivity models to operationalize the supply chains for every food systems across the country. Hence, a more systematic identification of these critical food systems across the country, its mapping, and more directed integrative and systemic interventions is crucial to better respond to the ongoing pandemic and prepare for future pandemics. Policy support is needed to achieve the following:

a. Strengthen support to local capacity toward being self-sufficient through well-planned local food production systems. While sustaining the efforts of improving productivity and income among rural farmers, urban communities could be supported in engaging in urban agriculture initiatives at the community and household levels.
b. Supporting more studies on how physical and financial technologies and social organizations be better wielded to make food system initiatives work and be made more efficient across scales.
c. Supporting action research identifying a set of effective incentives to support innovation studies and activities that significantly improve production, reduce production losses, and promote value-adding activities in both agriculture and related non-agriculture ventures.

The Philippines must heavily invest on more integrative studies assessing risks and uncertainties related to price volatilities, inclement weather, and climate change-related hazards that characterize farm production systems. We then need these action points:

a. Support more studies and activities related to improving design of financial technologies for farmers and encouraging wider participation in these financial systems like loans and credit systems and agricultural insurance facilities, among others.
b. Policies to support institutional and organizational interventions made suitable to the cultural nuances of a group or community would be particularly relevant both at the national and local conditions.

The growing interest in agriculture needs to be sustained with more targeted capacity building activities of relevant government agencies and groups to specifically promote and generate more agri-entrepreneurs. More sustained efforts must include the following:

a. Strongly encourage all sectors' participation, particularly the youth and women, through several systematic education and mentorship programs with well-thought-out and sustained incentives and innovative training modalities and backed with social safety net systems.
b. Strengthen the agricultural extension system of the Philippines through the Province-led Agriculture and Fisheries Extension Systems (PAFES) and the Community-based Participator Action Research Program (CPAR) of the Department of Agriculture (DA), among others.
c. Conduct an integrative study exploring how capacity of the Local Government Units could be strengthened particularly considering the Mandanas Ruling.

Strengthen capacities of Higher Education Institutions particularly the State Universities and Colleges (SUCs) particularly highlighting the need for food system innovations towards food security and sovereignty, resilience, and poverty reduction. Specifically, this must prioritize:

a. Increased capacity to implement curricular programs with strong emphasis on modern agricultural and entrepreneurial skills.
b. More public-value driven research initiatives that will strengthen our local food systems.
c. More directed science and technology-based extension services with greater emphasis on sustained community engagement and public service.
d. Establishment of agri-innovations hubs across the country complemented with sustained capacity building and training programs for students to be made more aware with Agri 4.0 technologies and encourage strong life-long learning to allow learning and co-learning modalities.

PROFILE

Acd. Rodel D. Lasco has more than 35 years of experience in natural resources and environmental research, conservation, education and development at the national and international level. His work has focused on issues related to natural resources conservation, climate change, and land degradation. He is an author of the IPCC, the 2007 co-winner of the Nobel Peace Prize. He is a multi-awarded scientist with over 80 technical publications in national and international journals dealing with the various aspects of natural resources conservation and environmental management.

ACD. RODEL D. LASCO

Executive Director, Oscar M. Lopez Center
Member, Agricultural Sciences Division
NAST Philippines

SPEAKER

NEXUS OF HEALTH RISK - NATURAL RESOURCES DEGRADATION

Pandemics are becoming more frequent globally. There is a growing body of evidence that this rise in pandemics is linked to the destruction of natural resources. The paper provides examples from recent studies of how the loss of natural systems is leading to an increase in novel diseases. It is therefore essential that the conservation of natural systems and their biodiversity be prioritized.

MODERATOR

PROFILE

Acd. Mudjekeewis D. Santos or “Doc Mudjie” is a fisheries scientist and and marine biologist widely recognized for his work on aquatic species genetics, assessment and policy studies to support fisheries management and aquaculture for food security, biodiversity conservation and climate change adaptation.

Acd. Santos is an Academician of the National Academy of Science and Technology (NAST) Philippines, a Career Scientist IV at the National Fisheries Research and Development Institute, and is a Faculty (non-regular) at the Graduate School of the University of Santo Tomas, Manila.

He has authored and co-authored more than 100 scientific articles, book chapters and books, and is currently the Editor-in-Chief of Scopus-indexed The Philippine Journal of Fisheries. He is a recipient of numerous awards including the prestigious Outstanding Agricultural Scientist and Presidential Lingkod Bayan awards given by the Office of the President of the Philippines.

In recognition of his significant contribution to the advancement of fisheries science and management in the country, a marine fish has been named after him (*Chelidoperca santosi*) by two of the world’s leading fish taxonomist in the world, Dr. Jeffrey Williams and Dr. Kent Carpenter in 2015. Also in the same year, an Islet in 11 Islands Zamboanga City, Philippines has also been named Mudjie Wise Key in his honor by the people of Barangay Dita for his scientific contribution and presence in the area.

ACD. MUDJEKEEWIS D. SANTOS

Member, Agricultural Sciences Division
NAST Philippines

PROFILE

Dr. Rico C. Ancog is an associate professor and UP Scientist III at the School of Environmental Science and Management (SESAM) of the University of the Philippines Los Banos (UPLB) and 2019 Outstanding Young Scientist given by the National Academy of Science and Technology (NAST)

He serves as the Head of the Ecosystem Services and Environmental Policy (ESEP) Research Laboratory of SESAM, while also working as the Managing Editor of the Journal of Environmental Science and Management (JESAM), an ISI-indexed journal based in UPLB.

He was awarded the Dr. Elvira O. Tan Award for Best Published Paper (2017) and the Asian Young Professional on Water Research (2009).

DR. RICO C. ANCOG

Associate Professor V and UP Scientist III
School of Environmental Science and Management
University of the Philippines Los Baños

Biology and Evolution of Viruses like SARS COV 2

PROFILE

DR. CYNTHIA P. SALOMA
Executive Director
Philippine Genome Center

Dr. Cynthia Palmes-Saloma is presently a Professor of Molecular Biology and Biotechnology and Principal Investigator at the Laboratory of Molecular and Cell Biology (LMCB) in the National Institute of Molecular Biology and Biotechnology in UP Diliman. She currently serves as the Executive Director of the Philippine Genome Center, University of the Philippines System.

Dr. Palmes-Saloma received her Ph.D. in Physiology in 1998 and her MS in Medical Science in 1995 from Osaka University, Japan. She holds two Bachelor's degrees, one in Molecular Biology from Nagoya University (1993) and the other in Fisheries from UP Visayas, where she finished her course in 3.5 years graduating with magna cum laude honors in October 1987. She was a recipient of the Monbusho scholarship as an undergraduate and MS student and became a research fellow of the Japan Society for the Promotion of Science (JSPS) while pursuing her PhD degree. She joined NIMBB in 1998 and started the Neurobiology Research Group which has now evolved into the Laboratory of Molecular and Cell Biology (LMCB). For her contributions in teaching, she was awarded the UP Diliman Centennial Gawad Chancellor para sa Natatanging Guro Award in 2008.

Dr. Palmes-Saloma served as past President of the Philippine Society for Biochemisty and Molecular Biology, the Philippine Society for Cell Biology as well as the Outstanding Young Scientists' Inc.-Philippine Academy of Young Scientists. She started the PGC DNA Sequencing Core Laboratory in 2012 and was appointed as PGC Executive Director in 2017. Since April 2020, the Philippine Genome Center Clinical Genomics Laboratory has been licensed by the DOH as a COVID-19 RT-PCR testing laboratory. Their PGC team, together with the NIMBB UP Diliman and NIH UP Manila, has been helping the DOH in training medtechs around the country to expand local capacity in COVID-19 testing by RT PCR.

SPEAKER

DR. JOMAR F. RABAJANTE

Dean, Graduate School
University of the Philippines Los Baños

PROFILE

Dr. Jomar F. Rabajante is the Dean of the UPLB Graduate School. He is a Professor and UP Scientist at the Institute of Mathematical Sciences and Physics, UPLB; and an affiliate faculty member of the Faculty of Education, UP Open University. He holds an appointment as Junior Associate at the Quantitative Life Sciences Group of the Abdus Salam International Centre for Theoretical Physics in Trieste Italy. He is a fellow of the UP Resilience Institute and a member of the UP COVID-19 Pandemic Response Team. He is one of the proponents and the co-chair for program implementation of the PhD in Applied Mathematics, the first and only doctorate degree in Applied Mathematics in the Philippines.

BIOSYSTEMS MODELING OF HAZARDS AND RISKS

In this talk, I will discuss what is a mathematical model, and what are the types of models. I will provide examples, especially related to biosystems. I will also initiate discussions on ethics, and on building a mathematical biology community that can have an impact in solving issues of our country.

Policy recommendations:

1. We need to aggressively promote mathematics and data science as an essential tool in science and in solving issues of our country.
2. We need to mentor and capacitate the young generation to be at the forefront or frontier of applied mathematics so that we can have more impact and we can be globally competitive.
3. The mathematical community should start discussing the ethics of mathematical modeling.

MODERATOR

PROFILE

Acd. Virginia C. Cuevas is a Professor Emeritus, Institute of Biological Sciences, University of the Philippines Los Baños. She taught in the Institute for 39 years. She is a 2008 MetroBank Outstanding Teacher Awardee for Tertiary Level.

Her area of specialization is Plant Ecology and Environmental Biology. Her current research is on rehabilitation of agricultural fields damaged by mine tailings rich in heavy metals.

ACD. VIRGINIA CUEVAS

Member, Biological Sciences Division
NAST Philippines

PROFILE

Dr. Melbourne R. Talactac is one of the Outstanding Young Scientist (2020) by the National Academy of Science & Technology and Outstanding Veterinarian in Education (2020) by the Philippine Veterinary Medical Association. He was also the Philippine Nominee for the APEC Science Prize for Innovation, Research and Education "ASPIRE" 2020. He is currently the Vice President for Research and Extension of Cavite State University.

DR. MELBOURNE R. TALACTAC, OYS 2020

Vice President for Research and Extension
Cavite State University

Adaptive Control of Pandemics and Optimized Allocation of Health Resources

PROFILE

Acd. Jose B. Cruz, Jr. received the BS degree *(summa cum laude)* from the University of the Philippines Diliman, SM degree from the Massachusetts Institute of Technology, and PhD degree from the University of Illinois, Urbana-Champaign (UIUC), all in electrical engineering.

