2021 ANNUAL REPORT

DOST-PCIEERD

Innovations

DOST-PCIEERD

2021 ANNUAL REPORT

INNOVATION COUNCIL

FOR INDUSTRY, ENERGY AND EMERGING TECHNOLOGIES (**DOST-PCIEERD**)

About the Cover

Innovations in motion. Like planet Earth, the speed of thought transcends the boundaries of space and time as the life we have now was born out of the ideas from the ones who came before us.

It is this motion that defines the nature of humankind, to strive for progress, and onto its maximum potential. This shared struggle is the theme of the 2021 Annual Report.

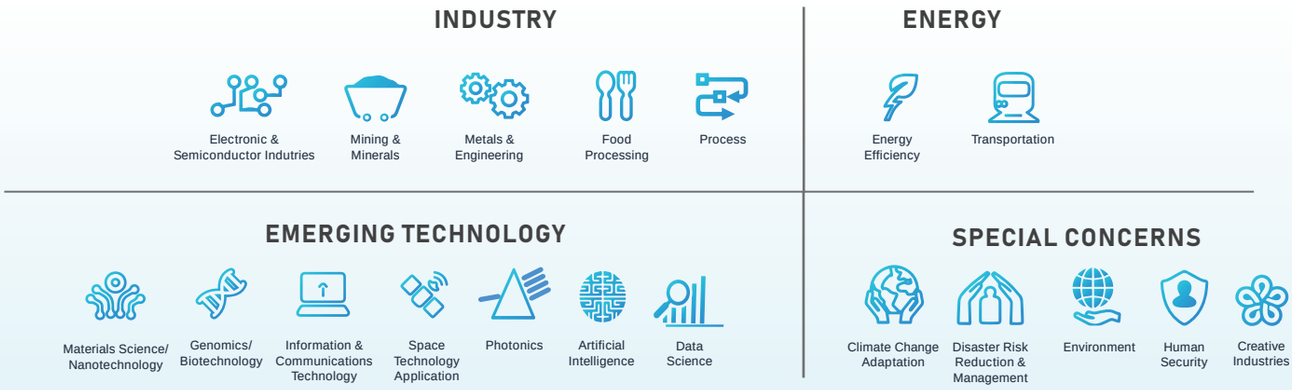
DOST-PCIEERD undertook massive strides in overcoming challenges in the post-pandemic world by supporting the development of game-changing technologies that help address the country's needs.

From building our living spaces to creating alternative options for human motion, we at DOST-PCIEERD consistently rise to the challenge to reach for the stars.

About DOST-PCIEERD

In support of the Department of Science and Technology's (DOST) mandate of leading the Philippines' scientific and technological efforts to achieve maximum economic and social benefits for Filipinos, the Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD), one of its sectoral planning councils, serves as the central agency in the formulation of policies, plans, and programs, as well as in the implementation of strategies that boost the country's industry, energy, and emerging technology sectors.

PCIEERD aggressively undertakes the application of science and technology (S&T) to upgrade the country's capabilities and Filipinos' quality of living. It provides continuing support to research and development (R&D), technology transfer, and information dissemination in these priority areas:



Our Vision

By 2040, PCIEERD is the Nexus of Innovation, the leading contributor to the nation's productivity and competitiveness by enabling Science and Technology solutions in the industry, energy sectors, and emerging technologies, while upholding the tenets of good governance.

Our Mission

Provide strategic leadership in enabling innovation in industry, energy sectors and emerging technology. PCIEERD commits to:

- Formulate national policies, plans, programs, and strategies for S&T development in the industry, energy and emerging technology sectors;
- Allocate government and generate external funds for research and development
- Manage STI programs and projects implemented and supported by the Council towards utilization and adoption

Message from the DOST Secretary

> “DOST- PCIEERD also created solutions for some pressing problems both on the local and national scales in the areas of transportation, disaster risk reduction and mitigation, including the effect of the changing climate, as well as food security.”

Nearly three years since the COVID-19 pandemic has put our lives at a standstill, our mission to bring science closer to people remains unperturbed. Though faced by struggles, our initiatives became the silver lining through our persistence in developing more innovations that would aid us in the fight against the dreaded disease and the unprecedented crisis it brought.

This year, the Department of Science Technology - Philippine Council for Industry, Energy, and Emerging Technology Research and Development (DOST-PCIEERD) pivoted into ways and supported initiatives primarily to save lives and continue delivering services.

This annual report narrates how the Council managed to rise up to the challenges and brought critical solutions in the fields of science, education, communications, engineering, tourism, e-commerce and other aspects covering its functions to be able to push its agenda toward nation-building and for the recovery of our local economy even at the height of the ongoing global health crisis.

DOST- PCIEERD also created solutions for some pressing problems both on the local and national scales in the areas of transportation, disaster risk reduction and mitigation, including the effect of the changing climate, as well as food security.

It is my privilege to invite you to see how the Council touched the lives of millions of Filipinos by carrying our mandate not through paper but through the good work that we do despite the challenges.

Mabuhay, DOST-PCIEERD!

PROF. FORTUNATO T. DE LA PEÑA
Secretary, Department of Science and Technology

As we slowly move away from the pandemic, a sea of change is dawning in the new era. We saw the fall of COVID-19 infections, indicating the effectiveness of vaccinations and our health protocols.

We commend the Department of Science and Technology Philippine Council for Industry, Energy and Emerging Technology Research and Development's (DOST-PCIEERD's) commitment to our research agenda in coming up with innovations featured in the 2021 Annual Report.

These innovations vastly contributed towards our achievement of committed outcomes of the DOST particularly in development of state-of-the-art facilities and capabilities and science-based breakthroughs DOST-PCIEERD provides solutions to transform research and development (R&D) opportunities for wealth and job creation through vigorous technology transfer and commercialization activities.

We are also happy with the synergy from the impressive collaborations from the academe, government, the private sector, and international organizations. These partnerships will surely help the country boost its productivity output, climate change adaptability, disaster risk reduction, and workforce resilience in labor disruptions.

We are confident that these developments will translate to the economic recovery of the Philippines. We call on other sectors of society to be a partner in nation building as we swiftly regain the opportunities we lost in the pandemic as well as adopt new technologies and innovations to hasten our recovery.

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

Message from the DOST Undersecretary for R&D

> **“We are confident that these developments will translate to the economic recovery of the Philippines.”**

Message from the Executive Director

"We made strides in new fields like data science, artificial intelligence, smart cities, industry 4.0, disaster risk reduction, and more. We put in place innovative programs in human resource and technology transfer to complete the journey of our researchers, scientists, and engineers in the research and development cycle. "

Innovations Thriving in the New Normal

Excellence, innovation, and integrity are the core values espoused by DOST-PCIEERD. With a major disruption caused by the pandemic two years ago, people were forced to be creative to be able to cope with the new normal and prevent the spread of the highly infectious COVID-19. DOST-PCIEERD recognizes that creativity and resilience are virtues that shone all throughout the pandemic.

Never have we seen the scientific community act so swiftly and concertedly across continents, despite travel restrictions, using their expertise and sometimes own resources to solve pressing problems across the globe. Within two years, vaccines were pilot tested and developed to curb the death toll and other innovations that helped us thrive in the new normal. That is a testament to how creativity, coupled with scientific know-how, converges and steers us away from more hardships.

DOST-PCIEERD is no different. We forge partnerships with various sectors of society to bring S&T innovations in the industry, energy, and emerging technologies come to life. We have engaged even more researchers, particularly in the Visayas and Mindanao regions in pursuing research in emerging fields.

This movement reinforced a suite of localized solutions to modern problems requiring greater complexity, from researching on underutilized indigenous resources, to implementing data-collection systems to implement smart solutions.

We made strides in new fields like data science, artificial intelligence, smart cities, industry 4.0, disaster risk reduction, and more. We put in place innovative programs in human resource and technology transfer to complete the journey of our researchers, scientists, and engineers in the research and development cycle.

These are just some of the milestones we achieved in the past year. By marrying the natural creativity of Filipinos, together with the technology we developed during the quarantine period, we can unleash S&T innovations that help make our lives better, safer, and sustainable.

Indeed, with necessity and creativity combined, we're pretty sure it'll help us thrive in the new, better normal.

DR. ENRICO C. PARINGIT
Executive Director, DOST-PCIEERD

PCIEERD in 2021
by the Numbers

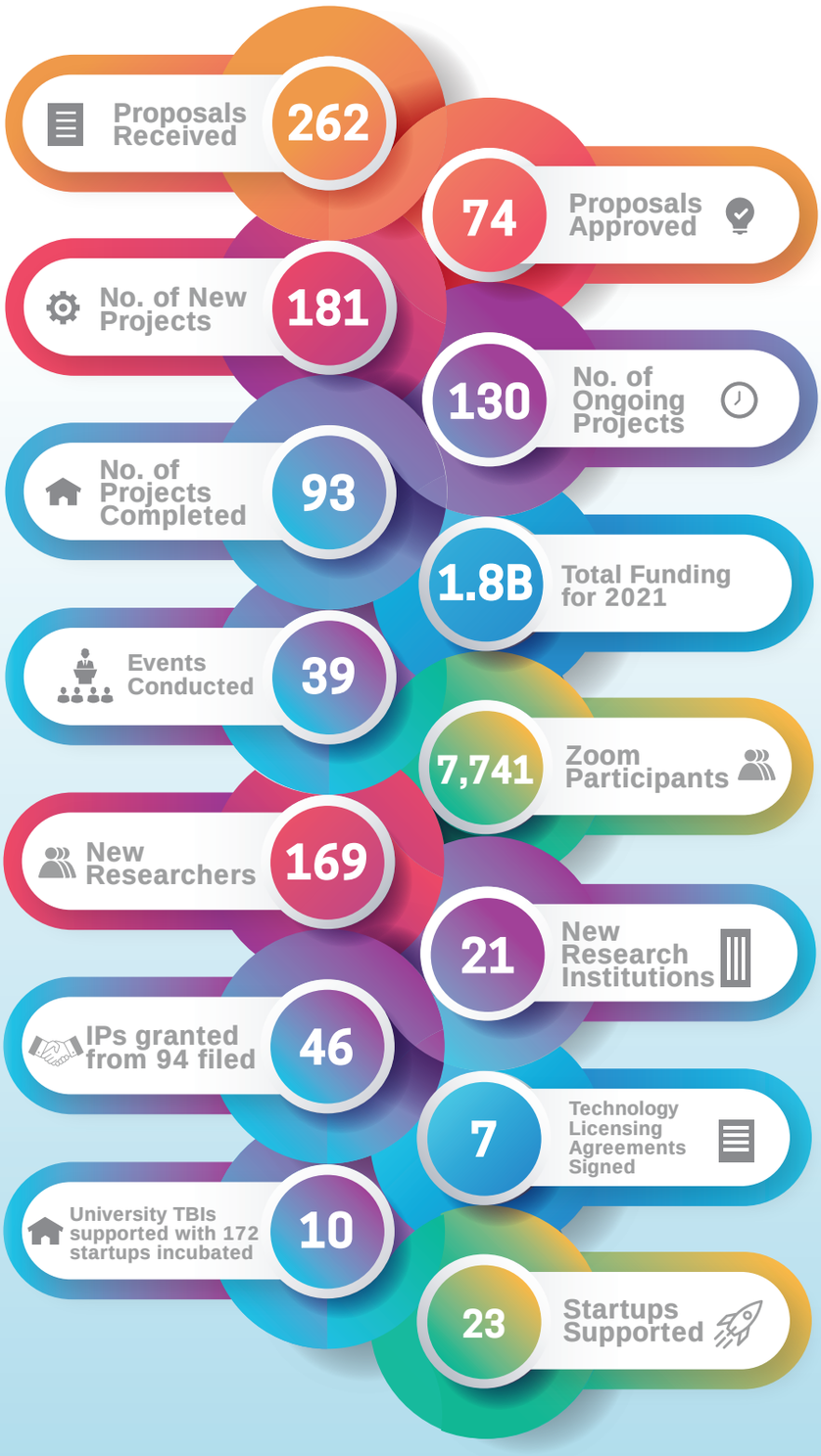


Table of Contents

Charting the Path towards Innovation

Roadmapping activities to update the Harmonized National R&D Agenda

To continue making way towards national progress through S&T, the Department of Science and Technology – Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) developed sectoral roadmaps, in alignment with the updating of the Harmonized National Research and Development Agenda (HNRDA).

These roadmaps give a clear view to stakeholders on the sectors' S&T directions for the short-, medium- and long-term and are the basis for the annual Call for Proposals of the Council.

The new roadmaps can be accessed at https://pcieerd.dost.gov.ph/library/road-maps.

Budgetary Requirement per Sector

Priority Sectors	Budgetary Requirement (in Million Pesos)	
	2022-2028 (HNRDA)	2029-2040 (Long-term)
1. Additive manufacturing	805	2,400
2. Advanced materials	800	1,750
3. Materials for energy	700	1,800
4. Nanotechnology	1,200	1,700
5. Optics and photonics	561	1,800
6. Electronics	2,070	1,700
7. ICT innovations	264	1,800
8. Industry 4.0	900	2,400
9. Quantum technology	860	2,850
10. Smart cities	470	-
11. Artificial intelligence	1,650	6,000
12. Creative Industries	970	950
13. Space technology applications	855	1,070
14. Transportation	1,266	4,990
15. Construction	990	2,540
16. Energy	2,595	17,830
17. Utilities	345	950
18. Disaster risk reduction-climate change adaptation	2,025	3,655
19. Unmanned vehicle systems	330	200
20. Human Security	927	808
21. Food	3,365	4,384
22. Metals and engineering	3,371	6,120
23. Environment	1,169	2,472
24. Process	1,559	1,870
25. Mining and minerals	805	3,005
26. Startup development program	1,331	3,452
27. Technology business incubation program	996	1,024
28. Capability building programs	1,462	4,385
29. Science communication	140	240
TOTAL	**34,781**	**84,145**

Support for R&D

Research and Development (R&D) is an important driver for economic growth as it provides powerful knowledge and insights that become the bedrock of life-changing innovations that bolster the Philippines' industry, energy, and emerging technology sectors.

Industry

The Philippines is brimming with a wide variety of industries that contribute to the attainment of sustainable and inclusive growth. With that, DOST-PCIEERD prioritizes R&D programs and projects relating to industrial processes, food processing, creative industries, textiles, furniture, chemicals, metals and engineering, mining and minerals, and the environment.

Energy and Utilities Systems

Filipinos have been clamoring for efficient and reliable energy and utilities systems to elevate their quality of life. With that, the Council is working hard to find innovative ways to solve problems related to energy, construction, transportation, and disaster management.

Emerging Technologies

Advanced technological progress is now reshaping industries all over the globe, as countries embrace the Fourth Industrial Revolution or Industry 4.0. Through DOST-PCIEERD, the Philippines is quickly catching up as it funds and monitors R&D projects and programs on emerging technologies, including materials science, nanotechnology, electronics, information and communications technology, artificial intelligence/robotics, data science, photonics, and space technology applications.

Science-backed water management tech saves more water

Project Title: Enhanced Forecasting Model for Complex Water Supply Systems of the East Service Area of Metro Manila

Project Leader: Dr. Christopher P. Monterola

Implementing Agency: Asian Institute of Management (AIM)

Project Title: Philippine Groundwater Outlook (PhiGO)

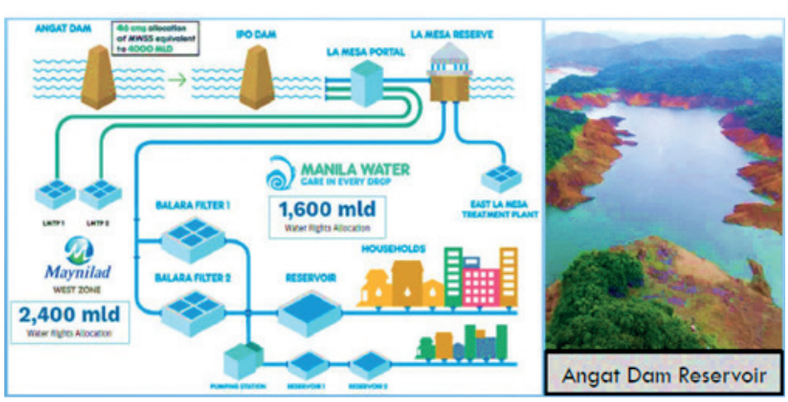
Project Leader: Dr. Maria Aileen Leah G. De Guzman

Implementing Agency: Ateneo de Manila University

Amid life-threatening impacts of the climate change, researchers from Ateneo de Manila University (ADMU) and Asian Institute of Management (AIM) developed water utility systems to aid the management of resources.

Data scientists and researchers from AIM developed the forecasting model for the water supply level of the country's major water reservoirs: Angat Dam, Ipo Dam, and La Mesa Dam.

The **"Enhanced Forecasting Model for Complex Water Supply Systems of the East Service Area of Metro Manila"** project focused on building robust time series forecasting models for predicting the water levels of the three main dams that supply Metro Manila.



"Dams and reservoirs play a crucial role in water resource management. Not only are they used to supply water to urban areas, but they are also used for flood control as well as for irrigation in rural areas and in the generation of hydroelectric power. To maintain this multipurpose water storage at optimal performance, the reservoir level must be continuously monitored so that necessary adjustments can be made in a timely manner," data scientist and project leader Dr. Christopher P. Monterola said.

The Angat-Ipo-La Mesa System of dams, reservoirs, tunnels, aqueducts, and associated facilities supplies the bulk of the National Capital Region's (NCR) daily water needs.

About 6.8 million people were affected by the water crisis in and around the Philippine capital in 2019. Monterola said the water shortage began in March that year when La Mesa Dam went below 70-meter critical level partially caused by the increasing demand within the East Service Zone, affecting almost the entire cities and nearby towns in the metro.

"Accurate forecasting of the Angat Dam levels will help in the optimization of releases which directly impact the water levels of Ipo Dam and La Mesa Dam," he said.

Meanwhile, researchers from the ADMU hope to provide a sustainable groundwater resource for two water-critical cities in the Philippines through its water management project.

The Philippine Groundwater Outlook (PhiGO) aims to deliver a robust set of methods, models and frameworks that are consistent, accessible, and transferable between water-critical regions within the Philippines.

Using two water-critical cities, Iloilo and Pampanga, as case study areas, the study will provide improved current observational infrastructure, further develop current conceptual models, build numerical models and methods designed for seasonal and long-term forecasting, and quantify how groundwater flood and drought impacts cascade through various socio-economic sectors.

Particularly, the study will deliver near-real-time groundwater level monitoring systems, enhanced models of regional groundwater dynamics, seasonal and long-term forecasts of groundwater levels, stakeholder focused reports of flood and drought risk and cascading hydrological and socio-economic impacts, web-based knowledge and data sharing platforms, and self-contained hubs that will act as blueprints for similar research in other water-critical cities across the Philippines.

Previous research conducted published by the Japan International Cooperation Agency (JICA) has identified nine water-critical cities, which were Metro Manila, Zamboanga City, Davao City, Iloilo City, Cagayan de Oro City, Metro Cebu, Bacolod City, Angeles City and Baguio City. These cities were considered critical given their increasing population, rapidly changing land-use, vulnerability to pollution and salt-water intrusion, and limited water resources.