Dr. Cruz is a Fellow of the International Federation of Automatic Control (IFAC). He is an Academician of the National Academy of Science and Technology of the Philippines and a member of the US National Academy of Engineering. Dr. Cruz is a Licensed Professional Electrical Engineer (PEE) in the Philippines.

Dr. Cruz is Professor Emeritus at the University of Illinois Urbana-Champaign (UIUC), University of California Irvine (UCI), and the Ohio State University Columbus (OSU).

ACD. JOSE B. CRUZ JR.
Member, Engineering Sciences and Technology Division
NAST Philippines

CO-PRESENTER

PROFILE

Acd. Raymond R. Tan is a Professor of Chemical Engineering and University Fellow of De La Salle University and an Academician of the Philippine National Academy of Science and Technology. In the Scopus database, he has over 400 publications and 8,000 citations, with an h-index of 48. He works in the research area of process systems engineering, with applications to process integration and carbon management. He is editor-in-chief of *Process Integration and Optimization for Sustainability*, associate editor of *Sustainable Production and Consumption and of Cleaner Engineering and Technology*, and serves as editorial board member of *Clean Technologies and Environmental Policy*. He is the author of the books *Process Integration Approaches to Planning Carbon Management Networks* and I*nput-Output Models for Sustainable Industrial Systems*, and editor of the books *Recent Advances in Sustainable Process Design and Optimization and Process Design Strategies for Biomass Conversion Systems*. He has received multiple scientific awards from government and professional organizations in the Philippines.

ACD. RAYMOND GIRARD R. TAN
Member, Engineering Sciences and Technology Division
NAST Philippines

CO-PRESENTER

PROFILE

Dr. Tirso A. Ronquillo, an ASEAN Engineer, is the President of Batangas State University and is currently the President of the Philippine Association of State Universities and Colleges. Dr. Ronquillo graduated Cum Laude in his BS Electronics and Communications Engineering degree from Batangas State University and finished his Master of Science in Electronics and Communications Engineering degree with Distinction in De La Salle University, Manila. He earned his Doctor of Philosophy in Management degree in Akamai University in Hawaii, USA.

Under Dr. Ronquillo's leadership, Batangas State University was rated three-star by the QS Stars University Rating and was recognized as SUC Level IV by the Commission on Higher Education. He established the University's Center for Technopreneurship and Innovation, which provided support ecosystem to its technology business incubatees including financing, mentoring, enterprise development and technology commercialization. He engineered the massive infrastructure development in all campuses of the university that provided for new learning spaces, laboratories, library and ICT facilites among others. He pioneered the establishment of the Knowledge, Innovation, Science and Technology (KIST) Park, the first University based technopark in the country of its kind that is proclaimed by the President and registered by the Philippine Economic Zone Authority as a Special Economic Zone.

He spearheaded outcomes-based accreditation of engineering programs in SUCs making BatStateU the first state university granted accreditation by the Philippines Technological Council. At present, Batangas State University is the only state university whose Engineering, IT and Computer Science programs are accredited by the U.S. Accreditation Board for Engineering and Technology (ABET), a member of Washington Accord. Being an active member of the American Society for Engineering Education and Australasian Association for Engineering Education, Dr. Ronquillo established the Batangas State University's Center for Innovation in Engineering Education to support the advancement of engineering education in the country. Through his leadership, Batangas State University was recognized as Center of Excellence in Electronics Engineering and Center of Development in Mechanical Engineering, Electrical Engineering, Teacher Education and Development Communication.

In 2013, the Institute of Electronics Engineers of the Philippines recognized him as the most Most Outstanding Electronics Engineers in the field of Academe. His other awards include: 2017 Gawad Kalasag Award for Excellence in Disaster Risk Management; BatStateU Most Outstanding Faculty Award; and Alumni Acheivement Award.

DR. TIRSO A. RONQUILLO

President
Batangas State University

Infrastructure and Management for Work-from-Home and Hybrid Systems in Industry

PROFILE

Dr. Ramon “Mon” B. Segismundo is an experienced business, human resources and strategy practitioner. He has worked for several decades in global multinational corporations in the United States, United Kingdom and Singapore as well as a Philippine conglomerate. In 2018, he co-founded a Singapore based HR consulting firm and, in 2020, graduated with a Doctor in Business Administration from the Singapore Management University (SMU). Mon is currently the President of the People Management Association of the Philippines Foundation and is a member of the SMU International Advisory Business Council. He is also a Berkeley Executive Coaching Institute Certified Executive Coach and a Fellow of the Institute of Corporate Directors (Philippines). He recently joined De La Salle University’s Ramon Del Rosario College of Business as Senior Professional Lecturer and currently teaches Strategic Management.

DR. RAMON B. SEGISMUNDO

President, People Management Association of the Philippines
Founder and CEO, 1-HR.X Pte. Ltd.

CO-PRESENTER

PROFILE

Ms. Grace Abella-Zata is an HR thought leader and practitioner. She is CEO of the IRC Institute, which develops practical knowledge related to leadership and talent development with a footprint in more than 40 countries. She was past president of the People Management of the Philippines, where she led researches such as the Competency Framework for the President of the Philippines. She is also President of the CESI/IRC Philippines group, which is a pioneer in executive search, staffing and managed outsourcing.

MS. GRACE ABELLA-ZATA

Chief Executive Officer
IRC Institute

PROFILE

Dr. Hussein Sinsuat "Tho" Lidasan is currently the Dean and a professor at the School of Urban and Regional Planning at University of the Philippines Diliman. He is also the Deputy Director of the Office of Design and Planning Initiatives of the University of the Philippines System, and the Director of the National Center for Transport Studies. He also provides advises to the UP System related to development planning and transport concerns. At present, he provides technical advice to MinDA (Mindanao Development Authorities) and at times acts as resource person of the IACTP (Inter-Agency Committee on Transport Planning) of NEDA. He is also a member of DPWH Multi-Sectoral Governance Council. Dr. Lidasan is an active member of the EASTS (Eastern Asia Society for Transport Studies), an umbrella organization of academic organizations in Asia and served as president of TSSP (Transportation Science Society of the Philippines). He is active in consultancies and research on smart city, TOD, critical transport infrastructure, transport planning, intermodal logistics, development planning and policy formulation and assessment, transport, and climate change, among others.

DR. HUSSEIN SINSUAT "THO" LIDASAN

Dean
UP School of Urban and Regional Planning (SURP)

EnP. CARMELI MARIE C. CHAVES

Assistant Professor, SURP
Project Leader, UP Planning and Development Research Foundation, Inc. (UP PLANADES)

PROFILE

EnP. Carmeli Marie C. Chaves is an Assistant Professor at the University of the Philippines School of Urban and Regional Planning and an active researcher in the Planning and Development Research Foundation (PLANADES). She earned her graduate degrees in Demography and Urban Planning at the University of the Philippines and in Sociology at the University of Canterbury in New Zealand.

Carmeli Chaves is an Environmental Planner, ranking first in the 2001 Environmental Planning Licensure Exam.

She is the project team leader of the Settlements Development Model for New Growth Areas in the Philippines commissioned by the Department of Science and Technology.

Prof. Chaves has more than 20 years' experience in settlements planning, participatory planning, socio-demographic research and evaluation, project implementation and assessment, and training. She has established networks with government and non-government organizations, and coordinated with local chief executives on land use and development planning, including the introduction of policies at the local level. Her current involvements are as resettlement specialist of the Metro Manila Subway Project and of the Mindanao Railway Project. She is part of an ongoing research on land use and resilient settlements in collaboration with scholars from TU Dortmund University, University of Stuttgart, and Ludwig Maximillians University Munich.

Prof. Chaves is a proud Mindanawon, having been born in Zamboanga City and grown up in Cagayan de Oro City.

LONG-TERM REGIONAL PLANNING SYSTEMS FOR BALANCED, INCLUSIVE, DIGITALIZED, AND LOW-CARBON GROWTH

In today's complex and rapidly changing times, it is essential to do long-term planning to attain sustainable development in the Philippines. The kind of development we envision is balanced and inclusive. The runaway urbanization sweeping across the country presents challenges to towns, particularly sprawl, congestion, degraded environment, and infrastructure that is ill-equipped to meet the demands of a burgeoning population. Using planning models and frameworks, we project that balanced growth will entail decongesting the National Capital Region and identifying new growth areas in the country, especially the emerging cities and municipalities, as well as sustaining the development of other metropolitan areas, such Metro Cebu, Metro Davao, and Metro Iloilo. At the same time, transport hubs outside metropolitan areas need to be upgraded: consider Batangas and Subic ports, for instance. We support the efforts of the transportation program managers to operate an integrated transportation system.

We posit that planning for inclusive development entails designing settlements so that these provide equitable access to basic services, and as important, to economic opportunities. The cities are seen to undergo a digital transformation so that they become smart, dynamic systems. We find that the use of technology and innovation in planning will lead to smart and agile urban governance. Cities will benefit from smart sustainable systems employing new digital technologies and ICT, which will improve the delivery of outputs and services at reduced economic cost, and to unlock future markets. Additionally, sustainable and resilient cities aim for low-carbon growth, integrating climate change with economic development. The ultimate scenario we plan for is balanced inclusive green growth (BIGG) in order to improve quality of life in spite of limited resources. For this we apply the Sustainomics transdisciplinary framework for making development more sustainable.

The COVID-19 pandemic has shown that the populations most at risk are those that depend heavily on the informal economy, occupy crowded areas prone to shocks, have inadequate access to basic services, have weak capacities and opportunities to adapt, and have limited access to technologies. At this point, it is crucial to attain immediate economic recovery and return to normalcy of the business supply chain after a pandemic. The tools we use are ones we employ in recovering after disasters and calamities. Moving forward, we advocate a development planning framework that integrates pandemic resilience, equitable and balanced regional development, smart city technologies, and low-carbon growth.