"Our key objective is tightly coupled to the need to better understand and quantify the susceptibility of groundwater to future hydrometeorological and urbanization extremes, to improve predictions of risk and to quantify pathways for cascading impacts," Project Leader Dr. Maria Aileen Leah De Guzman said.

According to the Asian Water Development Outlook published by the Asian Development Bank (ADB) in 2016, water security is of particular concern for Filipino cities, which has been designated among the worst in Asia for urban water security.

Cruising the fastlane to electro-mobility in the Philippines

Project Title: Development of a 23-Seater Electric Jeepney

Project Leader:
Mr. Edmund Arraga

Implementing Agency: Electric Vehicles Association of the Philippines (EVAP)

Project Title: Fabrication of a Novel Material as Anode Electrode for High Power Generation Al-Air Battery

Project Leader:
Dr. Ginno Andres
Dr. Abigail Cid-Andres

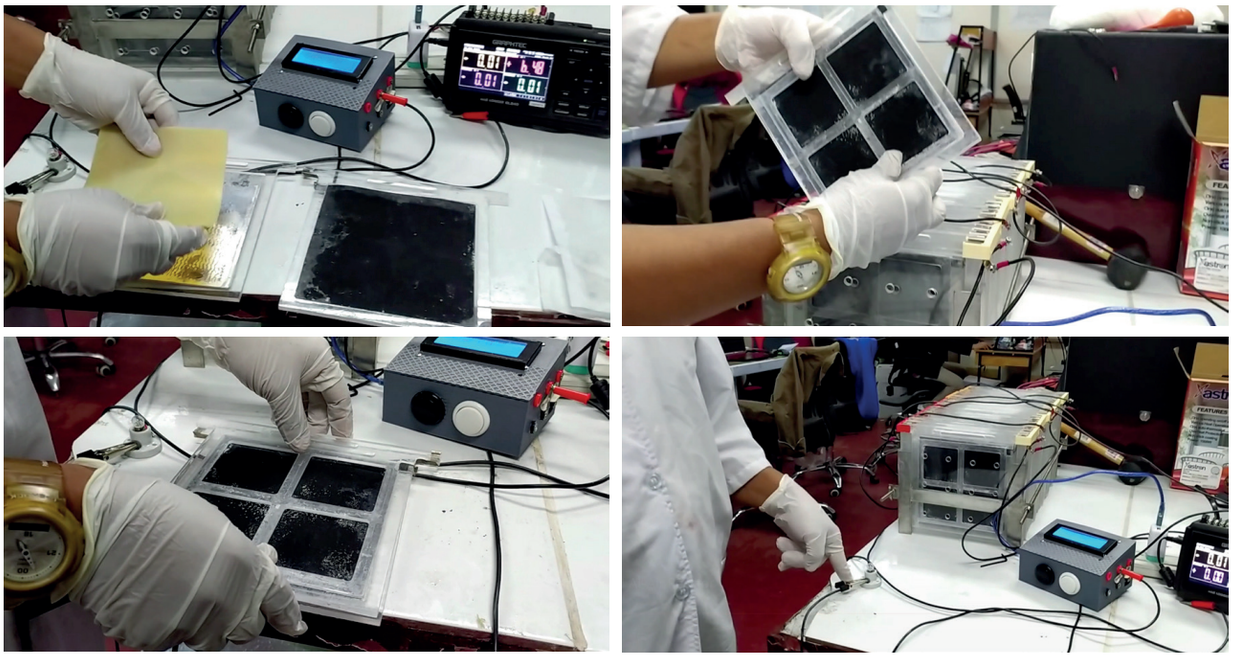
Implementing Agency: Polytechnic University of the Philippines

The Philippines' transport sector is dominated by fossil fuels. With that, it contributes 16% of the country's CO_2 emissions. To stay within the 1.5°C climate warming limit, opportunities to electrify the sector must be implemented.

The current public transport system heavily relies on jeepneys, aptly known as the "King of the Road." Official registrations reveal that the country has 250,000 jeepneys, with 55,000 in Metro Manila. Hoping to steer the sector towards becoming more environment-friendly, the government rolled out its Public Utility Vehicle Modernization (PUVM) Program.

In support of this, the Department of Science and Technology – Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) funded a research project that aims to develop a 23-seater electric vehicle or e-jeepney, hoping to cruise the fastlane towards electrifying the country's transport sector.

The project team has successfully developed two prototypes that promote low-carbon EV technology that conforms to the country's standards, battery charging and swapping stations for lithium-ion batteries with a management system, a business model for the efficient management of a fleet of e-jeeps involving fleet operations and collection of daily loan amortization.



"The current market realities, however, are stacked against e-jeeps. While they are expected to provide lower life-cycle cost because of their lower energy and maintenance cost, their higher initial expense makes them unattractive relative to Euro 4 diesels," said Project Leader and Electric Vehicle Association of the Philippines (EVAP) President Edmund Arraga.

With that, the project highlighted that the successful adoption of e-jeeps is dependent on the existence of support mechanisms like financing and leasing, government investments, introduction of vehicle or component manufacturing incentives program and implementation of the necessary vehicle and service quality safeguards.

As e-vehicles (EVs) rely on rechargeable batteries, Filipino scientists are now looking for reliable, alternative indigenous sources of energy to ensure that the transport sector meets its energy demand. Balik Scientists Dr. Ginno Andres and Dr. Abigail Cid-Andres are doing so through their **Aluminum-Air Reactor Project**.

The project team developed an alternative source of energy using commercial-grade aluminum as fuel, making it more economical, environmentally safe, and low-cost. They also used the technology to charge various electronic devices without the use of grid-connected electricity.

"We are looking forward to the day when our technology will be used in charging stations for the Philippines' emerging and developing EV technology," said Andres.

Finessing the construction industry with rubber, petrography

Project Title: Development of Standard Philippine Rubber-Modified Asphalt for Pavement Applications

Project Leader: Prof. Kevinilo Marquez

Implementing Agency: UP Los Baños

Project Title: Concrete Petrography Program

Project Leader: Dr. Richard Ybañez

Implementing Agency: National Institute of Geological Scienes (UP NIGS)

Project Title: Specific Earthquake Ground-Motion Levels to Help Increase the Seismic Resiliency of Government Infrastructures, Residential and Medium-to-High Rise Buildings in Pangasinan, Tarlac, Metro Iloilo-Guimaras, Cauayan City, Butuan City, and Mati City

Project Leader: Rhommel Grutas

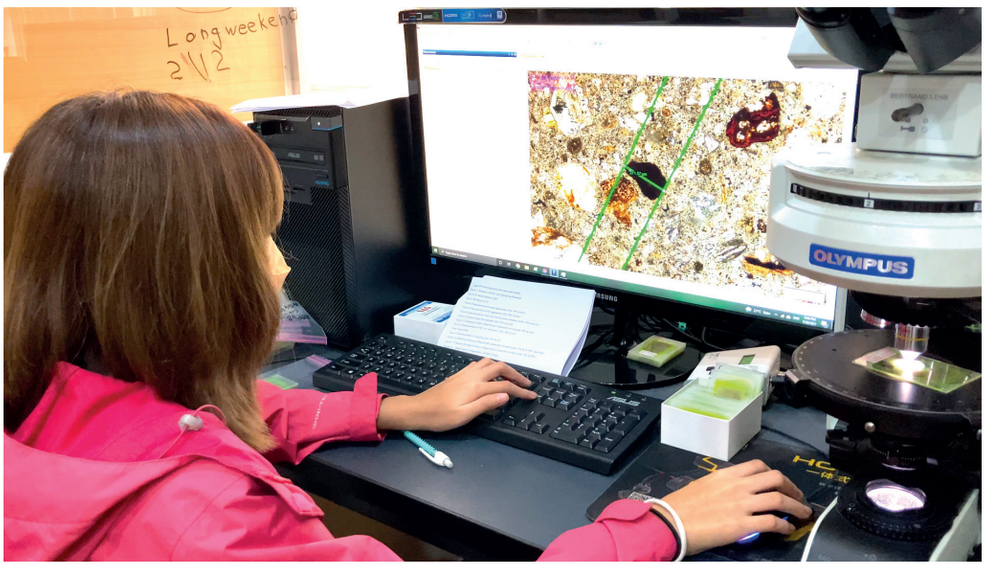
Implementing Agency: Philippine Institute of Volcanology and Seismology (DOST-PHIVOLCS)

According to the International Monetary Fund, the Philippines, barring the pandemic, has been one of the best performing economies in Southeast Asia in recent years. The country enjoys enormous potential due to its available natural and human resources, but this potential has been hampered by outdated and insufficient infrastructure to service the business community and the general public.

Given this sense of urgency, DOST-PCIEERD has been ramping up its S&T initiatives in the construction sector to provide technological interventions that will address common construction problems in the country.

Under the Council's sustainable construction material program, Mr. Kevilino Perez of the University of the Philippines Los Baños Institute of Chemistry (UPLB IC) successfully optimized the use of natural rubbers, used tires, and waste PET bottles as reinforcement additives in asphalt for a durable asphalt paved road.

The 3-in-1 solution was piloted in Laguna and Manila with the infrastructure funding support from the Department of Public Works and Highways – Bureau of Research and Standards.



"This technology serves three purposes, better roads with rubber-reinforced mix, prolong the effects of global warming by recycling plastics, and provide a sustainable and cheaper alternative to regular asphalt," Perez said.

Another study worth looking into under the Innovative Construction Services Program is the concrete petrography application projects of the UP National Institute of Geological Sciences (UPNIGS) and UPLB Institute of Chemistry. Concrete petrography, as a complementary tool, conducted concrete quality assessments of the country's lifeline infrastructures including the raw material used in concrete. It provides an in-depth analysis of the concrete, if it needs repair or if it is at risk of natural calamities.

Think of petrographers as forensic scientists for concrete: armed with modern technologies, petrographers can analyze the present condition of infrastructures built before and in the modern era. Preventive maintenance R&D such as this project could help the government save money on resources and prepare our structures for severe impacts of natural calamities such as earthquakes.

Further, and in relation to the DRR support for the Construction Industry Program, the DOST-Philippine Institute of Volcanology and Seismology (PHILVOLCS) implemented the third phase of their earthquake ground motion study wherein the institution produced a site-response atlas for earthquake-prone areas in identified parts of the country.

Led by Project Leader Dr. Rhommel Grutas, the ATLAS for Pangasinan, Tarlac, Iloilo, Guimaras, and Cauayan, Butuan, and Mati City were turned over to the respective local officials and building engineers to aid them in crafting better comprehensive land use, DRR plans and use the generated data that will increase the seismic resiliency of infrastructures in their locality. Prior to the project, PHIVOLCS was already able to generate and transfer the atlases of Metro Manila in 2015 and Metro Cebu and Metro Davao in 2019.

"I am optimistic that these projects will eventually scale up to cover the whole country given time and investment in these fruitful endeavors," Grutas said.

Creativity in education at the height of the pandemic

Project Title: Technology Innovations for Mathematical Reasoning, Statistical Thinking and Assessment

Project Leader: Dr. Ma. Louise Antonette De Las Peñas

Implementing Agency: Ateneo de Manila University

Project Title: Imahe Labs: An Educational Game for Chemistry in the Senior High School and Junior High School Sectors of Baguio City

Project Leader: Ms. Lovely Jenn Reformado

Implementing Agency: University of the Cordilleras

Project Title: Stunt Science: A Physics Simulator Mobile Game

Project Leader: Mr. Ryan Subong

Implementing Agency: Western Institute of Technology

Project Title: Nurturing STEM Interest Among Filipino Learners Using Minecraft

Project Leader: Dr. Saturnina Nisperos

Implementing Agency: Mariano Marcos State University

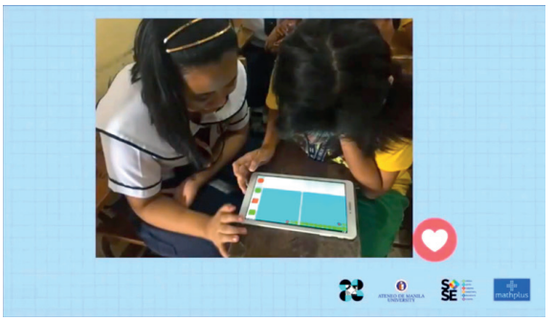
Researchers and scientists in the emerging technology sectors confronted their own set of obstacles, which were exacerbated by the fact that their programs were undertaken during a health crisis. Regardless, the accomplishments and joy earned by expanding their ingenuity, creativity and reach in the field of education through innovation are undeniably commendable.

This is how Dr. Ma. Antonette De las Peñas' project, *"Technology Innovations for Mathematical Reasoning, Statistical Thinking, and Assessment,"* unfolded, with its own bittersweet beginnings, but a wonderful conclusion that exceeded her expectations.

Math has always been a challenging subject, shared by Dr. De las Peñas, and assessments have typically had a low turnout of scores from students and even educators. With the pandemic as a complicated factor, Dr. De las Peñas' team decided to work on a game application that may help students with number awareness while also supporting teachers who wish to use research-based practices in the classroom.

"Schools in Mandaluyong, Quezon City, and Marikina were among the first to use the app, with a total participation rate of 200 percent", she emphasized.

The projected effect, which primarily focuses on a small number of schools to adapt and use, is exceeded by these outcomes.



The construction of Imahe Labs: An Educational Game for Chemistry in the Senior High School and Junior High School Sectors of Baguio City, founded by project leader Lovely Jenn Reformado, is another effort that makes teaching fascinating despite the internet barriers.

Considering chemistry is a laboratory-based topic with science-based activities, it was one of the most challenging subjects to teach. The gaming application for this project is focused on leveraging virtual reality (VR) to allow students to experience and absorb chemical principles while doing experiments in a virtual laboratory from the comfort and safety of their own homes.

"We need to collaborate with other groups of innovative educators to build more games," Reformado said.

She hopes that her project will serve as a springboard for future gaming-related efforts. This will put the Philippines on a map where we can teach, stimulate learning, and engage learners in fun activities all at the same time.

Physics is a difficult topic to teach, and instructors are concerned about the lack of face-to-face connection in the classroom. This inspired Engr. Ryan Subong, to create a mobile app and a project called Stunt Science: A Physics Simulator Mobile Game.

It met most of its goals because students and teachers were able to participate in an easy-to-use program, says Subong. According to their assessment of the application's simulation, secondary school pupils' academic performance in physics subjects has improved considerably.

Dr. Maria Mercedes Rodrigo was also inspired by the problem to act and offer her own project, *"Nurturing STEM Interest Among Filipino Learners Using Minecraft."*

Minecraft is a world-famous "sandbox game" that allows players to create their own experiences. This initiative aims to pique Filipino children's interest in STEM fields by immersing them in exoplanets or different alternative versions of the earth. It takes advantage of the University of Illinois in Urbana-What-If Champaign's Hypothetical Minecraft Implementations (WHIMC) project.

"Students enjoyed, appreciated, and understood the lessons well using Minecraft applications," shared by Dr. Rodrigo and her colleagues.

Another gaming application developed by Dr. Saturnina Nisperos with social studies as a primary subject can be used to demonstrate the ingenuity and originality of Filipino educators. As a result, a project dubbed *"A Game-based Mobile Learning Platform for Social Studies"* was established with the purpose of supplementing Araling Panlipunan subject training for children in Grade 8.

"Educators praised the tool for its user-friendliness and entertaining value," as narrated by Dr. Nisperos.

The pandemic's lessons only served to demonstrate that, our project leaders and even DOST-PCIEERD are working hard to ensure that emerging technologies will significantly aid the situation of our kababayans, particularly our students and teachers, through promising, creative game-based learning applications.

Aiding policymakers in making data-driven decisions

Project Title: PATURO: Platform for Assessment and Tracking of Urbanization-Related Opportunities

Project leader: Dr. Erika Fille Legara

Implementing Agency: Asian Institute of Management (AIM)

In line with Goal 11 of the United Nations Sustainable Development Goals (UN SDGs) to make cities and human settlements inclusive safe, resilient, and sustainable, researchers from the Asian Institute of Management (AIM) successfully created a data hub and a visualization dashboard under the Platform for Assessment and Tracking of Urbanization-Related Opportunities (PATURO) project which aims to become a valuable tool for the country's policymakers.

PATURO is a collaborative work among the City Government of Cauayan, AIM, and the Isabela State University—Cauayan Campus, aimed at formulating a Smart Index that could accurately capture a city's "health" in terms of interactions from a city's people, land, transportation system, and various economic activities.

This 2-year project was supported by the Department of Science and Technology- Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) with a funding amounting to P9.25 million.

According to Dr. Erika Fille Legara, PATURO's project leader, the team already completed formulating the five smart city indices and its supporting platform that would help city policymakers to rapidly assess the current state of their city. This will soon serve as a tool to enrich data-driven decision-making to help make smart decisions when developing policies and strategies.

With the completion of the project, the team had created a "city simulator" described as a "real-world sandbox" consisting of data-driven interacting models representing various aspects of a city—its people, land use, establishments like schools, stores, offices, banks, and transportation network.

"In the scientific front, the development of the Smart Index and its supporting model platform will yield a new understanding of the processes behind the makings of a city – something which continues to confound researcher, policymaker and citizen to the present. The agent-based simulation platform will be useful in helping to determine things that are not within the scope of other types of analyses," Legara emphasized.

She said Cauayan City in Isabela province was the country's pioneer in smart cities and has been recognized for its various smart city initiatives.

"While Cauayan is still a developing city, far from the cities making up the conurbation of the National Capital Region (NCR), it offers ideal ground for testing hypotheses regarding a city's development, and opportunities to avoid missteps made during the development of older, more established ones. Furthermore, it offers opportunities for the formulation of metrics of a smart city's "health" - smart city indices - which are suited for use in developing nations which face their own circumstances and challenges," she said.

She said the platform is a valuable tool for decision support and scenario planning, not just for Cauayan, but also for other cities, both in the Philippines and beyond.

From waste in rice farming to steel coating, the development of ecopaint

Project Title:
Development of Nanosilica-based Anti-corrosion Coating Formulations for Carbon Steel Reinforcement used in Farm Structures

Project Leader:
Dr. Marish Madlangbayan

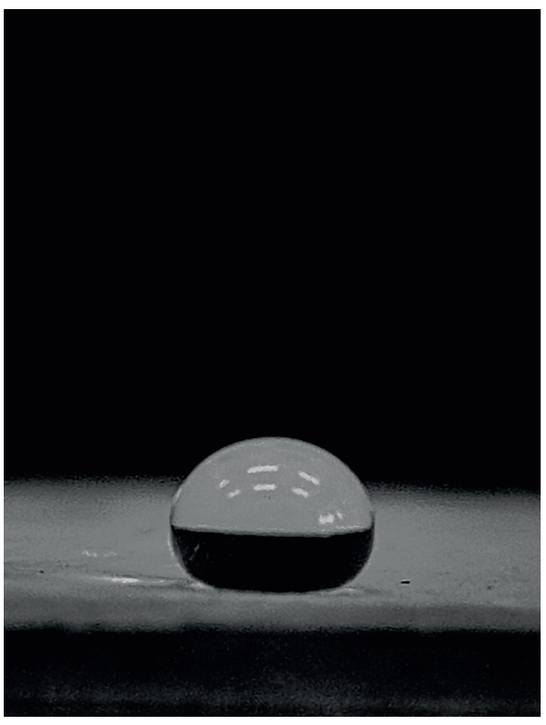
Implementing Agency:
University of the Philippines

For Drs. Engelbert and Milagros Peralta, they are proud of the research they have done to pave the way for innovators like Dr. Marish Madlangbayan to apply their nanosilica research to the coating industry.