POLICY STATEMENTS:

a. Reiterate the advocacy for green agriculture, green energy, green economics, resources efficiency, and eco-friendly consumption and production, based on the BIGG (Balanced-Inclusive Green) approach
b. Capitalize on the economic potentials of local areas under the economic corridor development strategy in support of enhancing growth areas
c. Reiterate the support for forest land use planning before any planning is done, especially in the urban areas
d. Encourage institutional mechanisms, such as localized economic cooperation or metropolitan arrangements in Mindanao
e. Investments on critical infrastructure and ICT and introduction of the Smart Cities technologies in support of environmentally sustainable development and growth
f. Incorporate in the planning policy framework addressing impacts of COVID-19, apart from reduction of carbon emission
g. Encourage more research (empirical, practical and science-based) on how disruptive innovations can enhanced balanced and inclusive environmentally-sustainable growth
h. Attract migrants to the 20 growth provinces by building upon their "pull factors" of economic opportunities, quality transport and physical infrastructure, and sustainable and safe environment.
i. Pursue in-city compact development. This includes designing areas for mixed land uses and multi-use buildings, with the aim of making neighborhoods self-sufficient, reducing the need to travel, and restraining urban sprawl.
j. Anchor countryside development on balanced and integrated urban-rural linkages. It is strategic to decongest crowded areas by developing alternative growth nodes outside highly populated centers. This will also manage migration to cities that are already congested.
k. Offer diverse economic opportunities based on the livelihood assets or resource base of a growth area. Expand household asset ownership and accumulation to reduce vulnerability to economic shocks.
l. Planning pandemic-resilient cities entails promoting accessible green spaces and ventilation corridors, safe public travel networks, designing spaces for walkability, and providing reliable basic services.
m. Assess land use suitability in locating industries, economic activities, housing projects, and infrastructure facilities. Protect forests and wildlife habitats, and separate areas used for keeping animals from areas used by humans.

MODERATOR

PROFILE

Acd. Aura C. Matias is a Professor at the University of the Philippines in Diliman and Center Director of the Philippine Learning Center for Environment and Social Sustainability (PHILCESS) at the UP National Engineering Center. She was recently appointed in January 2021 as the Director of the Academic Assessment and Development Office of the University of the Philippines Diliman campus. She was conferred the title of ASEAN Engineer in 2008 and elected to the National Academy of Science and Technology (NAST PHIL) as Academician in the field of Industrial Engineering in 2011.

Acd. Matias has been involved in teaching, research and extension work for government, academe and industry specializing in human factors engineering and ergonomics, particularly in the area of work measurement, productivity, optimization, quality management and occupational safety and health, environment and social impact assessment, and pioneering efforts towards the advancement of the Industrial Engineering profession.

ACD. AURA C. MATIAS

Member, Engineering Sciences and Technology Division
NAST Philippines

PROFILE

Dr. Ryan Rhay P. Vicerra is a Full professor and Chair of the Manufacturing Engineering and Management Department of the Gokongwei College of Engineering, De La Salle University. He is a recipient of the National Academy of Science and Technology Outstanding Young Scientist for 2019 and Institute of Electrical and Electronics Engineers Region 10 (IEEE-R10) Outstanding Volunteer Award for 2018.

A professional Electronics Engineer with PRC License Number 0000176, he is a graduate of PHD in Electronics and Communications Engineering in De La Salle University under the DOST Engineering Research and Development for Technology (ERDT) program.

Dr. Vicerra is also a research associate in the Intelligent Systems Laboratory of De La Salle University and project leader of the following DOST Funded Projects; "Project G-TWICE: Government Telecommuting Work Infrastructure Cost Estimator" and "Project CRUISE: Capacitive Resistivity Underground Imaging Survey Equipment for Underground Utility Assessment of Philippine Infrastructures."

DR. RYAN RHAY P. VICERRA, OYS 2019

Associate Professor, Department of Manufacturing Engineering and Management
De La Salle University, Manila

Curriculum Induced Learning Loss Before and During a Pandemic

PROFILE

Acd. Christopher C. Bernido is recognized for his research achievements in Theoretical Physics cited in advanced physics publications including the Handbook of Feynman Path Integrals. He is known in the international scientific community as conference convenor, speaker, journal referee, reviewer, and editorial board member. He is also recognized to his commitment to the development of physics teaching and research in the Philippines as Founding Director of the Research Center for Theoretical Physics, Central Visayan Institute Foundation (CVIF) in Jagna, Bohol. His dedicated efforts led to the improvement of basic education through the innovative CVIF Dynamics Learning Program which has been adopted by other schools in the Philippines. He was a former Director and Professor at the National Institute of Physics, University of the Philippines Diliman. He was elected to the National Academy of Science and Technology Philippines as Academician in 2005.

ACD. CHRISTOPHER C. BERNIDO
Founding Director, Research Center for Theoretical Physics
Central Visayan Institute Foundation
Member, Mathematical and Physical Sciences Division
NAST Philippines

SPEAKER

SENATOR SHERWIN T. GATCHALIAN

Chairman of the Senate Committee on Basic Education, Arts and Culture

PROFILE

Senator Sherwin T. Gatchalian, more known by his constituents as "Win," is no neophyte to public service with his almost two decades of experience marked by honesty, integrity, and a relentless drive to serve his countrymen.

The call for public service began in 2001—Win was elected initially as Valenzuela City's first district representative, then later as mayor of Valenzuela City in 2004. Upon his return to Congress in 2013, Win set out to nationalize some of Valenzuela City's most effective education reforms. In 2015, he filed the original version of the bill that would radically expand access to college education for millions of Filipinos—the House Bill No. 5905, more commonly known as the Free Higher Education Act. He also authored other notable and relevant bills including the measure on increasing salaries for teachers and non-teaching personnel, the nationwide school-based feeding program for kinder and elementary public school students, the Nanay-Teacher parenting program, and the Anti-Hazing Act, among others.

He made the move from the local political arena to the national stage before the May 2016 elections, Win won a successful dark horse bid for a Senate seat by galvanizing the youth vote with a single promise—to pass legislation establishing a tuition-free scheme in state universities and colleges. Only a year into his term, the Senate approved Senate Bill No. 1304, Affordable Higher Education for All Act, a consolidated version of Win's Free Higher Education Act, a landmark legislation that would make education within reach of deserving but underprivileged students. The measure was eventually enacted into law as Republic Act No. 10931, Universal Access to Quality Tertiary Education Act in August 2017—setting the stage for millions of young Filipinos to attain a free college education in the coming years.

As Chairman of the Senate Committee on Energy and Committee on Economic Affairs during the 17th Congress, Win steered both committees with one goal in mind—to protect and empower the Filipino consumers. He strove toward the passage of several key measures aimed at fostering a competitive, investor-friendly, and red tape-free environment in the energy sector, and in the Philippine economy in general. His goal was to spark an economic renaissance in the entire country by crafting measures that would promote robust competition, encourage investments, and make doing business in the Philippines easier.

Working at a considerable pace over the past four years, he has successfully steered the passage of pro-consumer legislations that have been signed into law by President Rodrigo Duterte. Among the laws he has authored are the Murang Kuryente Act, Electric Cooperatives Emergency and Resiliency Fund Act, the Energy Virtual One Stop Shop Act, the Energy Efficiency and Conservation Act, the Philippine Innovation Act, and the Mobile Number Portability Act.

Now in the 18th Congress, as Chairman of the Senate Committee on Basic Education, Arts and Culture, Win continues to introduce further reforms to bring the Philippine education system to world-class levels.

The foundations for Win Gatchalian's sense of public service and education advocacy started with his own education in the prestigious Boston University in Massachusetts, USA, where he graduated with a degree in Finance and Operations Management in 1995.

PROFILE

Atty. Nepomuceno A. Malaluan is Undersecretary, and Chief of Staff of the Secretary, at the Department of Education. He provides overall supervision to a number of priority programs of the Office of the Secretary, including the NEAP (National Educators Academy of the Philippines) Transformation, Sulong EduKalidad, and now the Learning Continuity Plan in the time of COVID 19. He represents the Department in various inter-agency processes, such as the Cabinet Assistance System. He also represents DepEd in the SDG 2030 Global Steering Committee. Nepo obtained his BS Economics and Bachelor of Laws from the University of the Philippines, Diliman.

ATTY. NEPOMUCENO A. MALALUAN

Undersecretary and Chief of Staff,
Office of the Secretary
Department of Education

Learning Loss in Tertiary Education

PROFILE

Acd. Maribel G. Nonato is known for her pioneering work on the discovery of the novel *Pandanus* alkaloids, which became a significant contribution to the Chemistry of Alkaloids establishing the Genus Pandanus as a new source of alkaloids. These types of alkaloids show interesting biologically activities prompting organic chemists to carry out syntheses of these structurally unique alkaloids. She has promoted multidisciplinary research on Philippine medicinal plants by mentoring young researchers and generously imparts her expertise in natural products to the scientific community.

She served as the President of the Natural Products Society of the Philippines promoting multidisciplinary researches on Philippine medicinal plants and has been teaching as professor at the University of Santo Tomas for 38 years now.

ACD. MARIBEL G. NONATO
Vice-Rector for Research and Innovation, University of Santo Tomas
Member, Mathematical and Physical Sciences Division
NAST Philippines

PROFILE

A chemist by profession, Dr. Ester A. Garcia earned her Bachelor of Science in Chemistry degree, Cum Laude, from the University of the Philippines in 1963, the same year that she topped the Philippine Board of Chemistry licensure examination. She went on to become a research aide at the International Rice Research Institute for a while before pursuing her doctorate degree at the Ohio State University. In 1969, she obtained her Ph.D. in Organic Chemistry, after which she worked for one year as a post-doctoral fellow at the ICN Nucleic Acid Research Institute in Irvine, California.

As a researcher, Dr. Garcia has published 20 scientific papers in peer-reviewed national and international journals, and is the author or co-author of more than 120 papers on issues related to science, education, technology, environment and gender. She was also a member of the Technical Advisory Committee of the Congressional Commission for Science, Technology and Engineering. She is a recipient of, among many other awards, the Outstanding Professional of the Year 1996 in Chemistry Award of the Professional Regulation Commission, an Achievement Award in Chemistry from the National Research Council of the Philippines, and the Achievement Award in Chemical Education from the Philippine Federation of Chemical Societies.

The UE President was also one of the 14 new individual recipients of the Manuel L. Quezon Gawad Parangal Award on October 12, 2018, at the Crowne Plaza Manila Galleria in Ortigas Center, Quezon City. The award is handed out by the Quezon City Government to outstanding Quezon City residents and institutions that have made significant contributions to the city and the nation. On the same year, she was inducted to the Philippine American Academy of Science and Engineering Hall of Honor.

Also among the 14 MLQ Gawad Parangal awardees was UE alumnus and former Philippine Vice President Manuel “Noli” L. De Castro Jr.

President Garcia, a long-time Quezon City resident, has had the city as her “second home” through her alma mater, the University of the Philippines-Diliman, where she went on to become a faculty member and eventually Chair of the Department of Chemistry from 1971 to 1973, and 1977 to 1979. She later on served as Vice Dean of the UP Division of Natural Science and Mathematics in 1979, and rose to become the UP Diliman Vice Chancellor in 1990, and eventually Vice President of the entire UP System in 1991.

President Garcia continued working in Quezon City as Commissioner of the Commission on Higher Education in 1994, and eventually as CHEd Chairman from 1999 to 2003. Since 2006, President Garcia has been a member of the Board of Trustees of the UE Ramon Magsaysay Memorial Medical Center Inc., located in Quezon City, and earlier in 2018, was appointed as UERMMMCI’s President and Chief Academic Officer as well.

DR. ESTER A. GARCIA

President and Chief Academic Officer
University of the East

PROFILE

Atty. Lily Freida C. Macabangun-Milla is the Secretary-General of the University Mobility in Asia and the Pacific (UMAP) Philippines National Secretariat, the ASEAN Socio-Cultural Community (ASCC) Focal Point for higher education in the Philippines, and CHED's alternate representative to the Asia Pacific Economic Cooperation (APEC) Human Resource Development Working Group (HRDWG), among other representations.

She served as the University Legal Counsel for the University of the Philippines System from 1999 to 2001 and later became Chief of the CHED Legal Service, the Director of the CHED Office for State Universities and Colleges and Local Universities and Colleges' Concerns, and now Director III of the CHED International Affairs Staff—spanning a total of 16 years of government service in the Philippine higher education sector.

As a lawyer she served at the Philippine Senate as a Chief Technical Officer in the offices in the Philippine Senate from 1993 to 1996. Atty. Milla was also a Court Attorney III at the Supreme Court of the Philippines and had stints in the private sector as an Internal Legal Counsel for Landco Pacific Corporation and the National Federation of Labor.

ATTY. LILY FREIDA C. MACABANGUN-MILLA

Officer-In-Charge, Office of the
Deputy Executive Director IV
Commission on Higher Education

MODERATOR

PROFILE

Acd. Fabian M. Dayrit is a Professor Emeritus at the Ateneo de Manila University, where he has been teaching since 1983. He obtained his BS Chemistry degree the Ateneo in 1975 and his MA and PhD degrees in Chemistry from Princeton University in 1978 and 1981, respectively. He was a research associate at Oxford University from 1980 to 1982.

His areas of interest are in the Chemistry of Natural Products, Coconut Oil and Environmental Chemistry. He was admitted as an Academician to the National Academy of Science and Tech-nology, Philippines in 2009, and is currently its Vice-President.

ACD. FABIAN M. DAYRIT

Member, Engineering Sciences and Technology Division
NAST Philippines

PROFILE

Dr. Aaron Joseph L. Villaraza received his BS in Chemistry (2001) from the Institute of Chemistry, University of the Philippines–Diliman, and his PhD in Chemistry (2008) from the School of Chemistry, University of Manchester. Afterwards, he conducted postdoctoral work at the National Cancer Institute of the US National Institutes of Health and the University of Oxford. He returned to UP Diliman in 2010 to assume a faculty position with the Institute of Chemistry, where he is currently a Professor. From 2015 to 2019, he also served as Deputy Director of the Office of International Linkages of the UP System promoting inter-university educational programs, and in 2018 was made a Member of the Royal Society of Chemistry. His research revolves around medicinal chemistry, specifically the synthesis of radiological diagnostic media, neuroactive bacterial secondary metabolites, and marine snail venoms.

DR. AARON JOSEPH L. VILLARAZA, OYS 2016

Professor, Institute of Chemistry
University of the Philippines
Diliman

BALANCING THE ECONOMY AND HEALTH

SPEAKER

PROFILE

ACD. ARSENIO M. BALISACAN

Chairman, Philippine Competition Commission
Member, Social Sciences Division
NAST Philippines

Acd. Arsenio M. Balisacan is serving as the first Chairperson of the Philippine Competition Commission. Before this appointment, he was the Philippine Government's chief economist, serving as Socioeconomic Planning Secretary and concurrent Director-General of the National Economic and Development Authority in 2012-2016.

A member of the regular faculty of the University of the Philippines (UP) for over three decades, Acd. Balisacan was Dean of the UP School of Economics and Director-Chief Executive of the Southeast Asian Regional Centre for Graduate Study and Research in Agriculture (SEARCA). Before joining the UP faculty in 1987, he was Research Fellow at the East-West Center in Honolulu and Economist at the World Bank in Washington, D.C.

His research areas have covered key development issues in the Philippines and Asia, including poverty and inequality, agricultural transformation, regional development dynamics, globalization, competition law and policy (antitrust), and the political economy of policy reforms.

A member of NAST since 2008, Acd. Balisacan holds a Ph.D. in Economics from the University of Hawaii, MS in Agricultural Economics from the University of the Philippines Los Baños, and B.S. in Agriculture (*magna cum laude*) from the Mariano Marcos State University.

BALANCING HEALTH AND ECONOMY TOWARD SUSTAINABLE AND INCLUSIVE RECOVERY

COVID-19 has made it undeniably clear that the public health system's decades-long neglect has come at very high costs to lives and the economy. The pandemic plunged the Philippine economy in 2020 into its most severe contraction in the postwar era, pushing about five million workers out of jobs, eroding five years of gains in poverty reduction, and inflicting scars that threaten the economy's long-term potential for inclusive growth. The recurring surges in infection cases and on-and-off lockdowns have also exposed the health system's inadequacy to contain the disease, highlighting the sheer dependence of sustainable economic recovery on a robust healthcare system, particularly for adequate testing, isolation, and vaccination to achieve herd immunity.

The pandemic has exacerbated existing inequalities—and created new ones. The burden of employment contraction has fallen disproportionately on lower-skilled and less-educated workers, especially in high-contact service sectors, such as tourism, restaurants, and brick-and-mortal retail trade. Moreover, the gaps in access to health care, education, and mobility services, already present during normal times, have further widened between the haves and the have-nots. The health crisis has also hastened workplace digitization and artificial intelligence (AI), enabling work-from-home arrangements and e-learning, although the benefits have been limited for workers with little or no education and those without access to reliable and affordable internet services, particularly the poor. The resulting loss of organizational and information capital (especially for small and medium enterprises), lost years of schooling and hunger impairing human capital (particularly among the less well-off households), investment foregone due to heightened uncertainty, and rising inequality will scar the economy. Such scarring will weaken the prospects for long-term productivity growth and inclusive economic development.

The road to sustained and inclusive recovery demands a strategic and timely deployment of policy tools that will strengthen the public health system and protect livelihoods and the most vulnerable population groups. The goal is to quickly recover to the pre-pandemic levels of employment and income to avoid deeper economic scarring and steer back the economy faster to its previous high-growth trajectory. Beyond recovery, the policy imperative must be to strengthen the resilience of the health-economy system, enabling it to withstand future health shocks and other challenges, such as those related to climate change. This imperative requires harnessing science to inform the country's policy choices moving forward.

Learning Losses

PROFILE

Dr. Diosdado M. San Antonio is the Undersecretary for Curriculum and Instruction at the Department of Education.

He holds a research PhD in Education from the University of Newcastle, Australia. He has been tasked to coordinate the ongoing review of the K to12 curriculum.

He also attempts to find ways of ensuring that every learner achieves authentic literacy. He pushes for transparency, ethics and accountability in school governance. In addition, he believes that a strong rewards and recognition system is an effective way to encourage officials and teachers to aim for excellence.

Furthermore, he strengthens a strong research culture towards meaningful innovations for learning. Finally, he nurtures productive partnerships with all educational stakeholders.

San Antonio is one of the five Presidential Gawad CES Awardees for 2019 for his role in fostering a positive organizational culture in the Department of Education - CALABARZON by advocating for Transparent, Ethical and Accountable (TEA) Governance affecting 120,000 teachers serving 3.8 million learners; for nurturing an intensive and collaborative research culture in CALABARZON, allowing basic educators to implement evidence-based best practices; and for building the competencies of regional officials through its PRINCE (Proactive, Results-oriented, Intelligent, Network-building, Credible and Empowering) Model.

DR. DIOSDADO M. SAN ANTONIO
Undersecretary for Curriculum and Instruction
Department of Education

SPEAKER

PROFILE

Acd. Mahar K. Mangahas is a multi-awarded scholar for his pioneering work in public opinion research in the Philippines and in South East Asia. He founded the now familiar entity, “Social Weather Stations” (SWS) which has been doing public opinion research since 1985 and which has become increasingly influential in the conduct of Philippine political life and policy. SWS has been serving the country and policymakers as an independent and timely source of pertinent and credible data on Philippine economic, social and political landscape. He is also a known expert in the field of Agricultural economics focused on the diffusion of rice technology. He obtained his PhD Economics from the University of Chicago and his MA and AB Economics from the University of the Philippines. He was elected to the Academy in 2018.

ACD. MAHAR K. MANGAHAS

President, Social Weather Stations
Member, Social Sciences Division
NAST Philippines

VACCINE CYNICISM

Filipinos' great fear of viruses is well-known; more so with Covid-19.

Public compliance with health safety protocols is actually good.

Unfortunately, Filipinos are relatively predisposed to distrust modern science – probably because basic education and R&D-investment are both very weak.

Willingness, hesitance, and resistance are equally present; the problem is vaccine supply, not demand.

The catastrophic scale of economic suffering – rather than the scale of suffering from Covid-19 itself – indicates the proper direction that policies should take.

Policy Recommendations:

1. The urgent need is to expand the vaccine supply. This can be done by allowing not only the government, but also the private sector, to engage in vaccine-importation and to establish the domestic capacity for vaccine-production.
2. There is no need for coercion. People already eager for vaccination are 10 times as many as the present supply can serve; many more will join them, as the hesitant realize that the risk is slight and that vaccines are actually on hand; those resistant will not mind being last in priority.
3. The people's mobility should be restored ASAP, to allow resumption of livelihoods and cut short the catastrophic economic suffering.
4. Government spending should aim for universal basic education and radical expansion of R & D capacity.

MODERATOR

PROFILE

Acd. Chrsitopher P. Monterola is the Head of Asian Institute of Management's Aboitiz School of Innovation, Technology, and Entrepreneurship (ASITE), the Executive Managing Director of the Analytics, Computing, and Complex Systems Laboratory (ACCeSs@AIM), holder of the Aboitiz professorial chair in Data Science, and the Academic Program Director of the newly launched Doctor Science program in the Philippines and among the few in Asia. He was recently conferred the rank of Academician by the National Academy of Science and Technology (NAST), the highest recognition and scientific advisory body of the Philippines under the Department of Science and Technology.