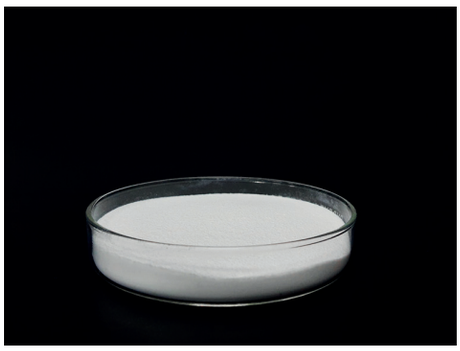
It's been almost a decade since the retired engineering professors from the University of the Philippines Los Baños (UPLB) explored toying with rice hull ash, the waste by-product of rice milling, when they realized that its properties such as friction resistance and tension resilience could be used in various industries.

"The use of nanosilica has been used a lot in the semiconductor industry. Back then when we presented it to potential investors, we were asked how much of the material can we produce, and they were demanding a lot because they were a leader in the industry so that's the time when we realized its potential," Dr. Engelbert said.

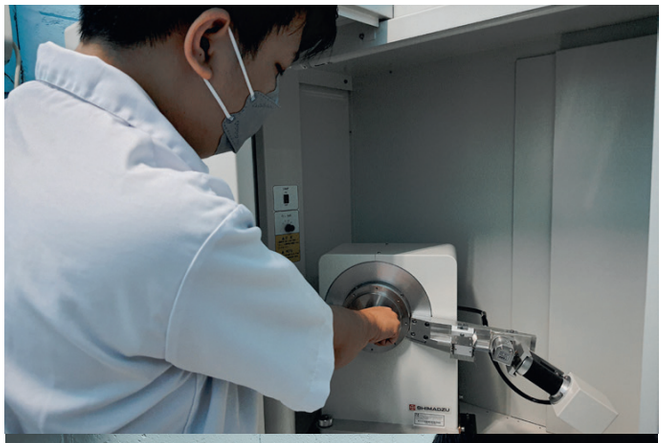
Enter Dr. Madlangbayan, who earned his doctorate of engineering from the Tokyo Institute of Technology and is the Vice-Chancellor for Planning and Development of the UPLB, who then studied the material and applied it in his field of expertise, steel corrosion and concrete durability.



"We developed a promising coating formula which is more environmentally friendly and does not contain lead using the rice hull ash. We have been presenting our findings so we can attract industry partners and some of them were even surprised that the Philippines has the technology already because their partners using the said technology are based in Vietnam," Dr. Madlangbayan said.



He said the project is already at 58% completion and is improving its formulation through various tests to fit industry standards. Right now, they are processing the technology transfer of the University and are working on filing a patent to protect their invention.



"We hope this invention provides a greener solution not only for the steel coating industry but also the construction industry. By using rice waste by-product, which the country is in abundance of, we can provide R&D support to said industries as well as provide an alternative source of income for our farmers."

The wonders of fish by-products

Project Title: Collagen and Gelatin from By-Products of Fish Processing Industry

Project Leader: Ms. Paragas Danila

Implementing Agency: University of the Philippines

Project Title: Collagen and Gelatin from By-Products of Fish Processing Industry

Project Leader: Ms. Paragas Danila

Implementing Agency: Central Luzon State University

Project Title: Fish Oil, Proteases, and Protein Hydrolysate from By-Products of Fish Processing

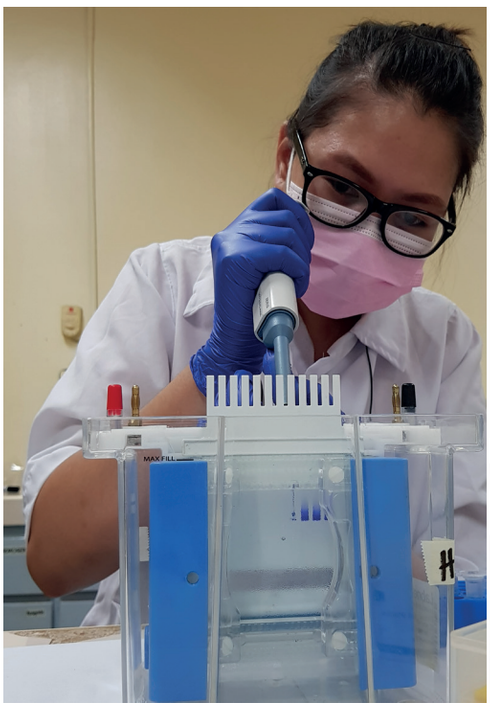
Project Leader: Dr. Cesar Ortinero

Implementing Agency: Central Luzon State University

There was a shift in the tide in the country's fish industry from 2018 to 2019, when production increased by around 5% compared to prior years. This led to a new waste-to-business endeavor in the form of fish waste products. Fish waste initiatives led by Central Luzon University experts Dr. Rosalie Rafael, Dr. Danila Paragas, and Dr. Cesar Ortinero have demonstrated this. They produced two projects that highlight Filipino inventiveness, entitled Collagen and Gelatin from By-Products of the Fish Processing Industry and Fish Oil, Proteases, and Protein Hydrolysate from By-Products of the Fish Processing Industry.

"The initiative has a zero-waste management since it intends to transform by-products regarded as trash by the fish processing industry into collagen and gelatin, which are considered value-added intermediate products for food application," narrated by Dr. Rafael.

According to Dr. Paragas and Dr. Rafael, they had a eureka moment at the end of the experiment when they discovered that the fish by-products did, in fact, form gelatin and collagen. Later, it was upgraded to a high-end commodity.



With his project, Dr. Ortinero learned about the importance of involving potential industry partners during the conceptualization stage. *"At first, we did not think about our industry users, but PCIEERD reminded us that after producing our own goods, there is a prospect of expansion and acceptance from other firms."*

From the by-products of milkfish, sardine, and mackerel processing, Dr. Ortinero and his colleagues were able to extract fish oil and proteases and produce protein hydrolysates.

The products they have developed through PCIEERD's intervention may eventually be proven useful by the food sector and may have a potential huge market in the local and global scene.

Fish by-products are also considered a significant product in Mr. Adrian Perdio's project "From Pest to a Valued Commodity: Black-Chin Tilapia for the Development of Surimi-based Products."

The project's goal is to develop a post-harvest processing procedure for a low-value commodity like the black chin tilapia that is considered a pest by Bataan fish farm owners.

"Our beneficiaries from Samahan ng Kababaihang Nagkakaisa Tungo sa Kaunlaran sa Pulo and Orani Peninsula Producer's Cooperative are mostly low-income housewives from the beach barangays of Bataan," Perdio explained. "They were ecstatic to be able to participate, and they gradually learned from the training sessions we held."

With the success of the project, Mr. Perdio thinks that in the future, some local fish-based enterprises or entities would be willing to go beyond partnerships to provide broader livelihood possibilities and vocational mobility to their target beneficiaries.

Raising the bar in VCO production

Project Title: Upgrading the pNS for Virgin Coconut Oil (VCO) and the Philippine VCO Industry

Project Leader:
Dr. Fabian Dayrit

Implementing Agencies:
Ateneo de Manila University
University of the Philippines

Cooperating Agency:
Philippine Coconut Authority, Virgin Coconut Oil Producers, and Traders Assocationn of the Philippines

With the renewed public interest in virgin coconut oil (VCO) as studies showed that it provides relief from COVID-19, the Philippines' VCO industry needs an upgrade to catch up with growing demands.

"The VCO trend in the world actually started in the Philippines around 2000 and the Philippines is still the leading VCO producer in terms of volume, but not in terms of quality," shared Program Leader Dr. Fabian Dayrit.

Hoping to raise the bar in VCO production even before the pandemic started, the Department of Science and Technology-Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) supported a research program that aims to upgrade the Philippine National Standard (PNS) for the VCO industry. The program is led by Dayrit, with fellow scientists and industry experts Dr. Crisanto Lopez, Dr. Casiana Blanca Villarino, and Dr. Erwin Enriquez.

"The continued success of VCO in both the international and domestic markets depend critically on quality. The principal motivation of this research program is to improve the quality of Philippine VCO and help the Philippine VCO producers upgrade their processes," Dayrit added.

The VCO Program is composed of five projects that reviewed the applicability of current standards and limits, determined tests to detect adulteration, measured microbiological parameters of production, assessed the production's Good Manufacturing Practice (GMP) and Hazard Analysis Critical Control Point (HACCP), and studied VCO stability.

They also engaged with seven VCO producers to cover all the three major extraction processes.The research results have catapulted the team to successfully prepare and propose the revised PNS for direct human consumption and the new PNS for cosmetic use.

To date, the VCO Program team is finalizing the standards with the PNS technical committee, comprising of experts from the Virgin Coconut Oil Producers and Traders Association of the Philippines (VCOP), United Coconut Association of the Philippines, Inc. (UCAP), Organix Solutions, Peterpaul Philippines, Ateneo de Manila University (AdMU), DOST Region IV-A, DOST-Food and Nutrition Research Institute (FNRI), DOST-Industrial Technology Development Institute (ITDI), Food and Drug Administration (FDA), Philippine Coconut Authority (PCA), and the Department of Trade and Industry-Export Marketing Bureau (DTI-EMB).

Once done, it will pass through rigorous evaluations from FDA, then the public. After revising it based on the public's recommendations, FDA will review it again. When approved, it will be endorsed to DTI-Bureau of Philippine Standards (BPS) and implemented as the official PNS for VCO production.

As the global VCO market is forecasted to be worth $3.69 billion by 2028 with a CAGR of 7.3% according to Fortune Business Insights' report that profiled key players including Philippine producers, the VCO Program is envisioned to contribute to this and pose the country to remain as the top exporter in the world.

2021

COMPLETED PROJECTS

Project Name	Sector	Lead Project Manager	Project Leader	Implementing Agency/Institution
iTrashBin (Intelligent Trash Bin) Internet-of-Things Trash Bin for Quarantine and Isolation Facilities	Human Resource Development	Ederlyn Rogelio	Don King Evangelista	Navotas National Science Highschool
Proton-Exchange Membrane (PEM) Fuel Cell Using Electrode Processed from Kaong Waste Product	Human Resource Development	Ederlyn Rogelio	Sheryl Fenol	Cavite State University
SPHERE: An Ultrawideband Technology based Innovation for Search and Rescue Operations in the Philippines	Human Resource Development	Ederlyn Rogelio	Marvin Norona	MAPUA UNIVERSITY
PROJECT LINGAP LANGHAP: Low-cost 3D Printed Air Purifier System using Agricultural Waste- Based Activated Carbon Filter	Human Resource Development	Ederlyn Rogelio	Joel Bautista	Philippine Science Highschool - Central Luzon Campus
LaBioRem: Landfill Bioremediation through Biodegradative activities of Pleurotus ostreatus (Oyster Mushroom) to High Density Polyethylene (HDPE) and other biodegradable polymers	Human Resource Development	Ederlyn Rogelio	Analiza Molina	Angeles University Foundation Integrated School
HEIRIT: Establishment of DOST-BulSU BARAS TBI (Business Assistance for Research Acceleration and Sustainability Technology Business Incubator)	Technology Transfer & Commercialization	Al Beato	Dennis Dela Cruz	Bulacan State University
FASTRAC: MAPX: Manage Assets and Properties and Map for Visualization	Technology Transfer & Commercialization	Al Beato	Rolyn Daguil	Caraga State University (CSU)
CRADLE: Enhancement and Market Validation of Plasma Enhanced Chemical Vapor Deposition industrial Prototype for Nitride-Based Coatings	Technology Transfer & Commercialization	Al Beato	Magdaleno Vasquez Jr.	University of the Philippines-Diliman
HEIRIT: ESTABLISHMENT OF DOST-SAMAR STATE UNIVERSITY TECHNOLOGY BUSINESS INCUBATOR	Technology Transfer & Commercialization	Al Beato	Vivian Moya	Samar State University
Enhancing Operational Capability of Palawan International Technology Business Incubator (PITBI)	Technology Transfer & Commercialization	Al Beato	Evangeline Tapar	Palawan State University
TBI 4.0: Co-incubation Program between CDO b.i.t.e.s. and and Spring Valley	Technology Transfer & Commercialization	Al Beato	Rhea Suzette Haguisan	University of Science and Technology of Southern Philippines
OPTIMIZATION OF VIRTUAL REALITY KIT (VR KIT) FOR NEW MEDIA TECHNOLOGY AND COMMERCIAL COMPETITIVENESS	Technology Transfer & Commercialization	Al Beato	Ryan Tan Yu	Mataverse Inc.
HEIRIT: Establishment of the DOST-TUPV HIVE (Hub for Innovation and Value Engineering)	Technology Transfer & Commercialization	Christian Zamora	Jovel Young	Technological University of the Philippines - Visayas
IMPACT: Enhancement of Intellectual Property and Technology Transfer Processes in MSU-IIT	Technology Transfer & Commercialization	Christian Zamora	Stephen C. Fajardo	Mindanao State University - Iligan Institute of Technology (MSU - IIT)
HEIRIT - Establishment of the DOST.TIP Technopreneurship and Innovation Center	Technology Transfer & Commercialization	Daniel Malapitan	Shearyl Arenas	Technological Institute of the Philippines
Operationalization of the Innovations for Filipinos Working Distantly from the Philippines (iFWD PH) Program	Technology Transfer & Commercialization	Francis July Rivera	Director Jose Patalinjug	Caraga State University
TBI 4.0: Evolution of UPScale from Local to Global Incubation	Technology Transfer & Commercialization	Jejomar Carlos	Luis Sison	University of the Philippines-Diliman
TBI 4.0: Elevating the Capacity & Services of TBIs Towards 4th Generation Incubator's Facilities	Technology Transfer & Commercialization	Jejomar Carlos	Katrina Rausa Chan	QBO Innovation Hub (IdeaSpace Foundation, Inc.)
Support to the Commercialization of 500 DOST Generated Technologies and Strengthening the Country's Intellectual Properly and Technology Portfolios (Phase 3)	Technology Transfer & Commercialization	Jejomar Carlos	Edgar Garcia	University of the Philippines-Diliman
MICAB CAB HAILING BIG DATA ANALYTICS ENGINE	Technology Transfer & Commercialization	Jejomar Carlos	Kenneth Joseph Von Baylosis	InfoDynamlcs Technologies
HEIRIT Establishment of the DOST-CITU TBI: Wildcat Innovation Labs	Technology Transfer & Commercialization	Marivic Oquialda	Ralph Laviste	Cebu Institute Technology - University
2017-2019 DOST Technology Transfer Day (TTD)	Technology Transfer & Commercialization	Marivic Oquialda	Engr. Edgar I. Garcia	Technology Application and Promotion Institute (TAPI)
HEIRIT: Support for the Establishment of TBI in Holy Angel University (HAU)	Technology Transfer & Commercialization	Marivic Oquialda	Melani Cabrera	Holy Angel University - Angeles City, Pampanga
Testing, Calibration, and Fabrication of NeuronVent System	Technology Transfer & Commercialization	Norman Jimenez	Edwin Calilung	Neuronmek Corp.
Pilot-Testing and Deployment of a Post-Community Quarantine (CQ) Health Monitoring and Contact-Tracing Online System for the IT-BPM Sector	Technology Transfer & Commercialization	Ryan Torrico	Exec. Dir. Rowen Gelonga	DOST Regional Office No. VI
TBI 4.0: DOST-S.I.B.O.L. Labs: Startup Innovation and Business Opportunity Linkage Labs (A collaboration between UC Berkeley Sutardja Center for Entrepreneurship and Technology and UP Los Banos Technology Transfer and Business Development Office)	Technology Transfer & Commercialization	Ryan Torrico	Glenn Baticados	University of the Philippines-Los Baños
TBI 4.0: Co-incubation Program between CDO b.i.t.e.s. and and Spring Valley	Technology Transfer & Commercialization	Al Beato	Rhea Suzette Haguisan	University of Science and Technology of Southern Philippines

Project Name	Sector	Lead Project Manager	Project Leader	Implementing Agency/Institution
Coastal Sea Level Rise in the Philippines (CSLR)	Space Technology Applications	Ariane Jaraplasan	Rosalie Reyes	University of the Philippines Diliman
Center for Astronomy Research and Development: Astronomical Near-Earth Observation Light Pollution (ANEO-LiPo) Program	Space Technology Applications	Ariane Jaraplasan	RYAN MANUEL GUIDO	Rizal Technological University
Environmental, Health and Safety Research in the Risk Assessment of Nanomaterials (Phase 1)	Nanotechnology	Desiree Vera	Blessie Basilia	Industrial and Technology Development Institute (ITDI)
A Mobile-Web Bidirectional Neural Machine Translation System for Filipino and Cebuano	Information and Communications Technology	Dianne Remae San Pedro	Kristine Mae Adlaon	University of the Immaculate Conception
Establishing an Environment-Friendly Chromium Plating Process using New Generation Ionic Liquids	Material Science	Marietta Valdez-Liu / Kristene Mendoza	Eden May Dela Pena	UPD
Electrochemical and Quantum Mechanical Investigation of Various Small Molecule Organic Compounds as Corrosion Inhibitors in Mild Steel	Material Science	Marietta Valdez-Liu / Kristene Mendoza	Dr. Francisco Franco Jr.	De La Salle University (DLSU)
Design, Development, and Testing of 10 units of Low-cost Ventilators based on DOST-PCIEERD specifications	Information and Communications Technology	May-Rose Parinas	Dr. May-Rose C. Imperial	Don Bosco Technical College, Inc.
Project 2. Electronics Product Inclusive Innovation Center (EPIIC)	Electronics Technology	May-Rose Parinas	Engr. Peter Antonio Banzon	Advanced Science and Technology Institute
Project 1. Electronics Product Development Center Upgrade and Operation	Electronics Technology	May-Rose Parinas	Earl Lawrence Qua	EIAPI
Establishment of a niche center on environmental informatics in Central Visayas	Space Technology Applications	Roven Tumaneng	Mary Joyce Flores	University of the Philippines - Cebu
Technology Innovations for Mathematical Reasoning, Statistical Thinking, and Assessment	Creative Industry	Jayson Nuval	Dr. Ma. Louise Antonette N. De Las Peñas	Ateneo de Manila University
Stunt Science: A Physics Simulator Mobile Game	Creative Industry	Jayson Nuval	Engr. Ryan A. Subong	Western Institute of Technology
A Game-based Mobile Learning Platform for Social Studies	Creative Industry	Jayson Nuval	Dr. Saturnina F. Nisperos	Mariano Marcos State University
Haynayan AR: An Augmented Reality-Based Lesson for the Improvement of Learning Achievement in Cell Biology for the STEM Curriculum	Creative Industry	Jayson Nuval	Mr. Joel T. Bautista	Philippine Science High School System-Office of the Executive Director
iJuanderer: An Augmented Reality-based Gamified Local Tourism and Cultural Heritage Promotion and Preservation	Creative Industry	Jayson Nuval	Mr. Joel T. Bautista	Philippine Science High School System-Office of the Executive Director
Development of Error Resilient Joint Source-Channel Video Transmission System for High Efficiency Video Coding (HEVC) Standards over Wireless Channel	Information and Communications Technology	Jayson Nuval	Dr. Angelo Dela Cruz	University of Sto. Tomas
PATURO: Platform for Assessment and Tracking of Urbanization-Related Opportunities	Smart Cities	May-Rose Parinas/ Karen Agcaoili	Dr. Erika Fille Legara	Asian Institute of Management
Helmet-Integrated Medium-Range IR Thermal Scanner	STRAP	May-Rose Parinas/ Karen Agcaoili	Dr. Romulo Olalia	San Carlos College