Acd. Monterola is a well-published scientist; in recent years, he has published in some of the most prestigious journals in complex systems, artificial intelligence, transportation, ageing, demographics, and basic research. On top of the academic publications, Dr. Monterola has led multimillion-dollar research and development projects with various sectors of the society. He has been responsible for training and mentoring young scientists and data scientists on an international level.

ACD. CHRISTOPHER P. MONTEROLA

Member, Social Sciences Division
NAST Philippines

PROFILE

Dr. Majah-Leah V. Ravago is Associate Professor at the Department of Economics, Ateneo de Manila University. She was the Program Director of the 2014–2018 USAID grant – Energy Policy and Development Program (EPDP). She served as the President of the Philippine Economic Society (PES) in 2018. In 2016, she was awarded the Outstanding Young Scientist (OYS) in the field of Economics by the National Academy of Science and Technology (NAST). She earned her BS in Business Economics and MA in Economics from the University of the Philippines. She obtained her PhD in Economics from the University of Hawai'i in 2012 under the East-West Center (EWC) Graduate Degree Fellowship Program.

DR. MAJAH-LEAH V. RAVAGO, OYS 2016

Associate Professor, Department of Economics
Ateneo De Manila University

The Health System Response

PROFILE

Dr. Maria Rosario S. Vergeire is the current OIC-Undersecretary for the Public Health Services Team and the official spokesperson of the Department. She was previously the OIC-Usec for Health Regulation Team and Assistant Secretary in-charge of the Public Health Services Team. She also acted as OIC- Deputy Director-General Filed Regulatory Operation - Food and Drug Administration, Office Director of the Health Facilities and Services Regulatory Bureau and Chief of the Health Research Division of the Health Policy Development and Planning Bureau. Undersecretary Vergeire has committed decades to public service, having worked in Marikina City's health office before joining the Department of Health in 2007. Aside from public service, she is also committed to nurturing our soon to be public health leaders serving as faculty at the Development Academy of the Philippines and part-time faculty in Ateneo School of Govt. She obtained her undergraduate degree in Zoology from the University of Santo Tomas, her MD from De La Salle University College of Medicine, and her MPH from the University of the Philippines, Manila.

DR. MARIA ROSARIO S. VERGEIRE, MPH, CESO IV
OIC-Undersecretary of Health
Public Health Services Team

SPEAKER

PROFILE

Dr. Michael L. Tan is a medical anthropologist (PhD, University of Amsterdam 1996) and a veterinarian (DVM, University of the Philippines 1977). He worked for many years with community-based health programs in the NGO sector before joining the academe. He has taught at UP since 1985 and is currently a faculty member of the College of Social Sciences and Philosophy and Clinical Professor with the UP College of Medicine. In 2014 he was appointed Chancellor of UP Diliman. He is a National Academician, a member of the Social Science Division.

ACD. MICHAEL L. TAN

Member, Social Sciences Division
NAST Philippines

PROFILE

DR. MARISSA M. ALEJANDRIA

Director, Institute of Clinical Epidemiology (ICE)
University of the Philippines

Dr. Marissa M. Alejandria, MD, MSc is a Professor of Clinical Epidemiology at the University of the Philippines-College of Medicine and a Clinical Professor of Medicine (Infectious Diseases) at the UP- Philippine General Hospital. She is a Philippine-board certified internist and adult infectious disease specialist with a Master of Science in Clinical Epidemiology (UP College of Medicine) and a Master of Science in Clinical Tropical Medicine (Mahidol University, Thailand). She currently serves as the Director of the Institute of Clinical Epidemiology, University of the Philippines-Manila, National Institutes of Health and Acting Associate Dean for Research of UP-College of Medicine. In 2020, she was elected as President of the Philippine Society for Microbiology and Infectious Diseases. With the untimely passing of Dr Anna Lena Lopez in January 2020, Dr Alejandria has been appointed as Principal Investigator for RePORT Philippines for the cohort on Long Term Outcomes of Diagnosed TB Cases in the Philippines.

Dr Alejandria's research expertise is on the conduct of epidemiologic research, health care quality improvement research, health policy and systems research and developing systematic reviews and clinical practice guidelines. Her research portfolio has spanned a wide range of clinico-epidemiologic studies on HIV, tuberculosis, antimicrobial resistant infections, sepsis, leptospirosis and community-acquired pneumonia. She recently participated in the 2016 National TB Prevalence Survey as deputy director of the project and is currently involved in the updating of the Philippine Clinical Practice Guidelines for TB.

Dr. Alejandria received her medical degree from the University of the Philippines-College of Medicine. She completed her residency training in internal medicine and fellowship training in infectious diseases at the UP-Philippine General Hospital. She is a Fellow of the Philippine College of Physicians and Philippine Society for Microbiology and Infectious Diseases.

DR. TEODORO J. HERBOSA

Professor, Emergency Medicine and Trauma Surgery, UP-Philippine General Hospital
Medical Adviser, National Task Force Against COVID-19

PROFILE

Dr. Teodoro "Ted" J. Herbosa was the Health Undersecretary of Philippines from 2010 to 2015. One of his important accomplishments during his term was helping achieve Universal Health Coverage. He also led the modernization of public hospitals through Health Facilities Enhancement Funds and the Public-Private Partnerships (PPP). As CIO, he achieved COBIT 5 Certification, and developed and implemented the National eHealth Strategic Framework Plan. He also served as the Coordinator of Foreign Medical Teams that responded after Typhoon Haiyan struck in 2013.

Dr. Herbosa has extensive experience in Trauma Surgery and Disaster and Emergency Medicine. In the University of the Philippines, he started the Fellowship Program for Trauma Surgery and the Residency Program in Emergency Medicine.

He has also held several international posts. He was a Professor of Emergency Medicine at Universiti Kebangsaan Malaysia from 2007 to 2010. He created the Center for Research in Emergency Medicine (CREM), and produced the first batch of Masters graduates in Emergency Medicine. He also was An International Associate for John Hopkins University, implementing the Hospital Preparedness for Emergencies (HOPE) course and the PEER Program which was funded by USAID.

He is a former Board member of the World Association for Disaster and Emergency Medicine (WADEM). He also participated in the World Health Organization's Safe Surgery Saves Lives Taskforce that developed the WHO safe surgery checklist.

Dr. Herbosa has also distinguished himself as a dedicated community servant. He is currently the Chairman of the Physicians for Peace, Philippines, and formerly the Vice President of the UP Alumni Association. His many awards include the 2011 UPAA Distinguished Award Public Service, the 2013 UPAA Distinguished Service Award, and the 2012 Rotary International D3780 Rotary Golden Wheel Award.

He was the Executive Vice President of the University of the Philippines System from 2017 to 2021. During his term he has several accomplishments, as a Chair, the university hosted two international conferences, the Association of Pacific Rim Universities (APRU) Conference in 2017 and ASEAN University Network (AUN) 2nd International Health Promotion Conference in 2019, and strengthened relations with Southern Taiwan University. He further expanded knowledge of the university on the Road Safety Emerging Interdisciplinary Research and created the UP COVID-19 Pandemic Response Team which has been overseeing the safety of all the university's employees across the country.

He is currently a special adviser to the Philippines' National Task Force Against COVID 19. He is also a professor of Emergency Medicine and Trauma Surgery at the UP-PGH, and faculty at the National Telehealth Center at UP Manila.

MODERATOR

PROFILE

Acd. Carmencita D. Padilla is recognized for her significant contributions to medicine, especially in the field of genetics, specifically, newborn screening for genetic disorders in the Philippines. Under her leadership, studies were conducted on prevalence and cost benefits analysis of a national program for newborn screening to prevent mental retardation and death from certain congenital disorders detectable at birth which provided the basis for the enactment of RA 9288 or the Newborn Screening Act of 2004.

Other important researches she has undertaken with students and co-workers include: identification of mutations causing the maple syrup urine disease (MSUD) among Filipinos and development of early detection analytical techniques; and molecular epidemiological study to assess association between genetic polymorphism and cancer risk. Currently, she is the Chancellor of the University of the Philippines Manila. She was elected to the National Academy of Science and Technology Philippines as Academician in 2008

ACD. CARMENCITA D. PADILLA

Member
Health Sciences Division

PROFILE

Dr. Nathaniel S. Orillaza, Jr. is a Professor 1 at the University of the Philippines Manila. He is a Hand and Upper Limb Surgeon at Department of Orthopedics, Philippine General Hospital. He is an Outstanding Young Scientist 2019 and Inter-agency Partnership (IAP) Young Physician Leader 2018 awardee. He is the Immediate Past President of the Association of Hand Surgeons of the Philippines.

Among his research interests include hand surgery management, patient reported outcomes, biomedical devices, and computer vision in medicine.

DR. NATHANIEL S. ORILLAZA JR., OYS 2019

Associate Professor
University of the Philippines Manila

PROFILE

Dr. Tonette P. Laude is currently an Associate Professor 6 at the Institute of Crop Science, College of Agriculture and Food Science (CAFS), University of the Philippines Los Baños (UPLB). She obtained her BS Agriculture (cum laude) in 2000 and MS Plant Breeding in 2006 both at UPLB, and PhD Plant Sciences in 2013 at North Dakota State University, Fargo, North Dakota, USA.

Through her 19 years of service to UPLB, she has demonstrated excellence in teaching and research. In 2019, she was one of the recipients of the One UP Faculty grant for her outstanding accomplishments in teaching and research in Crop Science. As a professor of plant breeding, she mentored and graduated nine (9) BS Agriculture students major in Agronomy specializing in Plant Breeding, including two who graduated cum laude, and six (6) MS Plant Breeding students, as their adviser.

Her significant years' work experience in corn breeding contributed to the identification of superior corn populations for better nutrition of which she was recognized as one of the 2016 Outstanding Young Scientists from the National Academy of Science and Technology. At present, their corn breeding group continues to identify and development varieties for better nutrition.