Project Name	Sector	Lead Project Manager	Project Leader	Implementing Agency/Institution
ZEOSKIN: A Green Indoor Air Filter	Environment	Liz Ahren Penaflor	Melissa May Boado	Saint Louis University
Development of a Compact Wastewater Treatment System for Restaurants discharging to Manila Bay Area	Environment	Marybhel Manaois	Reynaldo Esguerra	Industrial and Technology Development Institute (ITDI)
FIELD TESTING OF MODULAR ECO-FRIENDLY DOMESTIC WASTE WATER (MEDoWW) MANAGEMENT FOR SMEs: Lodging Inns, Transient Housetels, Budget-Hotels and Commercial Establishments	Environment	Marybhel Manaois	Merlinda Palencia	Industrial and Technology Development Institute (ITDI)
MECO -TECO: Development of Titanium Dioxide Films and its Derivatives for Semiconductor Mediated Photocatalytic Treatment of Water	Environment	Marybhel Manaois	Magdaleno Vasquez Jr.	UPD-DMMME
Scoping Study and Survey to Identify Key Environmental Problems of Industries in Valenzuela City	Environment	Marybhel Manaois	Abigail Cid-Andres	Polytechnic University of the Philippines
Development of Emulsified Meat Products (Sausage, Nuggets, and Burgers)	Food	Aleah Orendain	Michelle Evaristo	Industrial and Technology Development Institute (ITDI)
Establishment of Halal Assurance System for Muslim Delicacies and Processing Techniques	Food	Aleah Orendain	Eufemia Dampil	Sultan Kudarat State University
Development of Regional Halal Native Delicacies	Food	Aleah Orendain	Dr. Rimma Hassan	Mindanao Autonomous College Foundation, Inc. (MACFI)
Curriculum Development and Offering on Halal Science and Scholarship for SUC Faculty on Halal Science	Food	Aleah Orendain	Dr. Emma Sales	University of Southern Mindanao (USM)
Training Needs Assessment and Development and Deployment of Training Modules on Halal	Food	Aleah Orendain	Anthony Sales	DOST Regional Office No. XI
Establishment of Halal Assurance System for Processing Selected Banan Products (Banana Chips, Banana Catsup, and Frozen "Saba" Banana)	Food	Aleah Orendain	Maria Elsa Falco	Industrial Technology Development Institute
Development of Chicken Egg White Powder and Granules from Low Value Edible Shell Eggs	Food	Ana Mithuzela Espigol	Dr. Maria Patricia V. Azanza	University of the Philippines (UP) - Diliman
From Pest to Valued Commodity: Black-Chin Tilapia (Sarotherodon melanotheron) for the Development of Surimi-Based Products Processing	Food	Ana Mithuzela Espigol	Mr. Adrian C. Perdio	Bataan Peninsula State University
Development of Grading System for Adoption of Food Establishments in the Philippines	Food	Chelsea Ugay	Claire Malibiran	Food and Nutrition Research and Development (FNRI)
Assessing the Contribution of Food Banking Systems in Addressing Food Security	Food	Chelsea Ugay	Mr. Jose Mariano Fleras	Rise Against Hunger Philippines
Rapid Market Appraisal for Underutilized Fruits (Guava, Soursop, Sugar Apple, and Tamarind) in the Philippines	Food	Tarhata Mariano	Ernesto O. Brown	Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD)
Project BUHAWI (Automated Gun Mount for Browning 0.50 Caliber Machine Gun, M2, Heavy Barrel)	Metals and Engineering	Mark John Ratio	Engr. Jonathan Puerto	Metals Industry Research and Development Institute (MIRDC)
Metrology and PDEA: Correct Quantity, Right Decision	Metals and Engineering	Stephanie David	Kiveen P. Suycano	Industrial and Technology Development Institute (ITDI)
CRADLE: Design and Development of a Mechanical Garlic and Cashew Chipper	Metals and Engineering	Stephanie David	Engr. Melanie Cabrera	Holy Angel University
SAGES: Systems Approach for Greener, Eco-efficient and Sustainable mineral resource management	Mining and Minerals	Airess Casimero	Arnel Bas Beltran	De La Salle University
Developing a Sustainable pathway for the Philippine Nickel sector (SusNi)	Mining and Minerals	Airess Casimero	Romell Alope Seronay	Caraga State University
Project 1: Utilization of Nickel Laterite Ore rock (low grade) for various applications: Acid Mine Drainage treatment and Carbon Sequestration	Mining and Minerals	Airess Casimero	Aileen Orbecido	De La Salle University (DLSU)
Project 2. Recycling and reprocessing of siltation sediments from selected nickel laterite mining areas in the Philippines as raw materials for the synthesis of iron-based novel adsorbents	Mining and Minerals	Airess Casimero	Einstine Opiso	Central Mindanao University
Project 3. Recovery of nanominerals from silt for various ceramic applications	Mining and Minerals	Airess Casimero	Ivyleen Arugay	Mindanao State University - Iligan Institute of Technology
Project 4. Recycling of silt and spent residue from reprocessing as raw materials for geopolymer composite	Mining and Minerals	Airess Casimero	Michael Promentilla	De La Salle University (DLSU)
Characterization and Resource Estimation of Valuable Rare Earth Elements (REEs) and Natural Radionuclides in the Philippine Coal and Feldspar Deposits	Mining and Minerals	Airess Casimero	Cris Reven Gibaga	Philippine Nuclear Research Institute (PNRI)
PROMT: Philippines Remediation of Mine Tailings	Mining and Minerals	Katrina B. Landicho	Carlo Abundo Arcilla	Philippine Nuclear Research Institute (PNRI)
A Framework for the Sustainable Development of Marine Mineral Resources in the Philippines.	Mining and Minerals	Katrina Landicho	Teodorico Sandoval	DENR-MGB
Extraction of Radionuclides,, Rare Earths,, and Other Valuable Industrial Elements from Phosphogypsum Tailings: Phase I	Mining and Minerals	Katrina Landicho	Jennyvi Ramirez	Philippine Nuclear Research Institute (PNRI)

Application of Radiation Techniques in the Geochemical Characterization of Cobalt and other Valuable Metals in the Selected Metallic Deposits	Mining and Minerals	Katrina Landicho	Cris Reven Gibaga	Philippine Nuclear Research Institute (PNRI)
Utilization of Spent Tea Leaves and Tobacco Dust as Additives for Plywood Adhesive	Process	Bianca Ignacio	Juanito Jimenez	Forest Products Research Development Institute (FPRDI)
VCO Project 1. Physico-chemical Factors which Affect the Quality of VCO	Process	Bianca Ignacio	Fabian Dayrit	Ateneo de Manila University (ADMU)
VCO Project 3. Investigation of Factors Affecting the Sensory Properties and Acceptability of VCO	Process	Bianca Ignacio	Casiana Blanca Villarino	College of Home Economics, UP Diliman
Promotion of Modular Multi-Industry Innovation Center (MMIC) under the Modular Multi-Industry Innovation Center for Oils, Blends and Sauces Project	Process	Kristina Paula Anacleto	Dr. Annabelle V. Briones	Industrial and Technology Development Institute (ITDI)
Development of Inkjet CMYK Digital Printing Inks from Philippine Natural Dyes	Process	Mary Grace Buenavides	Zaila Payag	Philippine Textile Research Institute (PTRI)
Polyols Project 2. Development of Polyurethane-based Packing Materials and Anti-corrosive Coatings from Vegetable Oil	Process	Neil Allen Lalusin	Arnold Alguno	Mindanao State University - Iligan Institute of Technology (MSU - IIT)
Polyols Project 1. Production of Bio-based Polyols from Lignocellulosic Biomass	Process	Neil Allen Lalusin	Dr. Arnold Lubguban	Mindanao State University - Iligan Institute of Technology (MSU - IIT)
Value-Added Product from Fruit Processing Wastes: Acetic Acid for Potential Industrial Application	Process	Neil Allen Lalusin	Dominica Dacera	UP Mindanao
Polyhydroxyalkanoate (PHA) Production from Agricultural Wastes	Process	Neil Allen Lalusin	Jey-R Ventura	University of the Philippines - Los Banos (UPLB)

Project Name	Sector	Lead Project Manager	Project Leader	Implementing Agency/Institution
Project 2 : GEOLOGICAL, CHEMICAL AND PHYSICAL EVALUATION OF CONCRETE RAW MATERIALS USED IN CRITICAL PHILIPPINE INFRASTRUCTURES	Construction	Carluz Bautista	Marlon Conato	University of the Philippines - National Institute of Geological Sciences (UP NIGS)
Project 1: CONCRETE PETROGRAPHY AS A QUALITY ASSESSMENT TOOL OF HARDENED CONCRETE FROM LIFELINE STRUCTURES IN THE PHILIPPINES	Construction	Carluz Bautista	Richard Ybanez	University of the Philippines - National Institute of Geological Sciences (UP NIGS)
Specific Earthquake Ground-Motion Levels to Help Increase the Seismic Resiliency of Government Infrastructures, Residential and Medium-to-High Rise Buildings in Pangasinan, Tarlac, Metro Iloilo-Guimaras, Cauayan City, Butuan City and Mati City	Disaster Mitigation	Carluz Bautista	Rhommel Grutas	PHIVOLCS
The Use of Radon Technique in Mapping Geological Faults in the Philippines	Disaster Mitigation	Johanna Marie Gonzales	CARLO ARCILLA	Philippine Nuclear Research Institute (PNRI)
Analysis of the influence of sea surface temperature representation in downscaled regional climate using the SEACLID/CORDEX-Southeast Asia simulation	Disaster Mitigation	Mary Catherine Elizabeth Baliguas	Gemma Teresa Narisma	Manila Observatory
Multitemporal and Extremes Analysis of Modeled Climatology over the Philippines in the SEA Cordex Domain	Disaster Mitigation	Mary Catherine Elizabeth Baliguas	Gemma Teresa Narisma	Manila Observatory
Detecting Tropical Cyclones in a Downscaled Regional Climate Model for CORDEX-SEA	Disaster Mitigation	Mary Catherine Elizabeth Baliguas	Faye Abigail Cruz	Manila Observatory
Development of a hybrid trimaran fast craft passenger cargo vessel using multi engine and alternative energy source from ocean waves	Transportation	Rachel Habana	Yasmin Tirol	Aklan State University
Project 2 : EmoCION: Electric Mobility and Charing Infrastructure Operating as a Network	Transportation	Rachel Habana	XLew Andrew Tria	UPD-EEEI
Project 1 : AdVICE: Ad-hoc Vehicle Infrastructure Cooperative Environment	Transportation	Rachel Habana	Jethro Limjoco	UPD-EEEI
Project 3. E-trike Deployment and Utilization Study	Transportation	Rachel Habana	Arthur Ibanez	Cagayan State University
Optimal Locations and Allocation of Personnel (OLAP) at Checkpoints during the Coronavirus Lockdown in Metro Manila and other Regions	Transportation	Rachel Habana	Alexis Fillone	De La Salle University (DLSU)
Bayan Ko-ops	Transportation	Rachel Habana	Dr. Eugene Rex Jalao	UP-National Engineering Center (NEC)
Development of a 23-seater Electric Jeepney (E-Jeepney)	Transportation	Rachel Habana	Edmund Arraga	Electric Vehicle Association of the Philippines (EVAP)
Severe Wind Hazard Mapping for the Philippines and Cebu City	Disaster Mitigation	Rowena Gabua	Ma. Cecilia Monteverde	Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)
Exposure Data Development and Severe Wind Risk Assessment for Cebu City	Disaster Mitigation	Rowena Gabua	Thelma Cinco	Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)
[Philippines] Catchment susceptibility to hydrometeorological events: sediment flux and geomorphic change as drivers of flood risk in the Philippines	Disaster Mitigation	Rowena Gabua	Carlos Primo David	University of the Philippines (UP)
Geospatial Information Management & Analysis Project for Hazards & Risk Assessment in the Philippines (GeoriskPH)	Disaster Mitigation	Rowena Gabua	Mabelline Cahulogan	Philippine Institute of Volcanology and Seismology
Enhanced Severe Wind Vulnerability Curves of Key Building Types in the Philippines	Disaster Mitigation	Rowena Gabua	Timothy John Acosta	UP Institute of Civil Engineering
Investigation and numerical modeling of Philippine tsunamis based on historical, geomorphological and geological evidence of past earthquakes	Disaster Mitigation	Mary Catherine Elizabeth Baliguas	Dr. Noelynna G. Ramos	University of the Philippines - National Institute of Geological Sciences (UP NIGS)
Providing High Resolution (5km) Climate Change Projections in the Philippines using Weather Research and Forecasting (WRF) Model	Disaster Mitigation	Mary Catherine Elizabeth Baliguas	Thelma Cinco	Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)

Institution Development Program

The establishment of cutting-edge laboratories and facilities arms Filipinos in STEM to discover more breakthroughs and develop innovations. The Institution Development Program (IDP) strengthens the capability of institutions to pursue research by providing support for equipment acquisition and upgrading of laboratory resources.

DOST-PCIEERD is working towards establishing at least 1 IDP in each region. From 2015-2021, the project has built and upgraded 26 laboratories all over the country, amounting to a total investment of P140 million.

These laboratories now serve as a playground of ideas to generate new products and world-class research projects working hand in hand with the industry, business community, local government units (LGUs), and various government and non-government institutions.

List of Grantees

Project Title
Establishment of AI Research Center for Community Development (AIRCoDE)

Brief Description
This project aims to establish an AI Research Laboratory to strengthen the research capabilities of AI enthusiasts, faculty, and students in the field of Artificial Intelligence, and to conduct three (3) AI research studies, outputs, and publications.

Project Leader
Mr. Joseph Jessie Onate
Instructor/Research Publication Management Coordinator

Implementing Agency
Camarines Sur Polytechnic College - Main

Project Title
Establishment of ParSU MTL (Microbiology Testing Laboratory)

Brief Description
The establishment of ParSU-MTL will be useful research activities that need special equipment pertaining with analysis of food samples. The facility can also offer the facilities services to the community.

Project Leader
Ms. Liezel Del C. Atole
College Instructor

Implementing Agency
Partido State University - Goa

Project Title
Establishment of Mindanao Natural (MinNa) Language Processing (LProc) Research and Development Laboratory

Brief Description
This Laboratory will collect, digitize, store, and disseminate language resources, and develop and create task-oriented models, tools, and applications on Mindanaoan languages. It will also focus on the development of NLP applications, including the crafting of policy recommendations for Natural Language Processing studies.

Project Leader
Ms. Kristine Mae M. Adlaon
Assistant Professor

Implementing Agency
University of the Immaculate Conception

Project Title
Establishment of Recycled Concrete Aggregates Laboratory (ReCoLab)

Brief Description
The project aims to establish a Recycled Concrete Laboratory (ReCoLab) complementary to the existing laboratories to increase the research capability of the CE Faculty and other allied units, and allow the development of course offerings for the Civil Engineering Program.

Project Leader
Engr. Khim Cathleen R. Saddi
Chairperson, Civil Engineering Department

Implementing Agency
Ateneo de Naga University

Project Title
Towards the Establishment of the Pavement Research
(PAVER) Laboratory in Jose Rizal Memorial State University

Brief Description
The PAVER Laboratory will be the "Center of Pavement Research" in Region IX which will serve as the flagship and pioneer pavement engineering laboratory of the South dedicated inmixture design research, pavement performance evaluation, and emerging technologies.

Project Leader
Dr. Elias Cabilin
Dean, College of Engineering
Jose Rizal Memorial State University

Implementing Agency
Camarines Sur Polytechnic College - Main

Project Title
Establishment of IoT Research Laboratory and Training Center

Brief Description
This laboratory will serve as a venue for research and development and training focusing on Internet of Things (IoT).

Project Leader
Engr. Mariciel Marcial - Teogangco
Dean, College of Engineering

Implementing Agency
University of the Perpetual Help System
DALTA – Molino Campus

Project Title
Establishment of a Microgrid and Sustainable Energy Laboratory in Silliman University

Brief Description
This facility will aid the Silliman University in achieving its vision to be one of the institutes in Central Visayas R&D in sustainable energy. It will cater to activities involving microgrids that will focus on understanding the design and analysis to make them "smarter".

Project Leader
Dr. Maria Lorena L. Tuballa
Dean, College of Engineering

Implementing Agency
Silliman University

Project Title
Establishment of Drilling Fluids Research and Innovation Laboratory

Brief Description
This Laboratory aims to build the capacity of the Palawan State University-Department of Petroleum Engineering in doing R&D and developing programs/projects.

Project Leader
Engr. Jonathan Jared J. Ignacio
Instructor

Implementing Agency
Palawan State University

Project Title
Establishment and Operationalization of Integrated Research and Development Laboratory (IRDL)

Brief Description
The IRD Laboratory is envisioned to be the first testing laboratory in the province of Antique with advanced equipment and testing capabilities in the field of food, nutrition, and environmental science, and will serve as a hub for knowledge generation, transfer of technical skills, and creation of patentable products and processes.

Project Leader
Ms. Jessebel V. Gadot
Assistant Professor I

Implementing Agency
University of Antique

Project Title
Establishment of PnC DANGAL for Smart Warehouse Inventory Management System

Brief Description
This proposal aims to build and strengthen engineering and computing research in Pamantasan ng Cabuyao (PnC) for the enhancement of technology development leading to Industry 4.0 and facilitates flexible networks of collaboration and resource sharing with the manufacturing industries in the Province of Laguna.

Project Leader
Engr. Mary Grace Beaño
Assistant Professor IV

Implementing Agency
Pamantasan ng Cabuyao

Project Title
PERPSAT1: UPHSD Amateur Satellite Ground Station Development

Brief Description
This facility aims to be used by students and faculty members to communicate with artificial satellites in space using specific frequencies to set up successful connection

Project Leader
Engr. Lorena Ilagan
Dean, College of Engineering

Implementing Agency
University of Perpetual Help System Dalta-Las Pinas

Human Resource Development

It is apparent that the most important resource towards the achievement of progress is human resources. This is why DOST-PCIEERD has been upskilling Filipinos through its Human Resource Development Program (HRDP). It is a 12-component program that has successfully capacitated 225 Filipinos to date.