DR. TONETTE P. LAUDE

Outstanding Young Scientist 2016
Associate Professor
Institute of Crop Science, CAFS
University of the Philippines Los Baños

CHARACTERIZATION OF MAIZE HAPLOID INDUCER AND INITIAL ASSESSMENT OF HAPLOID INDUCIBILITY UNDER PHILIPPINE CONDITION

Tonette P. Laude, Alma O. Canama-Salinas, and Maria Alma B. Sanchez

The use of doubled haploid technology is a great tool to lessen number of years for inbred line development in hybrid breeding. This study aims to demonstrate the potential use of tropically adapted inducer line (TAIL) from CIMMYT with the local germplasm under Philippine condition for inbred line development and hybrid breeding programs. The two inducers, TAIL P1 and TAIL P1 x P2, and 22 other maize breeding materials were evaluated for agro-morphological characters. All entries were grouped based on the similarities obtained from 40 quantitative characters using the agglomerative clustering method generated using the STAR statistical software. Cluster analysis formed three distinct clusters among the entries with correlation coefficient of 0.725. Entries in each cluster consist of eight members (cluster 1), six (cluster 2) and ten (cluster 3). Both TAIL P1 and TAIL P1 x P2 belong to cluster 2, which is expected as TAIL P1 is one of the parents of the hybrid TAIL P1 x P2. On the other hand, the haploid inducibility was carried out using F1 and segregating materials: IPB 911 (F1 and F2), and three downy mildew resistant populations (UPLBCnN15, UPLBCnN17, and UPLBCnN20). These breeding materials were crossed with the inducer (TAIL P1) to promote haploidy. Haploid inducibility rate (HIR) was evaluated using R1-nj anthocyanin marker system. Based on this identification system, HIR ranges from 2.05% - 8.52%. All the five genotypes showed haploid induction, with the highest rate observed from UPLBCnN15. Extreme caution in identifying haploids out of the total number of kernels should be practiced, since kernel identification has some level of difficulties and prone to misclassification. This study has demonstrated the use of TAIL to promote haploidy in selected Philippine germplasm. The use of TAIL, therefore, can hasten the inbred and eventually hybrid maize development in the Philippines.

PROFILE

Dr. Aletta T. Yñiguez is an Associate Professor at the Marine Science Institute, University of the Philippines in Diliman where she heads the lab Biological Oceanography and Modeling of Ecosystems or BiOME. She obtained her Ph.D. from the Rosenstiel School of Marine and Atmospheric Science, University of Miami in Florida with the support of Fulbright and Maytag Scholarships. She uses an arsenal of field, laboratory and computer modelling approaches to investigate the potential effects of environmental conditions including anthropogenic activities and climate change on the base of the marine food web and how these can impact Philippine fisheries particularly the occurrence of harmful algal blooms. Her research efforts have been locally and internationally recognized. She was the recipient of the 2012 L'Oreal -UNESCO For Women in Science Fellowship, and was awarded as an Outstanding Young Scientist by the National Academy of Science and Technology in 2017. In 2018 as well, she was one of the 8 Filipinos who were part of the Asian Scientist 100 list. Yñiguez currently serves as Scientific Steering Committee Member of the IOC Sub-Commission for the Western Pacific (WESTPAC)-HAB, the IOC-SCOR GlobalHAB, as well as the East Asian HAB (EASTHAB). Beyond research, she advocates education and critical thinking through experiential learning through marine and climate science camps and various interactive learning modules. Recently, she became one of the four teachers honored by the Bato-Balani Foundation and Diwa Learning Systems in The Many Faces of the Teacher award.

DR. ALETTA CONCEPCION T. YÑIGUEZ

Outstanding Young Scientist 2017
Associate Professor
The Marine Science Institute
University of the Philippines
Diliman

INSIGHTS AND PERSPECTIVES ON HARMFUL ALGAL BLOOMS USING IN SILICO MECHANISTIC MODELS

Harmful algal blooms (HABs) are recurring events in many embayments around the Philippines that lead to negative socio-economic and health effects. As we push to strengthen our blue economy in the country, including mariculture activities, HABs can pose a significant threat and can also be an indicator of unsustainable practices. To help mitigate the impacts of HABs, it is important to understand the causative organisms, and the patterns in bloom initiation, maintenance and termination. HABs though are a complex phenomenon that occurs in the ecosystem through the interplay of a multitude of factors from biology, chemistry, larger oceanographic processes and even the fisheries it impacts. Dynamic computational models are powerful tools that can help tease out the factors and processes involved in HABs. We have developed a biophysical model where hydrodynamic and chemical models are coupled to an individual-based model of the main HAB causative species *Pyrodinium bahamense*, as well as the shellfish as a toxin vector. The model was initially developed for Sorsogon Bay and Murcielagos Bay, but was improved to allow for easier application to other embayments. We used this model to test different hypothesis on mechanisms and relative influences of different factors and processes on toxic *Pyrodinium* blooms; thus providing insights into HAB bloom conditions that can also be used to further investigate exposed gaps in knowledge.

PROFILE

Professor Dr. Rinlee Butch M. Cervera is a UP Scientist and laboratory head of the Energy Storage & Conversion Materials Research Laboratory at the Department of Mining, Metallurgical and Materials Engineering. He is the current program director of the Energy Engineering Graduate Program, College of Engineering, University of the Philippines Diliman. Dr. Cervera graduated with a BS Degree in Materials Engineering at UP Diliman, his MS degree at the Universiti Sains Malaysia, and his PhD degree at the University of Tokyo, Japan. He was a Balik-Scientist Awardee of the Department of Science and Technology (DOST) in 2012, an Outstanding Young Scientist of 2018 by the National Academy of Science & Technology (NAST), and a UP CoE Outstanding Engineering Researcher in 2019. He is also a Young Affiliate Awardee of The World Academy of Science (TWAS) and the current Editor-in-Chief of the Philippine Engineering Journal (PEJ).

DR. RINLEE BUTCH M. CERVERA

Outstanding Young Scientist 2018
Professor
Department of Mining, Metallurgical, and Materials Engineering
University of the Philippines Diliman

DEVELOPMENT OF NEXT GENERATION ALL-SOLID-STATE LI-ION BATTERY AND FUTURE PROSPECTS

For the next generation energy storage systems, the development of all-solid-state batteries are a significant endeavor not only due to its widespread applications which can provide much faster charging, higher energy density, and longer battery usage time but also as support for obtaining a sustainable and clean alternative energy sources. All-solid-state Li-ion battery utilizing ceramic based solid electrolyte is a promising technology for future high capacity and safe Li-ion batteries. The use of solid electrolyte will circumvent the problems associated with flammable organic liquid electrolyte typically used in commercial Li-ion batteries. Using solid electrolyte also promises more compact and higher capacities with lighter overall weight. However, high ionic conductivity and good interfacial contact between the electrodes and solid electrolyte still needs to be addressed in order to fully maximize its potential which will pave way in the realization and commercialization of this next generation energy storage battery technology. In this present study, fabrication and electrochemical performance of Ga-doped LLZO solid electrolyte and LiFePO4 cathode for all-solid-state Lithium battery application were investigated. Future prospects of all-solid-state Lithium-ion batteries will also be presented.

PROFILE

Dr. Nathaniel P. Hermosa II is professor of Physics at the National Institute of Physics, University of the Philippines Diliman. He heads the Structured Light and Applications cluster of the Photonics Research Laboratory. After almost 5 years of being a postdoc in Leiden University, the Netherlands, and in ICFO - The Institute of Photonics Sciences in Barcelona, Spain, he returned to the University of the Philippines Diliman in 2014 under the Balik PhD Program of the university.

He obtained his BS Applied Physics (Materials Physics Concentration), MS and PhD Physics from the University of the Philippines Diliman. He is a product of the public school system and is part of the experimental batches of the DOST-ESEP classes at national high schools.

He holds a One U.P. Professorial Chair for Outstanding Teaching and Research and is a UP Scientist 1. He is selected as one of the NAST Outstanding Young Scientists of 2017. He is also the recipient of the World Academy of Sciences Prize for Young Scientist (Physics) in the Philippines and the Eduardo A. Quisumbing Medal for Outstanding Research and Development for Basic Research in 2017. In 2018, he was named as one of the 100 Asian Scientists by the Asian Scientist, a Singapore-based science magazine.
He likes going to hardware stores and supermarkets, and savors staring at a scenery or a blank wall.

DR. NATHANIEL P. HERMOSA II

Outstanding Young Scientist 2017
Professor
National Institute of Physics
University of the Philippines Diliman

COLORED RONCHI PATTERN FOR FRINGE PROJECTION PROFILOMETRY

In this talk I will introduce several research work that have been done with our DOST NAST project entitled, “Resolution Limit of Fourier Transform Profilometry.” Specifically, I will put emphasis on a novel fringe pattern for fast and accurate surface profiling. The pattern is called the colored Ronchi pattern that is formed such that color channels red, green and blue are in separate spatial domains. From a single-shot image of the structured pattern, we are able to reconstruct the surface profile of a distorted paint canvas using both Fourier transform profilometry (FTP) and phase shifting profilometry (PSP). From the three surface reconstructions obtained using FTP, tiny artifacts in the form of ripples are observed. These artifacts are significantly reduced when the surface measurements in FTP are averaged. Experimental results have shown that both FTP and PSP successfully reconstructed the profile of a distorted stressed cloth with a measurement difference between 10.00% to 15.00% from the actual displacement.

PROFILE

Mr. Jeffrey S. Perez is a licensed Geologist and a Supervising Science Research Specialist of DOST-PHIVOLCS. One of the "*fault finders*" in the Philippines, his expertise includes active tectonics and paleoseismic studies of the different segments of the Philippine Fault and the Valley Fault System. Their research findings, make us understand the characteristics and history of surface-rupturing earthquakes along the different segments of the Philippine Fault. Their work has updated the active faults map of the Philippines, which is extensively used in seismic hazard assessment by different stakeholders for land-use and disaster risk reduction and management plans. Mr. Perez currently supervises the Disaster Risk Reduction Research and Development section of DOST-PHIVOLCS.

MR. JEFFREY S. PEREZ

Outstanding Young Scientist
2017
Supervising Science Research Specialist
Philippine Institute of Volcanology and Seismology
Department of Science and Technology

PALEOSEISMIC INVESTIGATION ALONG THE LEYTE SEGMENT OF THE PHILIPPINE FAULT

On 06 July 2017, a magnitude 6.5 earthquake occurred in northern Leyte Island. This earthquake produced strong ground shaking that damaged buildings and infrastructures. It also generated a 26-km-long surface rupture along the northern part of the Leyte Segment of the Philippine Fault. The surface rupture was manifested by continuous fault scarps, open cracks, and en echelon steps and coincides with the previously mapped tectonic geomorphic features. To characterize and understand the seismic activity of this segment, two (2) paleoseismic trenches were excavated. Analysis of the trench sites revealed stratigraphic evidence of at least three (3) surface rupturing events. Based on the charcoal samples collected the recurrence interval of surface rupturing earthquakes is about 60-120 years. Results of this study are essential to augment the limited historical and instrumental data we have for a better assessment of seismic hazards related to the Philippine Fault.