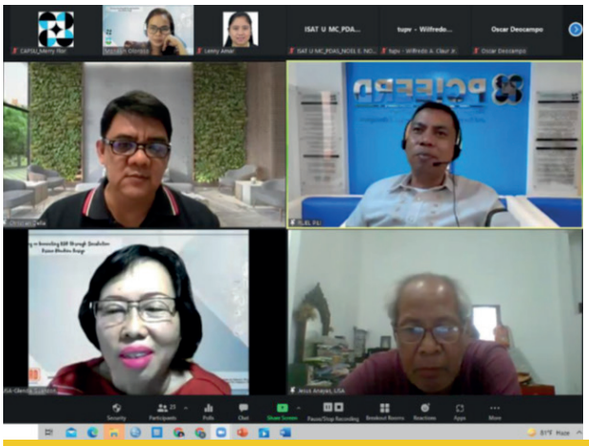
The HRDP was crafted to enhance the Philippines' capability in R&D and ther related skills to meet the present and future human resource requirements in the industry, energy, and emerging technology sectors.

HRDP Summary

Since 2015 to 2021, the HRDP has provided assistance to 434 grantees for its different components: Research Attachment, Visiting Expert, Facilities and Laboratory Access Grant (FLAG), Presentation of research results in conferences, and publication of scientific papers in S&T journals.
The program also introduced three new components in 2021 which were: RIEETOOL, PROSPPER, and Balik Saliksik.

Components	2021 Grantees
Research Attachment	1
FLAG	1
RIEETOOL	4
PROSPPER	2
Balik Saliksik	1
Support in the Conduct of Seminars/Conferences	5

Under the HRDP, the Council also supports the conduct of seminars and conferences–five of which were held in 2021:



This activity aimed to enhance and upgrade R&D projects by capacitating researchers particularly on the development of machines that will improve efficiency and effectiveness of processes. It also provided a platform for networking among researchers in Capiz State University and members of the WVCIEERD consortia. Moreover, the activity provided opportunity for researchers to test out different research approach and methodology in machine design which may result in cost reductions of these R&Ds.

Activity Title: Innovating R&D through Simulation Driven Machine Design
Date/s: Dec 27-30, 2021 and Jan 10-13, 2022
No. of Participants: Academe, 30-50

The Regional Geoscience Congress of Southeast Asia (GEOSEA) 2021 aimed at providing an online venue for participants to share and discuss their current research works from various fields of geosciences including geohazards and tectonics, energy, and resources, among others. It also served as a forum for knowledge dissemination among geoscientists, policy makers, media practitioners, undergraduate and graduate students, and other stakeholders.

Activity Title: Regional Geoscience Congress of Southeast Asia (GEOSEA) 2021
Date/s: December 6-8, 2021
No. of Participants: 1,000-1,200

This activity is relevant for scientific communication, which provided opportunities for researchers and students from different universities to meet other people, exchange or develop ideas, create partnerships, and obtain recommendations about their work.

Further, it served as an opportunity for researchers to publish their papers (subject to technical-review process) and be part of the first volume of the Journal of Emerging Technologies and Innovations (JETI).

Activity Title:	**1st International Conference on Emerging Technologies and Innovations (ICETI-1) Theme: Science, Technology and Innovation amidst the new normal**
Date/s:	**December 9-10, 2021**
No. of Participants:	**Academe, 50**

An organized discourse and collaboration among Optics and Photonics (OP) practitioners and a platform to connect with and among established experts around the globe with faculty, students, and professionals here in the Philippines.

Activity Title:	**Online Technical Seminars/Colloquiums to Support Optics & Photonics Sectoral Development under the program of HRDP**
Date/s:	**October 2, November 6, December 4, 2021**
No. of Participants:	**Academe, 100-120**

This two-day activity gathered researchers and thought leaders to explore innovative ways to develop and harness technologies to create an inclusive, human-centered future with the theme, *"Accelerating STEAM Innovations in the Age of Disruption"*.

Activity Title:	**4th International Research Congress on Science, Technology, Engineering, Agriculture and Fisheries, and Mathematics (iSTEAM4)**
Date/s:	**February 3-4, 2021**
No. of Participants:	**300**

Good Governance through Data Science and Decision Support System (GODDESS)

Project GODDESS provides financial support to training participants of the Smarter Philippines Through R&D, Training and Adoption (SPARTA) in developing appropriate capabilities, systems, and technologies geared towards enabling LGUs and NGAs to adapt data-driven governance and evidence-based management.

Project Title
Development of Data Analytics and Information System: Support on Social Welfare Services for Senior Citizens of Butuan City

Brief Description
This project aims to conduct data mining activities and develop an information system with data analytics to address the issues and concerns related to senior citizens in the city.

Project Leader
Dr. Eltimar Castro
FSUU Data Science and Analytics Center (DSAC) Coordinator

Implementing Agency
Father Saturnino Urios University (FSUU)

Project Title
PhilRice Data Analytics Initiative

Brief Description
The main objective of this project is to harness Data Analytics to enhance PhilRice research and development (R&D) governance and management and transform into a data-driven model government organization.

Project Leader
Dr. Jesusa C. Beltran
Chief Science Research Specialist/Scientist I
Philippine Rice Research Institute

Implementing Agency
Philippine Rice Research Institute

Project Title
Optimization of Decision Support System for Effective e-Governance (ODeSSEE) on Preemptive Evacuation for Flood Disaster amidst Covid-19 in Cagayan Valley

Brief Description
The project ODeSSEE aims to develop a decision-support system on preemptive evacuation plan for flood disaster integrating Covid-19 zoning.

Project Leader
Dr. Betchie E. Aguinaldo
Dean, College of Computing Studies Information and Communication Technology
Director, Business Intelligence Research & Development Center

Implementing Agency
Isabela State University

Project Title
Development of Iloilo Province Employment Portal and Services (IPEPS) with Data Analytics

Brief Description
The objective of this project is to develop the Iloilo Province Employment Portal and Services (IPEPS) Application and incorporate data analytics to forecast real-time data and include relevant features.

Project Leader
Dr. Yvette G. Gonzales
Faculty, ISAT-U
Center Chair, Center for Technology Research and Development, ISAT U

Implementing Agency
Iloilo Science and Technology University (ISAT-U)

Project Title
Hundred Islands National Park Management System: Implementation of Smart Tourism

Brief Description
The primary purpose of this project is to develop the Hundred Island National Park Management System with Motorized Banca Geolocation to provide efficiency in the management of the tourism services and will generate valuable information that will help the LGU in the decision making regarding the management of the Hundred Island National Park.

Project Leader
Mr. Paul Andrew V. Roa
Faculty - IT Department
Pangasinan State University - Urdaneta City campus

Implementing Agency
Pangasinan State University - Urdaneta City campus

Project Title
Development of Urdaneta City Market Tariff Information System

Brief Description
The main objective is to develop an automated system with the use of mixed technologies such as Radio Frequency Identification and QR Code for cashless and contactless trading hubs transaction.

Project Leader
Mr. Richard Myrick T. Arellaga
Data Controller, Urdaneta City University

Implementing Agency
Urdaneta City University

Project Title
Dagupan City Smart Garbage Collection & Monitoring System

Brief Description
The project aims to design and develop a system to monitor the waste management in the City of Dagupan.

Project Leader
Engr. Baby Hideliza C. Castiillo
College Dean/Data Protection Officer
College of Information and Computing Studies
Lyceum-Northwestern University

Implementing Agency
Lyceum-Northwestern University

Project Title
Prescriptive Navigation through Vision-based Traffic Monitoring for City of San Fernando, La Union

Brief Description
This project covers the development of Vision-based Traffic Monitoring System and Prescriptive Navigation App which will deliver more efficient service to travelers and locals of the City of San Fernando, La Union.

Project Leader
Ms. Sheena I. Sapuay
Program Chair, BS Information Technology
College of Information Technology
Don Mariano Marcos Memorial State University

Implementing Agency
Don Mariano Marcos Memorial State University

Department of Agriculture
PHILRICE
PHILIPPINE RICE RESEARCH INSTITUTE

Project Title
Development of Data Analytics System for Visualization and Exploratory Analysis of Philippine Rice Genetic Resources

Brief Description
This project aims to develop a data analytics system for visual analysis and data exploration of rice genetic resources conserved at PhilRice Genebank to assist in rice research for gene discovery, pre-breeding parental selection, and genebank curation.

Project Leader
Dr. Jonathan M. Niones
Head, PhilRice Genetics Resources Division

Implementing Agency
Philippine Rice Research Institute - Genetic Resources Division

ADAMSON UNIVERSITY
MANILA, PHILIPPINES

Project Title
Social Service Analytics and Mission Planning System (SSAMPS) for Barangay Guadalupe Viejo, Makati

Brief Description
This project aims to develop a system for an automated process for monitoring persons with disabilities (PWDs) in Guadalupe Viejo as well as the decision support for door-to-door PWD missions and services planning.

Project Leader
Engr. Dylan Josh D. Lopez
Full-time Lecturer, Department of Computer Engineering

Implementing Agency
Adamson University

THE UNIVERSITY OF MINDANAO
UM
VINCIT OMNIA VERITAS
DAVAO CITY
1946

Project Title
e-4PsMap: A data analytics-driven Pantawid Pamilyang Pilipino Program (4Ps) outcomes monitoring, visualization, and dashboard system for the City of Digos

Brief Description
The goal of the project is to create a system or platform that capture, clean, store, and present the social amelioration datasets of beneficiaries of the Pantawid Pamilyang Pilipino Program.

Project Leader
Dr. John Vianne B. Murcia
University Statistician and Director, Institute of Economy and Enterprise Studies

Implementing Agency
University of Mindanao Matina Campus

Balik Scientist Program

BSP is a banner program of the Department of Sciene and Technology that aims to encourage foreign-based Filipino scientists, engineers, and experts to return to the country and contribute in the efforts to fast-track the development of science and technology in the Philippines.

BSP Grantees

Roles/Summary of Accomplishments

1. Reviewed the Science and Technology Clean Air Roadmap 2019 - 2023
2. Drafted policy on the Reduction of Surface Ozone as an Atmospheric Oxidant in Butuan
3. Contributes to the analysis of long-term trends of atmospheric pollutants of Butuan, Metro Manila, and Boracay.
4. Continuous sharing of knowledge and skills to students and researchers on comprehending the local air quality using sophisticated techiques, such as remote satellite data and mass spectrometric techniques.

Dr. Christian Mark Salvador (new)

Expertise: Earth System (Atmospheric Science)
Host Institution: Philippine Nuclear Research Institute, Caraga State University

Roles/Summary of Accomplishments

1. Continuous training and mentoring of faculty, students, and researchers through an Inter-university Joint Seminar on Quantum Science and Computing for USC, CNU, UP Cebu, and CIT-U.
2. Continuous provision of technical expertise and advice on the research projects of PhD students in CNU.
3. Will develop course syllabi, modules, and lecture materials on the contemporary / mainstream condensed-matter research.

Dr. Felixberto Buot (subsequent)

Expertise: Theoretical Condensed Matter Physics, Nonequilibrium Quantum Transport Physics, Nanoscience & Nanotechnology, Device physics and Quantum Computing
Host Institution: Cebu Normal University

Roles/Summary of Accomplishments

1. Developed two (2) BS Industrial Engineering Curricula for UPV and established the UPV BSIE Business Advisory Council, which is currently composed of thirteen (13) members from different private and public institutions.
2. Conducted seminars on lean six sigma, big data analytics, Predictive business modeling, and accelerating large scale change and projects in organizations. He also gave a lecture on needs assessment results and the compelling business case for the BSIE program in Western Visayas.

Dr. Ferdinand Tesoro (new)

Expertise: Industrial Engineering, Predictive Modeling, Lean Six Sigma Process Improvement, Big Data Analytics
Host Institution: UPV SOTECH

Roles/Summary of Accomplishments

1. Provided assistance in the development of the proposal for the establishment of the JRMSU's Pavement Engineering Research Laboratory (PAVER).
2. Continuous involvement in the implementation of the PAVER Project funded by DOST-PCIEERD.
3. Continuous conduct of seminars with JRMSU to enhance the knowledge and capability of researchers, faculty members, and students in the field of pavement engineering.

Dr. Julius Marvin Flores

Expertise: Pavement Engineering
Host Institution: Jose Rizal Memorial State University

Roles/Summary of Accomplishments

1. Contributes to the fleetwide research and development activities of PNMO that are significant in protecting the country's maritime borders.
2. Continuous mentoring and training of at least 24 personnel / researchers from PN and the Holy Angel University (HAU).
3. Will develiop at least two (2) proposals related to AI/ UAV and on secured communications link.
4. Will check and provide list of new technologies and good management practice related to space communications technologies.

Engr. Leo M. Almazan

Expertise: Command Control Communication Computers Intelligence Surveillance and Reconnaissance
Host Institution: Philippine Navy Modernization Office (PNMO)

Roles/Summary of Accomplishments

1. Developed and launched a peer-reviewed international journal tied with an annual international conference on emerging technologies and innovations.
2. Continuous assistance in the establishment of the UM Technology Transfer and Intellectual Property Management Office (TTIPMO) and the Center of Green Nanotechnology Innovations for Environmental Solutions (CGNIES).
3. Continuous mentoring of undergraduate and graduate students.
4. Will establish collaborations / linkages with various local and international institutions including Chulalongkorn University.
5. Will submit at least three (3) manuscripts for publication to a Scopus-indexed journal.

Dr. Chosel P. Lawagon

Expertise: Nanoscience and Nanotechnology for Energy and Environmental Applications
Host Institution: University of Mindanao (UM)

Roles/Summary of Accomplishments

1. Shares expertise on innovative building materials, components and systems on new pedagogical, and other research and creative methodologies relevant to industrial design and architecture of buildings.
2. Continuous conduct of seminars, lectures and workshops on architectural design process, ideation, conceptualization, and design development.
3. Will contribute in addressing the problems on affordability and quality of socalized housing beneficial for people in disaster-stricken areas.
4. Will develop course curricula for the Adamson University Graduate Degree Program in Architecture.
5. Will have at least two (2) papers co-authored and submitted for publication to an international journal.

Arch. Fredinel F. Banaag

Expertise: Architecture and Design, Innovative Construction
Host Institution: Adamson University (AdU)

Roles/Summary of Accomplishments

1. Continuous involvement in the implementation of the project titled, "NextGen: Advance Cathode Materials Based on Earth Abundant Elements (Ni, Fe) for High Density Next Generation Batteries" and other energy storage and renewable energy projects.
2. Continuous mentoring of students and delivery of lectures and seminars.
3. Will establish collaborations with the Universiti Teknologi Petronas (Malaysia) and Kyushu Institute of Technology (Japan).
4. Wll have at least one (1) paper reviewed and four (4) papers co-authored and submitted for international publication.
5.Will have joint policy recommendation to the Philippine Energy Research and Policy Institute and policy adoption of locally-produced batteries for future electric vehicles.
6. Technology transfer and market/key player involvement in R&D.

Dr. Lawrence A. Limjuco

Expertise: Materials Science and Engineering
Host Institution: University of the Philippines Diliman

2021

KEY ACCOMPLISHMENTS

Enhanced supplemental guidelines

Launched the BSP online application system

Conducted orientation / pre-engagement activities with potential BS

Conducted orientation /pre-engagement activities with potential HIs

BSP Exit Report Presentations

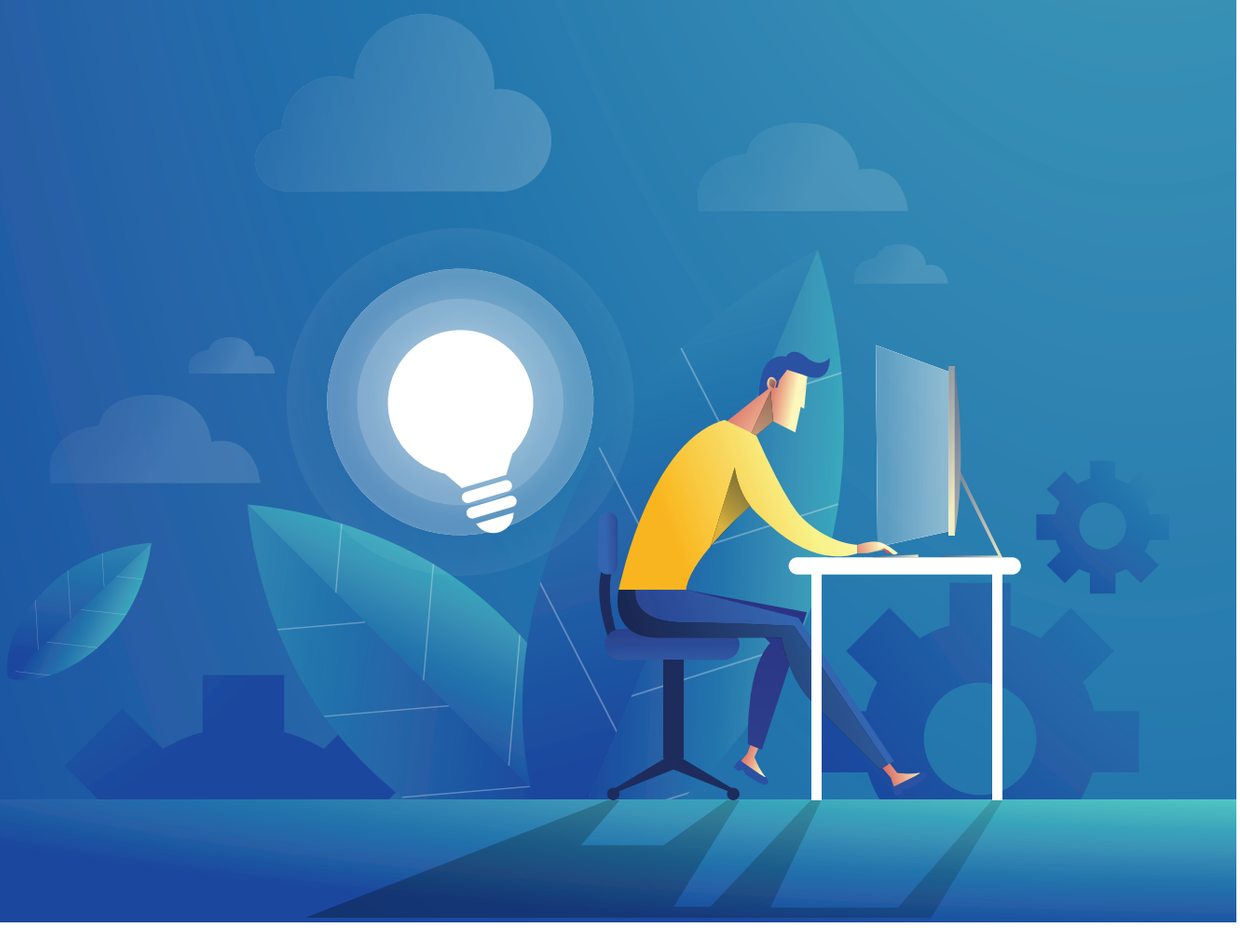
- Dr. Laurence L. Delina, USTP, 04 Mar 2021
- Dr. Noel Peter B. Tan, USC-Talamban Campus, 26 Apr 2021
- Dr. Ginno Andres and Dr. Abigail Cid-Andres, PUP, 14 May 2021
- Dr. Leonel Santos, DLSU, 28 Jun 2021
- Engr. Vicente E. DyReyes, 20 Oct 2021
- Dr. Engielle Mae Paguican, 10 Dec 2021

Conducted orientation / pre-engagement activities with potential BS

Dr. Felixberto Buot , Dr. Joey Mangadlao, Dr. Ferdinand Tesoro, Dr. Julius Marvin Flores, Dr. Samuel Dulay, Engr. DJ Donn Matienzo, Dr. Chosel Lawagon, Dr. Lawrence Limjuco, Dr. Ryan Banal, Ms. Erin Pangilinan, Mr. Kenn So, Dr. Franz Kevin Geronimo, Dr. Ma. Cristina Paule-Mercado, Dr. Noel Peter Tan, Architect Fredinel Banaag, Dr. Ricolindo Carino, Dr. Jeremy Rimando, Dr. Alvin Varquez, Dr. Earvin Cabalquinto

Young Innovators Program

The Young Innovators Program (YIP) is a research program of DOST-PCIEERD that provides grants to promising young innovators who want to take on pioneering works fostering quality research paper, publication or products, or inventions.



2 Ongoing Projects

Fungal chitosan- based Microbeads: A Heavy Metal Soil-based biobsorbent

Team Name
PUP FunGIE Team

Team Members
Ms. Irah Faye B. Garzo
Ms. Raven Elyze E. Laurella
Mr. Ghimel P. Espinosa

Mentor
Dr. Lourdes V. Alvarez
Professor II

Institution
Polytechnic University of the Philippines - Sta Mesa (BS)

In the present proposal, researchers will conduct a study that will lead in innovating chitosan microbeads product that will serve as biobsorbent of selected heavy metals (Cu, Cr, As) in the soil. The achievement of the present research study will greatly contribute to the solution of soil pollution caused by heavy metals.

Shock Electrodialysis Apparatus (S.E.A.)

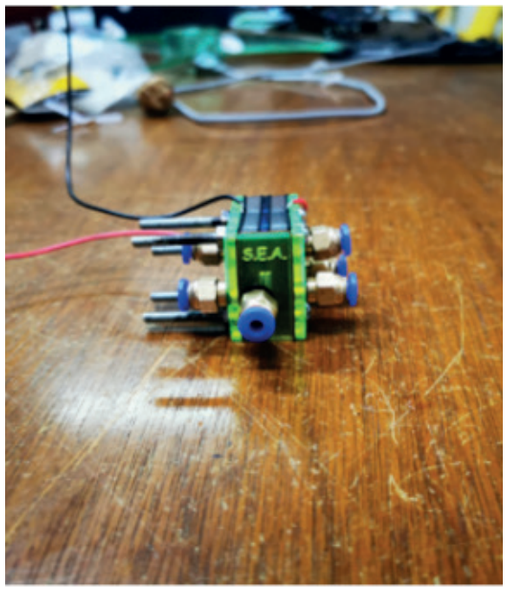
Team Name
Team S.E.A

Team Members
Mr. Paris Miguel U. Bereber
Mr. John David F. Magnaye
Mr. Davis Nicholo A. Magpantay

Mentor
Engr. Boon Kristoffer P. Lauw

Institution
PSHS-Main Campus (HS)

Shock Electrodialysis Apparatus (S.E.A) is an intuitive and compact desalination device which uses shock electrodialysis technology to desalinate saltwater. S.E.A integrates intuitive and well-known mechanism with modern and efficient technology to create a simple and user-friendly product that could efficiently desalinate saltwater for the use of coastal communities.



8 New Projects

Novel microring resonator (MRR)-based optical sensor using Photonic Integrated Circuits (PICs)

Team Name
Ateneo KISLAP Team

Team Members
Jan Llenzl Dagohoy
David Jonas Bambalan

Mentor
Dr. Benjamin B. Dingel

Institution
Ateneo de Manila University - Ateneo Research Institute for Science and Engineering

The research project aims to design and optimize a novel high-sensitivity optical sensor using a microring resonator (MRR)-based photonic integrated circuit technology to contribute knowledge towards the development of the optics and photonics sector in the Philippines, especially for biosensing applications.

3D Printed Waste Battery Rod Derived Exfoliated Graphite-Polymer Composites for Electronic Sensor Applications

Team Name
Team Batt2SAI

Team Members
Jefferson A. Macalalad
John Marlou T. Opiña
Seth F. Robiso

Mentor
Dr. Reymark D. Maalihan
Dr. Anton Louise P. De Ocampo

Institution
Batangas State University - Main

The project aims to utilized spent battery rods as conductive filler to 3D printed polymer composites intended for fabrication of electronic sensors. This will provide a recycling path for waste battery components by using them as a raw materials for sustainable additive manufacturing.

BidaLight (Bio-derived Light): Spent Mushroom Substrate (SMS) - powered microbial fuel cells

Team Name
Team BidaLight

Team Members
Rheinne M. Sanchez
Rogiebelle DR. Caliao
James Matthew T. Hile

Mentor
Dr. Lourdes Alvarez

Institution
Polytechnic University of the Philippines

The general objective of this project is to produce a functional fungal-derived microbial fuel cell (MFC) using Pleurotus ostreatus inoculates and spent oyster mushroom substrates (SOMS).

Application of green silver nanoparticles for dye wastewater treatment

Team Name
Feb Alexis P. Marquez

Team Member
Mr. Feb Alexis P. Marquez

Mentor
Noreen Grace Fundador

Institution
University of the Philippines - Mindanao

This research will provide a cheap and eco-friendly alternative to prepare AgNPs using Cavendish banana florets, which is a waste -product of the banana industry for the degradation of methylene blue without the need for UV illumination. The success of this project will benefit mainly the textile industry as well as other industries that use toxic dyes in their products.

Development of optimized compression molding machine for production of biocomposite materials using agricultural wastes

Team Name
Team BioMech

Team Members
Charyce A. David
Shenna Babe S. Hernandez
Andrea Shane M. Torres

Mentor
Engr. Dan William Martinez

Institution
Bataan Peninsula State University - Main Campus

The development of a machine capable of integrating agricultural waste into biocomposite is the most visible intended outcome of this project proposal. The project will explore various agricultural waste, which is abundant in Orion, Bataan as well as different binders and adhesives to determine which is the appropriate raw material to be used in producing biocomposites.

Potential biodegradable scaffold from Chanos chanos (milkfish) scales and fishbone

Team Name
Team SIKAD

Team Member
C Jay Bryan P. Malonzo
Terence Manuel B. Lazaro
Denisse A. Villanueva
Micah Danielle A. Santos
Alyana Loisse R. Reyes

Mentor
Dr. Analiza Molina
Dr. Roberto Pagulayan (Co-adviser)
Engr. Carolyn Arbotante (Co-adviser)

Institution
Angeles University Foundation Integrated School

The proposed study on the fabrication of a biocompatible, biodegradative scaffold made from the extracted collagen from the scales and fishbone of Chanos chanos (milkfish) will explore new methods in developing biotechnological materials that will aid in skin tissue regeneration.

Synthesis of Biodegradable, Water-soluble Film from Durio zibethinus (Durian) Seed Nanostarch as Food Packaging Material

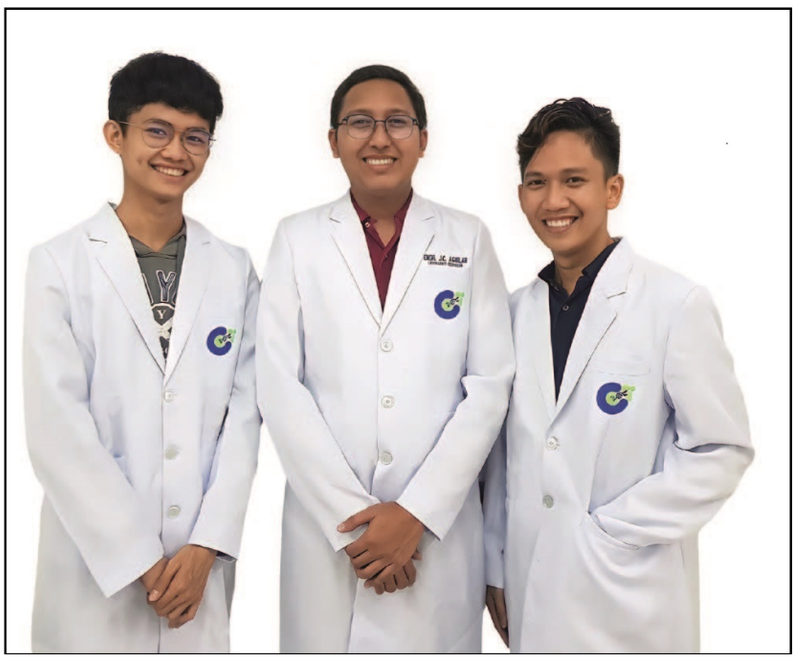
Team Name
Team SEEDbethiNEW

Team Members
Herald Carl Jesalva
Jaime Subaldo, Jr.

Mentor
Jay Carlo Aguilar

Institution
University of Mindanao - Bolton

This project pursues the synthesis of a biodegradable, and water-soluble film from Durio zibethinus (durian) seed nanostarch. Seed flour is extracted from the fruits, which is then processed to extract its starch. After that, the starch is turned into nanostarch by reducing the particle size of starch, and this nanostarch is prepared to synthesize the biodegradable film.



GCAP: Evaluation of Mechanical and Ballistic Properties of Glazed Ceramic Armor Plates

Team Name
Team GCAP MSUIIT

Team Member
Roben Victor M. Dispo
Christian Julle Saladaga
Sherlyn Keh Dionio

Mentor
Dr. Ivyleen Arugay

Institution
Mindanao State University - Iligan Institute of Technology

This study aims to utilise local raw materials to produce a stoneware ceramic armor plate coated with glaze, and to promote raw materials as an alternative to imported raw materials for ceramic armor plates.

The study also aims to increase the durability of ceramic armor plate due to the glaze supplementing strength in its compressive state and survivability of the wearer. The design will also be beneficial for military purposes especially for easy manuever during combat and portability for fast replacement of damaged armor plates.

7 Completed Projects

SPHERE: An Ultra-wideband Technology-based Innovation for Search and Rescue Operations in the Philippines

Team Name
Team KAIZEN

Team Members
Ms. Ma. Cathyrine Ravina
Ms. Denisse Joy Dayao
Ms. Janela Zambrano

Mentor
Engr. Marvin Norona, Professor

Institution
Mapua University (BS)

The Sphere will utilize Ultra Wide Band (UWB) technology that can detect heart rate regardless of the type of wall blocking the victim. It comes with a remote control and added features vital for the search and rescue operations like Global Positioning System (GPS) to pin the exact location of victims, built-in lights to better see the situation underground, camera that has a night vision, and a speaker for the controller to speak with the victims underneath the debris.

iTrashBin (Intelligent Trash Bin) Internet-of-Things Trash Bin for Quarantine and Isolation Facilities

Team Member
Mr. John Emmanuel Javines

Mentor
Mr. Don King O. Evangelista

Institution
Navotas National Science High School (HS)

The idea of this project is to create a robot designed to collect the waste products of COVID-19 patients and suspected ones. At the same time, to disinfect the waste products on the process. In order to do these, the researcher will adapt the system of Internet-of-things (IOT) in which the device will use the internet as a way of transferring data through a smart phone to control the robot.

PROJECT LINGAP LANGHAP: Low-cost 3D Printed Air Purifier System using Agricultural Waste-Based Activated Carbon Filter

Team Name
Team LiLa

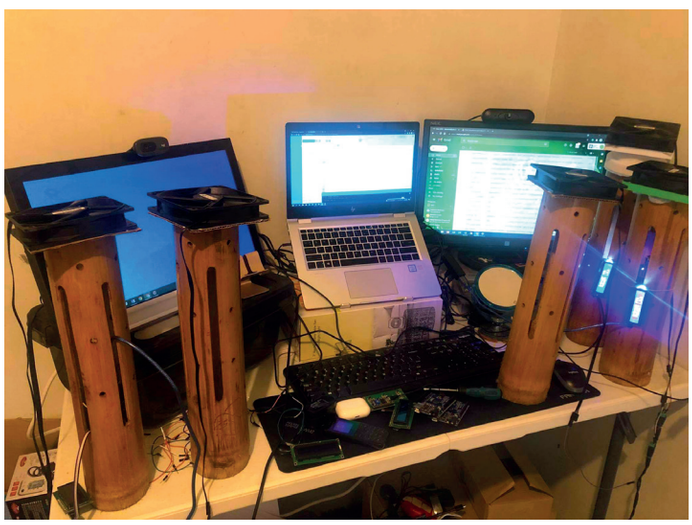
Team Members
Mr. Carlos Jerard Dela Cruz
Mr. Jan Paolo Pineda
Ms. Maria Michaela Tumonong

Mentor
Mr. Joel T. Bautista

Institution
PSHS-Central Luzon Campus (HS)

The proposed air purifier shall be using activated carbons from biomass in combination with HEPA filters in order to create a low-cost air purifier system. It would also be capable of measuring air quality with a PM 2.5 sensor and collect/ share that data to users via an Internet of Things connection.

A bamboo filter casing will be used to contain the activated carbon due to its high availability and faster production due to its already hollow and cylindrical form. The filter case housing will be made of bamboo treated with coats of varnish to prevent mold and degradation, with 3d printed end caps of HEPA filters and other filtration layers.



Proton-Exchange Membrane (PEM) Fuel Cell Using Electrode Processed from Kaong Waste Product

Team Name
Team Kaong

Team Members
Ms. Alexis Anne C. Bonus
Mr. Renz John Kurt S. Reyes
Ms. Vien Isabella R. Rom

Mentor
Ms. Sheryl D. Fenol

Institution
Cavite State University (HS)

The proposed project is a Proton-Exchange Membrane (PEM) Fuel Cell that will be developed using Sugar Palm (Kaong) waste product. Kaong tree is abundant plant in upland Cavite. The project will be able to produce potable water from wastewater and can serve as voltage source.

Hg and Pb Detention Kit Utilizing D-Limonene from Sweet Orange (Citrus sinensis) Peelings

Team Member
Mr. Steph Kier S. Ponteras

Mentor
Dr. Chosel P. Lawagon

Institution
University of Mindanao – Main Campus (BS)

The aim of this study is to make an easy and efficient Hg and Pb detection kit, specifically this seeks to achieve the following objectives:
i. To synthesize D-limonene from orange peelings.
ii. To synthesize D-limonene polysulfide and test its efficacy for Hg and Pb detection from water sources near mining areas.
iii. To fabricate Hg and Pb detection kit that can easily be used by any person especially in resource-limited communities near mining areas.
iv. To optimize the sensitivity and performance of the Hg and Pb detection kit

LaBioRem: Landfill Bioremediation through Biodegradative activities of Pleurotus ostreatus (Oyster Mushroom) to High Density Polyethylene (HDPE) and other biodegradable polymers

Team Name
Team SISID

Team Members
Ms. Nikka C. Banez
Ms. Princess Angelica S. Besonia
Ms. Kyla Carmina F. Consul
Ms. Jules Hyacinth B. Macasaet
Ms. Ma. Angelica D. Gomez

Mentors
Dr. Analiza J. Molina
Research Adviser

Mr. Emmanuel Carbungco
Research Adviser

Institution
Angeles University Foundation Integrated School

The study primarily aims to determine a more ecological approach in addressing plastic garbage issues with the investigation of biodegradative activities of Pleurotus ostreatus (Oyster mushroom) on High Density Polyethylene (HDPE).

Synthesis of nanocellulose from durian rinds for the preparation of a self-healing smart concrete with augmented mechanical properties

Team Member
Mr. Ivanbert Y. Damasco

Mentor
Dr. Chosel P. Lawagon

Institution
University of Mindanao – Main Campus (BS)

Cement-based products are susceptible to crack formation due to various factors including but not limited to environmental conditions, induced loadings, or combination of both. Although the cementitious material can potentially self-heal cracks, the rate of micro-crack formation is comparably higher than that of the self-healing.

The utilization of durian rind, a common agricultural waste product possess excellent potential as source of nanocellulose.

The material will be used as reinforcement for the self-healing cement together with sodium silicate.

The primary self-healing agent is sodium silicate. Studies of self-healing phenomena have shown that microencapsulation method is an efficient technique to transport and mix the healing agent in the cementitious matrix. By this method, nanocellulose from durian rinds can be used as carrier of sodium silicate as well as aid in augmenting the mechanical properties of the concrete.

PCIEERD in the Regions

Project Title: *Support for the PCIEERD's Regional Consortia Research Institution*
Implementing Agency: *DOST-PCIEERD*

One of the functions of PCIEERD is to establish, develop, and maintain local and international technical cooperation linkages to drive the country towards its national development goals. For this to be truly effective, the regions of the Philippines need to work together. The Regional Research Institution or Regional Consortia aims to advance the R&D sectors in S&T by providing research funding in the regions, thereby encouraging new researchers and new institution to take an active role in bringing forward the country to its goals.

About the Program

This consortia program will ensure the following:

- Alignment of programs/project s to priority areas of the Council, Regional S&T Agenda and HRNDA
- Strengthen the collaboration, capacity and expertise of its Regional Consortia in the implementation of R&D and other scientific activities to support the Council's priority thrusts, plans and programs
- Sustain the holistic development of the regions' resources through networking and collaborations among the member institutions from the academe, government and the private sectors as well as the industries in the region

To further facilitate collaboration, a holistic approach is taken among the member institutions, with representatives from the academe, government, and private sectors.

Currently, the following 16 Regions in the Philippines are participating in the program:

REGIONS	NAME OF THE CONSORTIA
Region I	Ilocos Consortium for Industry, Energy and Emerging Technoloogy Research and Development (ICIEERD)
Region II	Cagayan Valley Industry, Energy, and Emerging Technology Research and Development Consortium (CVIEERDEC)
CAR	Cordillera Industry, Energy, and Emerging Technology Research and Development Consortium (CIEERDEC)
Region III	Central Luzon Consortium for Industry, Energy, and Emerging Technology Research and Development (CLIEERDEC)
NCR	Metro Manila Industry, Energy, and Emerging Technology Research and Development Consortium (MMIEERDEC)
Region IV-A	Southern Tagalog Consortium for Industry, Energy Research and Development (STCIERD)
Region IV-B	Southern Tagalog Islands Research and Development Consortium (STIRDC)
Region V	Bicol Consortium for Industry, Energy and Emerging Technology Research and Development (BCIEERD)
Region VI	Western Visayas Consortium for Industry, Energy, and Emerging Technology Research and Development (WVCIEERD)
Region VII	Central Visayas Consortium for Industry, Energy and Emerging Technology Research and Development (CVCIEERD)
Region VIII	Eastern Visayas Consortium for Industry, Energy, and Emerging Technology Research and Development (EVCIEERD)
Region IX	Zamboanga Industry, Energy, and Emerging Technology Research and Development Consortium (ZIEERDC)
Region X	Northern Mindanao Consortium for Industry, Energy, and Emerging Technology Research and Development (NorMinCIEERD)
Region XI	Davao Region Industry, Energy and Emerging Technology Research and Development Consortium (DRIEERDC)
Region XII	Cotabato Region Industry, Energy, and Emerging Technology Research and Development Consortium (CRIEERDEC)
Region XIII CARAGA	Eastern Mindanao Industry, Energy and Emerging Technology Research Alliance for Development (EMIEERALD)

These consortia have sustained the holistic development of the regions' resources through networking and collaborations among the member institutions from the academe, government and the private sectors. However, three (3) of the consortia such as Region
III-CLIEERDEC, Region 7-CVCIEERD and Region 13- EMIEERALD have some operational issues and concern that made them inactive for the two (2) years now. As a result, regional consortia operations in 2021 saw an increase in its membership CY
2018-2021.