PROFILE

Dr. Mary Donnabelle L. Balela is a Full Professor at the Department of Mining, Metallurgical and Materials Engineering (DMMME), University of the Philippines-Diliman. She is a graduate of BS Metallurgical Engineering from UP in 2004, MS Materials Engineering from the Universiti Sains Malaysia in 2008 and PhD Materials Science and Engineering from Kyoto University in 2011. She currently heads a dynamic research group, the Sustainable Electronic Materials Group, which aims to develop low-cost synthesis process for metal and oxide nanomaterials for various energy, environment and energy applications. She is the runner-up in the 2019 ASEAN-US Science Prize for Women, 2019 Department of Science and Technology National Science and Technology Week Outstanding Research and Development Awardee for Applied Research, 2018 University of the Philippines Outstanding Engineering Researcher, 2017-2019 University of the Philippines Scientist, 2016 National Academy of Science and Technology-Outstanding Young Scientist for Materials Science and Engineering, 2016 Japan Society for the Promotion of Science HOPE Fellow, and Royal Academy of Engineering Leader in Innovations Fellow (Batch 3). She is a member of Global Young Academy and a co-leader of the Science Education for the Youth.

DR. MARY DONNABELLE L. BALELA

Outstanding Young Scientist
2016
Professor
Department of Mining, Metallurgical and Materials Engineering
University of the Philippines Diliman

HYDROTHERMAL SYNTHESIS OF HIERARCHICAL HEMATITE NANOSTRUCTURES FOR ENVIRONMENTAL CLEANING

In this work, the effect of additive to the morphology of hematite (α-Fe2O3) nanostructures and its corresponding photocatalytic property was investigated. Hydrothermal treatment at 120 °C for 6 h was used to synthesize various hematite (α-Fe2O3) nanostructures using different additives (NaCl, Na2SO4, Na2C2O4), followed by annealing in air at 400 °C for 2 h. The photocatalytic behavior of the as-synthesized powders was assessed by degrading 5 ppm of methyl orange (MO) under UV-C lamp with hydrogen peroxide (H2O2) as activator. The urchin-like α-Fe2O3 hierarchical structures exhibited the best photocatalytic behavior.

RESPONSE FROM NEDA

PROFILE

Rosemarie G. Edillon is presently the Undersecretary for National Development Policy and Planning at the National Economic and Development Authority (NEDA).

USec. Edillon holds a PhD in Economics from La Trobe University in Australia, an MA degree in Economics from the University of the Philippines (UP) School of Economics and an MS degree in Statistics from the UP School of Statistics. She is also a 2019 Presidential Gawad CES Awardee.

Among her major responsibilities is shepherding the formulation of the Philippine Development Plan (PDP). The PDP is an elaboration of the country's priorities over the medium-term and is the blueprint of government policies, programs and projects. She also oversees the monitoring of the PDP implementation. In addition, she is in charge of providing technical advice on policy issues to both the legislative and executive branches of government, especially the committees of the NEDA Board.

Presently, USec. Edillon chairs the Task Group on Recovery under the National Task Force against COVID19; she also chairs the Technical Working Group on Anticipatory and Forward Planning and a member of the sub-TWG on Data Analytics under the Inter-Agency Task Force on the Management of Emerging Infectious Diseases.

USec. Edillon also chairs the Social Development Committee-Technical Board and the Technical Committee on Tariff Related Matters and is a member of the Development Budget Corrdination Committee of the NEDA Board. She also heads the Secretariat of the Economic Development Cluster of the Cabinet.

Usec. Edillon is currently a member of the Board of the Philippine Economic Society, where she used to be President. She is also a member of the Philippine Commission of the UNESCO. She was formerly the Chair of the Macroeconomics Committee of the UNESCAP and the Vice-Chair of the Economic Committee of the APEC.

USEC. ROSEMARIE G. EDILLON
National Economic and Development Authority

2021
NAST PHL AWARDS

MEMBERSHIP TO THE ACADEMY

ARVIN C. DIESMOS, Ph.D.
Biology

In recognition of his outstanding contributions to the systematic biology, ecology, and conservation of Philippine amphibians and reptiles. His research and publications on diverse disciplines including species descriptions, taxonomic revisions, evolutionary biology, biogeography, and natural history have guided national efforts to manage and conserve biodiversity of these economically and ecologically important organisms. He championed herpetological research in the Philippines, making significant contributions that have enriched our knowledge in this field and helped bring the country to the forefront of global herpetological research and biodiversity conservation.

For his research on the recovery of metals from non-traditional sources, such as chromium from chromite tailings, copper from chrysocolla, gold from refractory pyrites, nickel and cobalt from laterites, and other recovery processes. For his contribution to the Philippine semiconductor industry, in particular the establishment of Association of Semiconductor and Electronics Manufacturing Engineers of the Philippines and its National Technical Symposium. And for his contributions to undergraduate and graduate programs of Materials Science and Engineering at UP Diliman.

MANOLO G. MENA, Ph.D.
Metallurgy

CRISTINA J. MONTIEL, Ph.D.

Peace/Political Psychology

For her significant contributions to the field of peace/political psychology through her deep involvement in Philippine liberation movements, during and after martial law. Her direct experiences in collective movements informed her writings and scholarship on peace/political psychology from a Global South perspective. During the country's democratic transition, she brought peace/political psychology to strategic national institutions, leaders, and projects related to social peace in the Philippines. Dr. Montiel's primary contribution to the global field of peace/political psychology lies in her excellent and original scholarship. She is a world-renowned and multi-awarded senior scholar on the psychology of peacebuilding and democratic transitions.

For his pioneering and translational researches on tuberculosis that explored outpatient Supervised Short-course Chemotherapy, which contributed to the adoption of WHO's Directly Observed Therapy Short course or DOTS strategy in the national program. He strategized the creation of collaborative public-private mix DOTS that brought private and government TB workers together, which became a model for the Stop TB Partnership at the WHO Geneva. To address the lack of ventilators, Dr. Roa invented the Pulmo 1 Ambubagger, a temporary device that can be used in the absence of a ventilator. Dr. Roa successfully combined his scientific knowledge, inventive skills, and transformational leadership to help control the dreaded disease of tuberculosis and created a cadre of young pulmonologists who will help him carry on this mission.

CAMILO C. ROA JR., M.D.
Pulmonary Medicine

OUTSTANDING YOUNG SCIENTISTS

For his outstanding contributions in the field of communications network engineering, expert systems, control systems, network design, and optimization. He has contributed to the optimization of communication systems to make them more functional and adapted to the industry. He successfully created simulation models to replicate different scenarios in network design, and has recently developed these in the field of Biomedical Engineering.

AARON DON M. AFRICA, Ph.D.

Electronics and Communications Engineering
De La Salle University

For his innovative, collaborative, and socially grounded research works that have generated original insights regarding an increasingly digitalized Philippines, focusing on media and multiculturalism, digital labor, and digital disinformation. In his globally recognized publications, he has sought to decolonize the field of Media and Communication Sciences by developing theoretical approaches grounded in the realities of the Philippines. Through his writing and speaking, he has raised awareness regarding cross-cultural relations amongst Filipinos and those in the Global South and influenced policies that seek to protect Filipino digital workers and stem the growth of the digital disinformation in the Philippines.

JASON VINCENT A. CABAÑES, Ph.D.

Communication Studies
De La Salle University

REYNANTE L. ORDONIO, Ph.D.

Agricultural Science
Philippine Rice Research Institute

In recognition of his significant contributions as plant molecular breeder, specifically to rice and sorghum, using modern biotechnology as tool. A staunch modern biotech advocate, Dr. Ordonio actively shares knowledge about its benefits and also leads the Healthier Rice Project at PhilRice, developing Golden Rice and High Iron and Zinc Rice with the aim of addressing the problem of Vitamin A deficiency, anemia and stunting in the country. He also served as the technical expert under the Department of Agriculture-Biotech and National Committee on Biosafety Philippines that crafted the country's first policy on products of gene editing and other plant breeding innovations.

In recognition of his outstanding contributions to the fields of limnology and freshwater biology in the Philippines and Southeast Asia. His well-cited publications on freshwater zooplankton systematics, biology, and ecology, have greatly expanded knowledge on important yet neglected aquatic ecosystems and resources. His scientific outputs have guided efforts of the national government on the conservation and management of major lakes and other freshwater ecosystems in the Philippines.

REY DONNE S. PAPA, Ph.D.

Biological Science
University of Santo Tomas

GAY JANE P. PEREZ, Ph.D.

Physics
University of the Philippines
Diliman

In recognition of her innovative contributions in harnessing satellite technology to address critical environmental problems. Her notable works include studies of agricultural drought and large-scale seasonal and interannual variability of vegetation in the Philippines, including changes in forest cover. Dr. Perez is also recognized for her pioneering contributions in the development of the country's first microsatellites by leading the science team in defining the satellites' missions and in generating remote sensing products.

In recognition of his exemplary contributions in the field of applied mathematics, particularly in the mathematical modeling of complex biological and social systems. His mathematical projections and data analytics helped the national and local governments in the fight against COVID-19. His study on gene regulatory networks lead to the discovery of candidate biomarkers for diseases, such as cancer. His model of Red Queen dynamics provides new insights for the fields of evolutionary biology, parasite ecology, biomedical parasitology and epidemiology that are essential for better understanding of antibiotic resistance to control diseases. He pioneered the modeling of foraging behavior of native stingless bees to improve crop pollination, which helps farmers develop better farm practices that optimize their yield and minimize pest damage.

JOMAR F. RABAJANTE, D.Sc.

Mathematical and Systems Engineering
University of the Philippines Los Baños

In recognition of his outstanding contributions to the advancement of human ecological research in the country that spans the fields of environment, socio-economics, public health, and food systems. He applied advanced geographic, statistical, and machine learning techniques to study problems, such as child malnutrition, poverty, population growth, environmental degradation, and climate change in the Philippines.

ARNOLD R. SALVACION, Ph.D.

Environmental Science
University of the Philippines Los Banos

In recognition of her outstanding contributions in the field of Operations Research (OR), especially in the development and use of systematic methodology for computer-aided decision-making to enhance industrial efficiency and tackle environmental sustainability and socio-economic issues. She developed an algorithmic framework called Target-Oriented Robust Optimization (TORO), which integrates uncertainty at the point of decision-making and guarantees computational tractability so that models can be solved efficiently. Dr. Sy extensively used TORO for the design of engineering systems, including infrastructure and network planning in the fields of energy, production, and water networks.