In line with the PCIEERD's envision to provide a clear direction setting for each regional consortium in terms of their R&D, particularly the process of submission, evaluation and implementation of approved project proposals and other scientific activities to support the Council's priority thrusts, plans and programs.

Also, to sustain the holistic development of the regions' resources through networking and collaborations among its member institutions from the academe, government and the private sectors by implementing a new mechanism and strategies as follows:

1. Review and revised new guidelines

2. Call for proposals started CY 2021for both support for operations, research and development (RRI) and Experts Intervention for Scientific Engagement
(ExperTISE)

3. Technical evaluation practices reviewed and implemented

4. Conduct of Proposal Writeshop's and Proposal Pre-engagement Meetings

Regional Consortia Component Programs:

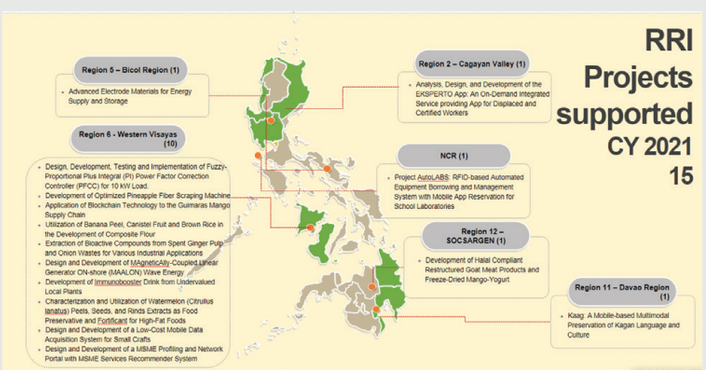
In 2021 the regional consortia has three (3) components these are: (1) Support for RRI Operations (2) Regional Research Institution (RRI) (3) Experts Intervention for Scientific Engagement (ExperTISE).

1. Support for Consortia Operations
2. Regional Research Institution (RRI)
3. Experts Intervention for Scientific Engagement (ExperTISE)

Regional Consortia Institution Members

PCIEERD REGIONAL CONSORTIA OPERATIONS					
Monitoring Report as of December 2021					
Regions	Consortium Name	Regional Consortia Institution Members			Total
		HEIs	Government Agencies	Other Agencies	
NCR	MMIEERDC	23	3	6	32
CAR	CIEERDEC	10	10	6	26
Region 1	ICIEERD	11	10		21
Region 2	CVIEERDEC	8	7		15
Region 3	CLIERDEC	12	9		21
Region 4A	STCIERD	13	6		19
Region 4B	STIRDC	8	6		14
Region 5	BCIEERD	17	8	3	28
Region 6	WVCIEERD	18	3		21
Region 7	CVCIEERD	15	2		17
Region 8	EVCIEERD	10	2		12
Region 9	ZIEERD EC	8	3	2	13
Region 10	NORMINCIERD	15	6	4	25
Region 11	DRIEERDC	17	10		27
Region 12	CRIEERDC	8	4		12
Region 13	EMIEERALD/ CARAGA	6	4	3	13
TOTAL		199	93	24	316

The regional consortia were able to submit thirty seven (37) proposals and fifteen (15) of these proposals were approved for RRI projects and six (6) submitted proposals for ExperTISE Projects were also approved. The figure below shows the approved projects per region. Also attached is the list of approved projects, for reference.



Fourteen (14) Newly Approved RRIs Projects for CY 2021

	PROJECT TITLE	PROPONENT	AGENCY
1	Development of Halal Compliant Restructured Goat Meat Products and Freeze-Dried Mango-Yogurt - CRIEERDC-R12	Cyril John Domingo	Sultan Kudarat State University (SKSU)
2	Utilization of Banana Peel, Canistel Fruit and Brown Rice in the Development of Functional Food for Lactating Mothers - WVCIEERD-R6	Frisian Causing	Iloilo Science and Technology University (ISAT U)
3	Development of Optimized Pineapple Fiber Scraping Machine - WVCIEERD-R6	Engr. Monalyn Oloroso	Capiz State University (CapSU)
4	WVCIEERD Small R&D: Design, Development, Testing and Implementation of Fuzzy-Proportional Plus Integral (PI) Power Factor Correction Controller (PFCC) for 10 kW Load. - WVCIEERD-R6	Engr. Ramon Alguidano	Iloilo Science and Technology University (ISAT U)
5	WVCIEERD Small R&D Project - Application of Blockchain Technology to the Guimaras Mango Supply Chain - WVCIEERD-R6	Prof. Maureen Nettie N. Linan	Iloilo Science and Technology University (ISAT U)
6	Project AutoLABS: RFID-based Automated Equipment Borrowing and Management System with Mobile App Reservation for School Laboratories	Engr. Davie Jone Niverca	Adamson University Manila (AdU)
7	Design and Development of MAgneticAlly-Coupled Linear Generator ON-shore (MAALON) Wave Energy	Engr. Perry Neil Fernandez	Visayas State University (VSU)
8	Development of Immunobooster Drink from Undervalued Local Plants, a WVCIEERD Proposal	Ms. Shailini Gestosani	Iloilo Science and Technology University (ISAT U)
9	Design and Development of a Low-Cost Mobile Data Acquisition System for Small Crafts	Julie Ann Salido	Aklan State University - Kalibo Campus
10	Design and Development of a MSME Profiling and Network Portal with MSME Services Recommender System	Regin Cabacas	West Visayas State University
11	Analysis, Design, and Development of the EKSPERTO App: An On-Demand Integrated Service providing App for Displaced and Certified Workers	Billy Javier	Cagayan State University - Aparri
12	Kaag: A Mobile-based Multimodal Preservation of Kagan Language and Culture	Shenna Rhea Cloribel	University of the Immaculate Concepcion
13	Characterization and Utilization of Watermelon (Citrullus lanatus) Peels, Seeds, and Rinds Extracts as Food Preservative and Fortificant for High-Fat Foods	Danica Marie Aposaga	University of Antique
14	Advanced Electrode Materials for Energy Supply and Storage	Anabella Vilando	Bicol State College of Applied Sciences and Technology (BISCAST)

Six (6) Newly Approved ExperTISE Projects for CY 2021

	PROJECT TITLE	PROJECT LEADER	INSTITUTION / AGENCY	INDUSTRY PARTNER
1	ExperTISE Program of MSU-IIT with PILMICO Foods Inc.	Dr. Rodel D. Guerrero	Mindanao State University, Iligan Institute of Technology (MSU-IIT)	PILMICO Foods Inc.
2	Expert Intervention for Scientific Engagement (ExperTISE) Program for PCIEERD Regional Consortia	Dr. Wilson C. Nabua	Northwestern Mindanao State College of Science and Technology (NMSCST)	Segatic Daku Small Coconut Farmers Cooperative
3	ExperTISE Project: Ameliorating a non-net metering grid-tie solar PV systems	Mr. Clark Darwin M. Gozon	University of Science and Technology of Southern Philippines (USTP) - CDO	Greenergy Development Corporation
4	Immersion of USTP Jasaan researchers to PICMW for the Ideation of research proposal	Engr. Maricel C. Mandawe	University of Science and Technology of Southern Philippines (USTP) - Jasaan	Philippine Iron Construction and Marine Works Inc.
5	Capacity development needs of the 1.4 MW Maramag Mini Hydropower Project towards a sustainable renewable energy source	Dr. Einstine M. Opiso	Central Mindanao University (CMU)	King Energy Generation, Inc
6	Transitioning Adlaw farm into a climate resilient and smart cacao and chocolate production company: a capacity needs assessment	Mr. Rex O. Yadao	Central Mindanao University (CMU)	Adlaw Diversified Farmers

Policy Development and Advocacy

As R&D projects uncover findings that explore the contours of pressing social problems, DOST-PCIEERD sees to it that that the review of gaps in existing legislation and the development of policy tools and frameworks are at the forefront of its priorities. Policymakers, researchers, decision-makers, and the public alike are then equipped with science-based information and policy options through various avenues including policy briefs, policy papers, and direct communication.

Moreover, research information from PCIEERD-supported projects are effective guideposts for advocacy strategies that help bring about improvements in the lives of Filipinos.

MEASURING R&D IMPACT

PCIEERD Impact Assessment Studies

To ensure fulfillment of its mission of providing strategic leadership in enabling innovations in industry, energy, and emerging technology sectors, the Department of Science and Technology – Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) is implementing impact assessment studies across its supported projects and programs.

In a nutshell, the studies are conducted to ensure that outcomes and impacts of its R&D projects, including those outside the originally intended objectives, are observed, reported, and accounted for.

In the long run, the results of each impact assessment help provide the council with a scientific framework for learning from past R&D projects that will help maximize the efficiency and net benefits of future projects.

In addition, the findings of each IA will also prove significant to DOST-PCIEERD in terms of future project disposition, fund allocation, and planning of future activities. These in turn will enhance the efficiency and effectiveness of programs.

This year, DOST-PCIEERD is assessing the impact of four programs: Infrastructure Development Program (IDP), Technology Innovation for Commercialization (TECHNICOM) Program, PHiL-LiDAR Program, and the PHIVOLCS and PAGASA Projects and Programs Implemented from 2010-2020.

Impact Assessment of the Infrastructure Development Program (IDP)

Project Leader:
Dr. Maria Excelsis M. Orden

Implementing Agencies:
Central Luzon State University

The Infrastructure Development Program (IDP) envisions fully complementing the R&D needs and requirements of the industry, energy and emerging technology sector as it was implemented to provide support for the development of infrastructure for research of academic and research institutions.

The presence of infrastructure in R&D institutions and higher educational institutions is critical to the institutions' development and, in a macroscopic lens, the advancement of the country's S&T. However, the institutions usually have limited financial allocations for infrastructure establishment. As such, DOST (PCIEERD?) steps in and provides the needed funding.

Since 2015, IDP has provided support in the upgrading of research laboratories and facilities of academic and research institutions in areas within the PCIEERD sectoral priority areas or the Harmonized National R&D Agenda-HRDA and where there is inadequacy of research expertise and/or facilities.

From 2015-2020, the program had helped set up and upgrade **34 laboratories** and facilities all over the country, amounting to a total investment of **Php125.41 million**.

To evaluate the process and dynamics of its implementation and quantify outputs, outcomes, and its potential impacts for the amount of investment provided, an ex-post assessment is imperative. This project aims to further understand gender relations and the power dynamics behind them, which is a prerequisite for understanding individuals' access to and distribution of resources, the ability to make decisions, and the way women and men are affected by economic and social development.

Impact Assessment of the Technology Innovation for Commercialization (TECHNICOM) Program

Project Leader:
Ms. Annette M. Tobias

Implementing Agencies:
Philippine Council for Agriculture, Aquaculture, and Natural Resources Research and Development (PCAARRD)

Collaborating Agencies:
National Research Council of the Philippines (NRCP)
Philippine Council for Industry, Energy & Emerging Technology (PCIEERD)
Philippine Council for Health Research and Development (PCHRD)

The Technology Innovation for Commercialization (TECHNICOM) Program is one of the flagship programs of the DOST implemented by the Technological Application and Promotion Institute (TAPI). This program aims to accelerate the transfer and commercialization of innovations and technologies developed locally in the country.

Through financial and technical support from DOST and TAPI, TECHNICOM assists research and development (R&D) projects geared towards market readiness and commercialization. It focuses on assistance in intensive field and market testing, commercial prototype development, technology validation, and pilot scale testing.

Starting 2013, the TECHNICOM program has received a total of **P224.1 million** from the DOST Grants-in-Aid (GIA) program funding. Under this program, DOST has supported **32 completed projects** and is currently funding **28 ongoing projects** distributed across nine regions in the Philippines. **30 of the completed projects** have already been deployed/ commercialized.

Given these significant government investments in the TECHNICOM program and the number of completed projects across the country, it is high time to determine the extent of the program's contribution. Ultimately, its contribution is expected to heavily impact the economic and development sectors.

The impact assessment study will determine the return on investments and will identify strong and weak points of the program. It will also help aid policy makers, R&D planners, and extension workers in improving the existing platforms as well as in developing more effective and efficient technology diffusion. This study targets to assess the economic, institutional, and if possible, environmental impacts of the program.

Impact Assessment of the PhiL LIDAR Program

Project Leader:
Dr. Moises Neil V. Serino

Implementing Agencies:
Visayas State University

Light Detection and Ranging or LIDAR is a remote sensing technology that examines the surface of the Earth. The PHIL-LIDAR Program is a program supported by the DOST, University of the Philippines (UP) Diliman and 15 HEIs that use LIDAR and other remotely sensed images to generate maps that can help in disaster risk reduction management and resource management. The Program has 39 projects which started in 2014 and concluded in 2018.

There are two PHIL-LIDAR Programs. The PHiL-LiDAR 1 aimed to generate fine-scale flood hazard maps and river water forecast system for 257 major rivers in the Philippines. It is an expansion of the Disaster Risk and Exposure Assessment for Mitigation (DREAM) which uses the same technology but covers only 1/3 or 18 major river basins in the Philippines.

Its goal was to cover the remaining 2/3 of the major river basins and capacitate State Universities and Colleges (SUCs) and HEIs, local government units (LGU), and national government agencies (NGAs) such as the DOST-PAGASA, DENR Mines and Geosciences Bureau (MGB) and National Mapping Resources Information Authority (NAMRIA) on the use of LIDAR technology.

PHiL-LIDAR Program 2 focused on producing detailed resource maps using LIDAR for various applications like production of high value crops, irrigation assessment, aquaculture production, forest/watershed protection, and discovery of renewable energy sources.

The Program has 19 projects. Capacity building is also a component of the program. With a total budget of P1.4 billion for 3 years for PHIL-LIDAR 1 and P936.7 million for PHIL-LIDAR 2, it is only appropriate to subject the program to impact assessment to determine its actual impact to its stakeholders and beneficiaries.

In this study, the outcomes of the projects will be traced from its inputs to determine the impacts that they had brought about and generated to their beneficiaries or communities. This will help set future policies in the implementation of programs or projects related to LIDAR or geospatial information systems in the country.

Flood models was used as part of an early warning system that may provide lead time for evacuation

Impact Assessment of the PHIVOLCS and PAGASA Projects and Programs Implemented from 2010-2020

Project Leader:
Dr. Rico C. Ancog

Implementing Agencies:
School of Environmental Science and Management, UP Los Baños

The Philippine Institute of Volcanology and Seismology (PHIVOLCS) and Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA) are two authorities in seismic and meteorological services. With that, the two are some of the most important national agencies in the Philippines, especially in the field of disaster and risk reduction with the country being disaster-prone.

In the past 10 years, programs and projects spent for PHIVOLCS and PAGASA amounted to almost P 1.3 billion combined, with the latter having a total of almost one billion pesos alone. During this long period, several projects and programs were implemented without subjection to any evaluation, it is thus crucial that an impact assessment of these projects be done.

An impact assessment of these programs and projects will give PHIVOLCS, PAGASA, and the DOST a clear view of the changes in the communities of Filipinos caused by the interventions, in accordance with the mandates of these institutes especially in disaster and calamity preparedness.

Meanwhile, the Philippine Institute of Volcanology and Seismology (PHIVOLCS) is mandated to research and monitor volcanic eruptions, earthquakes, and tsunamis and provide relevant information and services for the country to be adaptive and responsive to calamities.

The R&D initiatives of PHIVOLCS involve several equipment acquisitions for the proper monitoring of seismic events and capacity building. PAGASA provides similar functions only to a different set of phenomena.

With that, it is important that their R&D projects and services are subjected to impact assessment wherein the impact of an intervention to its intended stakeholders is determined. Because of this, the results of investments in R&D are identified. Moreover, it may address issues on scarcity, allocation, and priorities – institutions need to look at projects that need to be prioritized and which are essential based on the current situation. Results of the assessment may serve as a basis for more effective and efficient decision-making and policy formulation.

Latest Policy Briefs

Powering Missionary Areas with Solar Energy

An Overview

Based on global data on energy consumption, fossil fuels remain the top source of energy in the world (Ritchie and Roser,2017). Fossil fuels are the primary source of greenhouse gas emissions and are harmful to the environment. The Philippines' reliance on imported fossil fuels leaves its economy vulnerable to price shock.

Meanwhile, renewable energies account for 36.39% of the total energy consumption worldwide. Making use of REs for power generation could improve fuel security in the country in a more cost-effective approach.

Solar energy is a very promising energy source. Unfortunately for the Philippines, it only contributes 5.7% of the country's total power generation as of 2019. This shows the need for more interventions to fully harness solar energy.

In 2019, the National Electrification Administration (NEA) reported that around 2.3 million households in the Philippines still have no access to electricity due to challenges encountered in using on-grid electrification in isolated areas.

A micro-grid solar photovoltaic (PV) system, a group of solar panels that capture energy from the sun's light, is seen to have the potential to solve this concern.

Several projects from the government have been implemented in line with the National Electrification and the Renewable Energy Act of 2008. Solar PVs are being installed in Marawi City as part of its rehabilitation program through the United States Agency International Development (USAID) and Mindanao Development Authority (MinDA), and capacities to generate power from solar energy are being established.

The Department of Science and Technology - Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD), through DOST Region XI, the Ateneo de Davao University (AdDU), and local government units (LGUs) collaborated to bring electricity, through a micro-grid hybrid PV power system, to the community of Barangay Manurigao, New Bataan, Compostela Valley.

The system was able to generate 112 kWh of energy per day, supplying electricity to 100 households. It has batteries for energy storage, and a generator to ensure continuous supply of electricity.

However, the community cannot sustain the P40.00 per kWh energy cost for the maintenance of the batteries and fuel for the generator, essential components of the system, and workforce for system operations.

The following are policy recommendations for the planning of future electrification projects by national government agencies (NGAs), and the ensuing implementation of these projects with concerned LGUs:

• Highlight socio-economic feasibility of adoption of solar PV for remote communities

1. Incorporate socio-economic plans in projects or programs to assist the beneficiaries of power systems in sustaining the technology.
2. Offer employment opportunities and include training programs for community members.
3. Install solar capacity as quickly and as much as possible, similar to the "SunShot 2020" Program of the US Department of Energy in 2011
4. Re-evaluate the prevailing focal point of rural electrification and assess the current economic model used.
5. Use livelihood electrification as the cornerstone of future projects.