CHARLLE L. SY, Ph.D.

Industrial and Systems Engineering
De La Salle University

MARVIN A. VILLANUEVA, Ph.D.

Veterinary Medicine
Philippine Carabao Center National Headquarters

In recognition of his exemplary accomplishments in veterinary science. His innovative researches led to the development of technologies for the detection and control of ruminant diseases that are of economic and public health importance. His significant research findings aimed at directly reducing the morbidity and mortality of water buffaloes and other livestock that resulted in improved production efficiency. He selflessly shared his knowledge and best practices with farmers through a variety of media platforms, which resulted in improved livestock production and better control of zoonoses.

In recognition of her research achievements and continuing efforts to promote and strengthen the discipline of environmental microbiology, particularly in the study of agricultural produce and irrigation waters. She pioneered the investigation of microbial safety of agricultural products by focusing on the microbiota of fresh produce from Philippine markets, which highlighted the importance of foodborne disease detection and prevention.

PIERANGELI G. VITAL, Ph.D.

Biology
University of the Philippines
Diliman

2021 NAST TALENT SEARCH FOR YOUNG SCIENTISTS

First Place

RENIER G. MENDOZA, Dr.rer.nat.

Mathematics
University of the Philippines Diliman

In recognition of his outstanding scientific and technological research entitled: "A Two-Phase Segmentation Approach to the Impedance Tomography Problem"

Second Place

ANGELO EARVIN S. CHOI, Ph.D.

Chemical Engineering
De La Salle University

In recognition of his outstanding scientific and technological research entitled: "Oxidation by H2O2 of Bezothiophene and Dibenzothiophene over Different Polyoxometalate Catalysts in the Frame of Ultrasound and Mixing Assisted Oxidative Desulfurization"

Third Place

MARVIN M. FLORES, Ph.D.

Physics
University of the Philippines Diliman

In recognition of his outstanding scientific and technological research entitled: "Constraining Stealth Supersymmetry with Illuminated Fat Jets at the Large Hadron Collider"

Special Citation

NONAWIN L. AGUSTIN, Ph.D.

Agricultural Sciences
Philippine Rice Research Institute

In recognition of her outstanding scientific and technological research entitled: "WEG1, which Encodes a Cell Wall Hydroxyproline-rich Glycoprotein, is Essential for Parental Root Elongation Controlling Lateral Root Formation in Rice"

Special Citation

JHUD MIKHAIL O. ABERILLA, Ph.D.

Environment and Sustainable Technology
University of the Philippines Diliman

In recognition of his outstanding scientific and technological research entitled: "An Integrated Sustainability Assessment of Synergistic Supply of Energy and Water in Remote Communities"

2021 OUTSTANDING BOOK AWARD

Matyag: State of Coastal Habitats in the Six Philippine Marine Biogeographic Regions

David, L. T., Licuanan, W. R. Y., Dela Cruz, T. L. P., Cariño-Valdez, B. A. B., and Arceo, H. O.
University of the Philippines Diliman

Pelikulang Komiks: Toward a Theory of Filipino Film Adaptation

Arriola, J. L.
The University of the Philippines Press

Philippine Politics and the Marcos Technocrats: The Emergence and Evolution of a Power Elite

Tadem, T.S.E.
Ateneo de Manila University Press

Tuklas Lunas® Protocols for Drug Discovery and Development.

Alvero, R.G.Y. and Guevara, A.P. (Editors)
Department of Science and Technology – Philippine Council for Health Research and Development

Special Citation

2016 Philippine Climate Change Assessment (PhilCCA): The Physical Science Basis

Villarin, J. T., Algo, J. L., Cinco, T. A., Cruz, F. T., de Guzman, R. G., Hilario, F. D., Narisma, G. T., Ortiz, A. M., Siringan, F. P., Tibig, L. V.
The Oscar M. Lopez Center for Climate Change Adaptation and Disaster Risk Management Foundation Inc. and Climate Change Commission

2017 Philippine Climate Change Assessment: Impacts, Vulnerabilities and Adaptation

Cruz, R. V. O., Aliño, P. M., Cabrera O. C., David, C. P. C., David, L. T., Lansigan, F. P., Lasco, R. D., Licuanan, W. R. Y., Lorenzo, F. M., Mamauag, S. S., Peñaflor, E. L., Perez, R. T., Pulhin, J. M., Rollon, R. N., Samson, M. S., Siringan, F. P., Tibig, L. V., Uy, N. M., Villanoy, C. L.
The Oscar M. Lopez Center for Climate Change Adaptation and Disaster Risk Management Foundation Inc. and Climate Change Commission

2018 Philippine Climate Change Assessment: Mitigation of Climate Change

Buendia, L. V., Lasco, R. D., Biona, J. B. B., Badrina, R. B., Baviera, M. S., De Jesus, A. C., Dela Torre, D. M. G., Demafelis, R. B., Pulhin, F. B., Recabar, S. G., Ruzol, C. D., Tamayo, E. G. T., Tapia, M. A., Tongko-Magadia, B., Sabino, L. L., Sabino, N. G.
The Oscar M. Lopez Center for Climate Change Adaptation and Disaster Risk Management Foundation Inc. and Climate Change Commission

2021 OUTSTANDING SCIENTIFIC PAPER AWARD

Green Behavior and Generation: A Multi-Group Analysis Using Structural Equation Modeling

Bautista, R. A. Jr.
Asia-Pacific Social Science Review

Diversity and Bioactivities of Mangrove Fungal Endophytes from Leyte and Samar, Philippines

Apurillo, C. C. S., Cai, L., and dela Cruz, T. E. E.
Philippine Science Letters

Mobility-guided Modeling of the COVID-19 Pandemic in Metro Manila

Egwolf, B. and Austriaco, N., O.P.
Philippine Journal of Science

Simulating National-scale Deforestation in the Philippines Using Land Cover Change Models

Jardeleza, J. M., Gotangco, C. K., and Guzman, M. A. L.
Philippine Journal of Science

RAD51 135G>C Single Nucleotide Polymorphism and Risk of Breast Cancer in Selected Filipino Cases

Ragudo, G.P., Pureza, B.S., Rimando, D.A., Manrique, M.R., Ortin, T.S., Notarte, K.I., and Albano, P.M.
Philippine Journal of Science

Resistance Gene Analogs of Mango: Insights on Molecular Defenses and Evolutionary Dynamics.

Lantican, D. V., Cortaga, C. Q., Manohar, A. N. C., dela Cueva, F. M., and Sison, M. L. J.
Philippine Journal of Science

Resistance Screening and Influence of Fruit Physico-biochemical Properties of "Carabao" and Other Mango Varieties Against Oriental Fruit Fly, *Bactrocera dorsalis* (Diptera: Tephritidae), in the Philippines

Sison, M. L. J., Cortaga, C. Q., Barcos, A. K. S., Laurel, N. R., Mateo, J. M. C., dela Cueva, F. M.
Philippine Journal of Science

An Analysis of the Effects of Foreign Ownership on the Level of Tax Avoidance Across Philippine Publicly Listed Firms

Shi, A. A., Concepcion, F. R., Laguinday, C. M. R., Ong Hian Huy, T. A. T., and Unite, A. A.
DLSU Business & Economics Review

2021 NAST AWARD FOR OUTSTANDING RESEARCH IN TROPICAL MEDICINE

NELIA P. SALAZAR, Ph.D.

Microbiology

In recognition of her pioneering contribution in the field of tropical medicine and public health. She is known for the discovery of *Capillaria philippinensis* sp.nov., a causative agent of the first reported case of human intestinal capillariasis in a patient with intractable diarrhea in 1963. She also led the establishment of the Department of Parasitology and Medical Entomology, and Malaria Study Group at the Research Institute for Tropical Medicine (RITM). She spearheaded the isolation and identification of Cryptosporidium organisms in the first reported AIDS patient in the Philippines, which resulted in the inclusion of this organism in the differential diagnosis of parasite-related diarrhea in immunocompromised patients and children less than 5 years old. She also conducted original studies on malaria, dengue, parasite-related diarrhea, soil-transmitted helminthiases and studies on herbal scabicides, and herbal antihelminthics.

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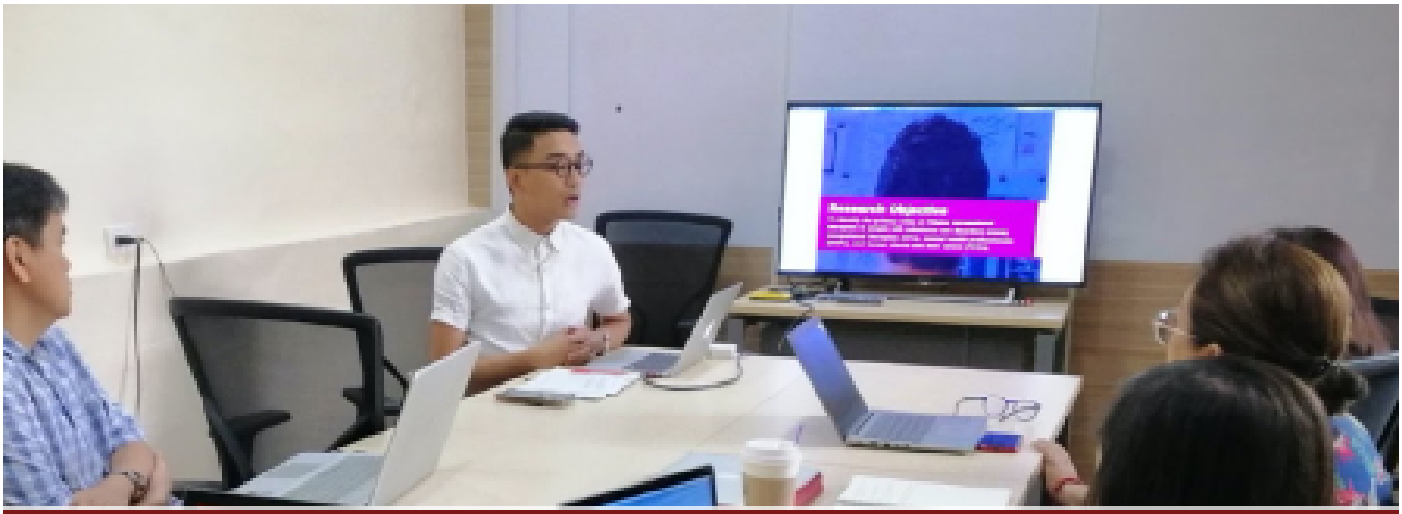

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