• Incentivize off-grid PV systems by law and grow knowledge and skills in operating the technology

1. Develop parameters and models to include and incentivize lower-income households and farms in net metering.
2. Pivot Universal Charge into renewable energy (RE) facilities for microgrids in remote areas.

• Conduct ex ante situational analysis
• Streamline bureaucratic processes in developing RE facilities

Technology Transfer and Commercialization

More than developing innovations, DOST-PCIEERD assists researchers and startups in ensuring that they sow the fruits of their labor and that these fall into the hands of Filipinos who need it the most.

DOST-PCIEERD has technology transfer and commercialization programs that successfully bring scientific research to the market, boosting the availability of innovation and increasing productivity.

Other support mechanisms include capacity building programs, technology assessment, promotion, intellectual property and technology management.

Funding Assistance for Spin-off and Translation of Research in Advancing Commercialization (FASTRAC Program)

VISSER

Brief Description

VISSER, or the Versatile Instrumentation System for Science Education and Research, is a research-grade laboratory system developed by researchers from the University of the Philippines. It is a handheld device that serves as a hub for various sensors that can be used to perform experiments in various fields of science.

VISSER was designed in order to put modern science laboratories in every school and college across the country and contribute to the enhancement of Philippine science education and research.

Project Leader

Dr. Giovanni A. Tapang
Dean, UP Diliman College of Science

Implementing Agency

National Institute of Physics, UP Diliman

Gmatrics

Brief Description

A building board that is made from agricultural waste as reinforcement. It is a composite panel with a lower carbon footprint using a proprietary binder formulation from natural minerals and coal ash.

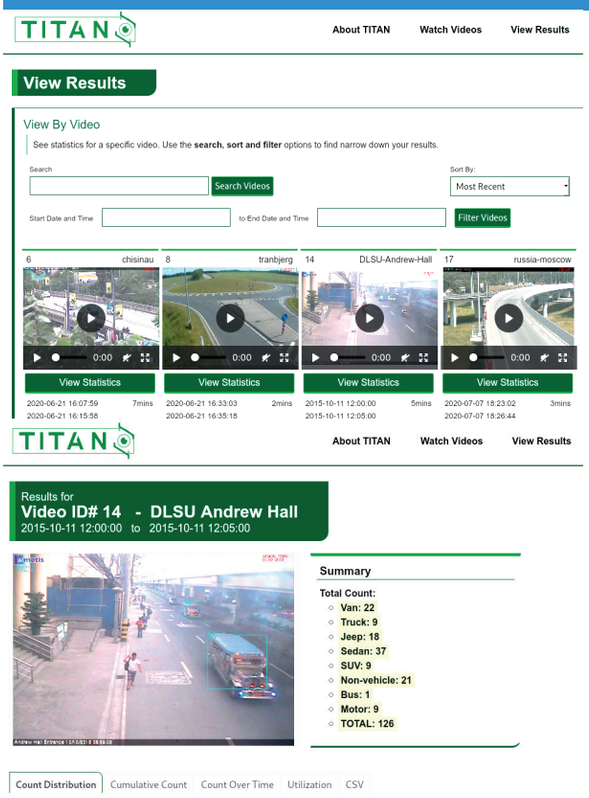
Project Leader

Dr. Michael Angelo Promentilla
Head of the Waste and Chemicals Management Unit of the Center for Engineering and Sustainable Development Research (CESDR)

Implementing Agency

De La Salle University

FASTRAC: Enhancement and Market Validation of TITAN Vision based Traffic Information and Analysis



Brief Description

TITAN is a software system that can process videos of various traffic road scenes under different weather conditions. The system can generate useful traffic data such as traffic volume and density, speeds of movement, and identify concentrations of vehicular and human activity.

Project Leader

Dr. Joel P. Ilao
Director, Advanced Research Institute for Informatics, Computing and Networking (AdRIC)
Associate Professor, Computer Technology Department
College of Computer Studies, DLSU

Implementing Agency

De La Salle University

Regional Startup Enablers for Ecosystem Development (ReSEED) Program

Project Title
HEIRIT ReSEED: Technological Consortium for Awareness, Readiness and Advancement of Knowledge in Innovation - Cordillera (TARAKI Cordillera)

Lead TBI/Implementing Agency
University of Cordilleras

Cooperating TBIs
Saint Louis University

Project Leader
Thelma Palaoag

Designation, Affiliation, Address
Director, UC Innovation and Technology Office

Contact Information
tpalaoag@gmail.com

Project Title
HEIRIT ReSEED: Innovation CONsortium of South Luzon (ICONS South Luzon)

Lead TBI/Implementing Agency
Batangas State University

Cooperating TBIs
UPLB TBI, PITBI, Animo Labs

Project Leader
Albertson Amante

Designation, Affiliation, Address
Vice President for Research and Development at BatStateU

Contact Information
albertsonamante@g.batstate-u.edu.ph

Project Title
HEIRIT ReSEED: Unified Movement in Western Visayas to Accelerate Startup and SpinOff Development (UMWAD Western Visayas)

Lead TBI/Implementing Agency
Iloilo Science and Technology University

Cooperating TBIs
WVSU, TUPV

Project Leader
Carmelo Ambut

Designation, Affiliation, Address
Vice President for Research and Extension at ISAT-U

Contact Information
carmelovambut@gmail.com

Project Title
HEIRIT ReSEED: Mindanao Startup Ecosystem Transformation Consortium (MindSET Northern Mindanao)

Lead TBI/Implementing Agency
University of Science and Technology of Southern Philippines

Cooperating TBIs
Caraga State University - Main
Mindanao State University-Iligan Institute of Technology

Project Leader
Bronson Mabulay

Designation, Affiliation, Address
Director, Innovation and Technology Solutions Division of USTP CDO

Contact Information
bronson.mabulay@ustp.edu.ph

Project Title
HEIRIT ReSEED: Synergistic, Innovative and Agile Cagayan Valley (SINAG Cagayan Valley)

Lead TBI/Implementing Agency
Cagayan State University - Andrews

Cooperating TBIs
Nueva Vizcaya State University - Main

Project Leader
Jose Guzman

Designation, Affiliation, Address
Director of Climate Change Program, CSU-OVPRDE / TBI Manager, BizNEST TBI

Contact Information
joguz1129@gmail.com
tbicsu@gmail.com

Project Title
HEIRIT ReSEED: Strategic and Collaborative Alliance for Leveraging Ecosystem of Startups in the National Capital Region (SCALE NCR)

Lead TBI/Implementing Agency
Technological Institute of the Philippines Quezon City

Cooperating TBIs
QBO, Mirriam, Animo Labs, Adamson, UST, Mapua, UPSCALE, AIM

Project Leader
Shearyl Arenas

Designation, Affiliation, Address
Electronics Engineering & Technopreneurship Coordinator/ TBI Manager, TIP N.I.T.R.O. TBI

Contact Information
shearyl.arenas@tip.edu.ph

Project Title
HEIRIT ReSEED:Development and Acceleration Support for Innovation Growth in Central Visayas (DASIG Central Visayas)

Lead TBI/Implementing Agency
Silliman University

Cooperating TBIs
UP Cebu, CIT

Project Leader
Janice Antoniette Forster

Designation, Affiliation, Address
TBI Manager, SInergy TBI

Contact Information
janicevforster@su.edu.ph

Project Title
HEIRIT ReSEED: Establishment of the Innovation and Development Accelerators Consortium for Startups in Davao Region (IDEAS- Davao Region)

Lead TBI/Implementing Agency
University of the Philippines Mindanao

Cooperating TBIs
University of Mindanao

Project Leader
Miguel Carlo Guillermo

Designation, Affiliation, Address
TBI Manager, UPGrADE TBI

Contact Information
msguillermo2@up.edu.ph

Project Title
HEIRIT ReSEED: Start-up ecosystem Leveraging on Opportunities and Networks for Growth (SULONG Central Luzon)

Lead TBI/Implementing Agency
Bulacan State University - Main

Cooperating TBIs
Holy Angel University

Project Leader
Dennis Dela Cruz

Designation, Affiliation, Address
Asst. Professor IV, Bulacan State Univaeristy /
Center Manager, BARAS TBI

Contact Information
dennis.delacruz@bulsu.edu.ph

Women-Helping-Women: Innovating Social Enterprises (WHWise) Program

Project Title
Prototype Improvement and Market Validation of AtoANI i-CROP Platform (A Data-based Recommendation Platform for a Produce-to-Demand Agriculture Model)

Description
A startup social enterprise that advocates the use of natural and sustainable farming practices. They developed AtoANI i-CROP, a tool that provides data-based recommendation to farmers on the type and amount of crop they should plant based on the demand from the orders of B2B customers (ex. Fresh produce stores). The team has worked with 39 small-holder farmers in Bohol and Cebu.

Social Enterprise
AtoANI

Community
Farmers

Project Leader
Añora, Maria Wilvenna Aparece
Co-Founder and Head of Strategy and Business Development

Contact Information
wilvie.anora@gmail.com

Project Title
EdukSine App and Streaming Website

Description
Pinoy Indie Films Road Show is an unconventional platform for showing local independent films about education, women empowerment, VAWC, health, environment, gender equality, agriculture, and other films for nation building. The team developed the EdukSine App and Streaming Website for Blocked Screening Video on Demand.

Social Enterprise
PIRFS Multimedia Distribution Services

Community
Indie Filmmakers & Producers

Project Leader
Karen Jane Salutan
CEO, Founder and Marketing Director

Contact Information
karenjaneds@gmail.com

Actions-Hub Inc.

Project Title
Assistance to the Upgrading of Technology of LunchBox Project Superfoods and its Community Partners in Bulacan, Philippines

Description
Actions Hub Philippines Inc.'s mission is for local producers to be able to supply the feeding program demand of their own locality. The technology, Superfoods, is a variation of nutritious food packs where the base raw materials are supplied by the DOST-FNRI adaptors, and the added ingredients are supplied by the community of farmers and various livelihood food manufacturing entities.

Social Enterprise
Actions Hub Philippines Inc

Community
Farmers

Project Leader
Deborah Gay Estacio
Founding President

Contact Information
gayedayrit@outlook.com

Project Title
Babae Livelihood AcceleratiNG Kasaba OpportunitY (BALANGKOY)

Description
FLQ Foods and Panciteria has been producing miki for their panciteria using flour bought outside Kalinga since there are no flour producers in the province. The team aims to enhance the process of producing pancit miki by converting cassava flesh into powder.

Social Enterprise
FLQ Foods and Panciteria

Community
Indigenous Farmers

Project Leader
Wilma Alvester
Founder/ Former chairperson of Tabuk Women Indigenous Organization (TWIO)

Contact Information
fordladyqueen@gmail.com

www.husay.co

Project Title
Enhancement and Market Validation of Husay.Co, a Learning-to-Earning Platform for Filipino Artists and Creative Workers

Description
Husay Co. is a social enterprise with the goal to empower Filipino artists to increase their income, establish their profession, and ease their creative process with their clients through social learning and job management. They are developing a learning-to-earning platform for Filipino artists and creative workers where they can showcase their portfolio, take classes, teach, get hired, and participate in creative communities.

Social Enterprise
Husay Company

Community
Artists & Creative Workers

Project Leader
Rasay, Leah Katrina Del Rosario
Founder and CEO

Contact Information
leah@husay.co

VIRTUALAHAN
Business Value + Social Impact

Project Title
Enhancement and Market Validation of a Fully Accessible Cloud-Based Virtual School for Persons with Disabilities in the Philippines

Description
Virtualahan is an impact driven company that provides digital skills training, employment & entrepreneurship support, life-coaching & community building for Persons with Disabilities. They developed the first Filipino-made virtual pre-employment school for all types of persons with disabilities that is compliant with the Web Content Accessibility Guidelines.

Social Enterprise
Virtualahan Inc.

Community
PWD

Project Leader
Rose Villamor
Co-Founder and Vice President for Community Building and Well-being

Contact Information
rose@virtualahan.com

empath

Project Title
Development and Market Validation of Empath, A Mental Health App for Youth in High-Stress Situations

Description
Empath envisions greater mental health care access for Filipinos by providing access to online counselling and workshops/seminars on mental health care. They currently have an online, web-based booking platform for one-on-one counselling sessions that connects prospective clients with partner MHC providers.

Social Enterprise
Empath Corporation

Community
Students and Young Professionals

Project Leader
Stephanie Angelica Naval
Founder and CEO

Contact Information
stephsnaval@gmail.com

PLANTSVILLE HEALTH

Project Title
Optimizing the Production of Natural Products from the Philippine Cinnamon & other aromatic plants

Description
A social enterprise that champions for the conservation of the Philippine cinnamon for livelihood and climate change mitigation. They partner with farmers in planting, growing, and harvesting crops and have products such as cinnamon seeding, essential oil, aromatic water/hydrosol, natural sanitizer, bark chip, and cinnamon coco sugar.

Social Enterprise
Plantsville Health Products

Community
Farmers

Project Leader
November Canieso
Social Entrepreneur

Contact Information
novembercanieso@gmail.com

Ofamen Cacao Farm

Project Title
Calunasan Cacao Pod Husk w/ Rice Hulls based Fuel Briquetting

Description
Ofamen Cacao Farm's legacy started 30 years ago with their farm having 130 Cacao trees and major products including cacao seedlings, tableya, vegetables and bananas. Ofamen eyes the opportunity to convert waste agricultural biomass by-products from rice hulls and cacao pod husks into commercial briquettes.

Social Enterprise
Ofamen Cacao Farm

Community
Farmers

Project Leader
Joy Pulchra Sarabia
Social Entrepreneur

Contact Information
joypulcra@gmail.com

Startup Grant Fund Program

AGRABAH VENTURES

Project Title
Agrabah: An Agriculture Technology Platform for Automated Logistics Booking for Farmers and Fisherfolks

Description
Agrabah provides an integrated platform that arranges delivery of agricultural produce from farming communities to enterprise, providing farmers a seamless experience to market, easy access to clients and financing to meet volume requirements.

Startup Company
Agrabah Ventures Inc.

Priority Area
Supply Chain and Logistics

Project Leader
Joselito Ocol, Jr.

Contact Information
Agrabah@aim.edu
jun@agrabah.ph

CAWIL.ai

Project Title
Enhancement of the Prototype and Market Validation of Traceability Access for Consumer and Export powered by Artificial Intelligence (TrACE.AI) Software System

Description
TrACE.AI is a Fish- Electronic Catch Documentation and Traceability app which automates catch documentation by utilizing artificial intelligence in identifying fish species.

Startup Company
CAWIL AI

Priority Area
Supply Chain and Logistics

Project Leader
Ms. Cherry Murillon-Cubacub

Contact Information
cherry@cawilai.co

Project Title
Improvement and Assessment of Marketability of an AI-powered Buyer-Supplier Matching and Management System for Businesses in the Philippines

Description
The Burket platform provides digitized procurement processes for business-to-business transaction that efficiently and conveniently connect businesses to suppliers and buyers enhancing discoverability, savings, and sales.

Startup Company
Burket PH

Priority Area
Supply Chain and Logistics

Project Leader
Mr. Jeff Clarenz Turla

Contact Information
jeff@burket.ph

Project Title
Enhancement and Validation of Zippee Logistics: A Franchise B2B Logistic Platform for Truck Owners and Franchisees

Description
Zippee Logistics is a B2B logistic service booking platform for truck owners and franchisees

Startup Company
Bizooku Philippines Inc.

Priority Area
Supply Chain and Logistics

Project Leader
Mr. Alejandro James A. Chiongbian

Contact Information
alejandro@bizooku.com

Project Title
Enhancing the MSME Supply Chain Experience by Integrating Cold Chain Solutions in DeliverE 2.0

Description
The DeliverE Platform integrates different agriculture stakeholders into a single digital platform from farmer-to-consumer (F2C), business-to-business (B2B) and business-to-consumer (B2C), that increases process cycle efficiency by 63% by shortening the agriculture supply chain from 8 steps to 4 steps. It also includes monitoring of transport fleet and warehouses.

Startup Company
InsightSCS Corp.

Priority Area
Supply Chain and Logistics

Project Leader
Arvi P. Miguel

Contact Information
pierre.curay@insightscs.com
arvi.miguel@insightscs.com

Project Title
Enhancement of BizKit (The First Local Centralized Business Suite) to better facilitate cross-functional and holistic business operations in the new normal

Description
BizKit is a local centralized business suite to streamline processes and information across the entire company and enable real time data visibility of business status

Startup Company
Bizkit

Priority Area
Supply Chain and Logistics

Project Leader
Ms. Jin Beryle Dela Cruz

Contact Information
jindelacruz@bizkittechnologies.com

AGRO-DIGITALPH

Project Title
Prototype Enhancement for Digitizing Traditional Market Centers (Bagsakans) and Market Validation for a Networked Agricultural Clearing House

Description
'AgroDigitalPH' is a digital platform developed by Verdant that provides end-to-end solutions for small farmer organizations by virtually aggregating farmers' assets and production capabilities. This platform aims to digitally-support market centers or modernized bagsakans to give the farmers an opportunity to monetize their produce.

Startup Company
Verdant Seasons Farm Management Technologies Corporation

Priority Area
Supply Chain and Logistics

Project Leader
Rey Kenneth D. Molina

Contact Information
henry.sison@agro-digitalph.com
ken.molina@agro-digitalph.com

PTi inc. Platform Technologies

Project Title
Improvement and Digitalization of Agri-Ecommerce Farm To Table Infrastructure

Description
Platform Technologies Inc. provides Software as a service (SaaS) for cooperatives, associations and MSMEs in Cebu, and also operates The Green Table (TGT) which has been advocating to provide healthy food products delivered direct to consumers. TGT has a Farm to Table E-commerce platform that guarantees farmers sure buyers at a fixed price and it also manages oversupply of produce and demand for healthy products through processing of value-added products like juices, smoothie kits and salads.

Startup Company
Platform Technologies Inc.

Priority Area
Supply Chain and Logistics

Project Leader
Ms. Guada Marie Kho

Contact Information
khoneilclyde@gmail.com
gmckho@gmail.com

eCFULFILL

Project Title
Exporter Incubation and Predictive Intelligence for Exporters – Improving the Capabilities of eCExport, an AI-powered export incubation platform for Filipino MSMEs

Description
ECExport is a web-based enterprise resource planner (ERP) for Filipino MSME exporters. The software integrates e-commerce marketplaces, market intelligence, warehouse logistics, order fulfillment, digital marketing, and digital payment methods.

Startup Company
ECFULFILL INC.

Priority Area
Supply Chain and Logistics

Project Leader
Mr. Ghian Carlo Marucot

Contact Information
09175202082

ROCKETLABS

Project Title
Enhancement and Market Validation of Airship Logistics, a Logistics Management Suite to Help Optimize the End-to-End Delivery Operations of Ecommerce Logistics

Description
Airship is an end-to-end, ready to use logistics management system designed for local Philippine courier companies to streamline logistics workflow through an optimized delivery process.

Startup Company
Rocket Labs Consulting Inc.

Priority Area
Supply Chain and Logistics

Project Leader
Ms. Rachelle Uy

Contact Information
09175378250
rachelle.uy@airship.me

Project Title
Enhancement and Market Validation of OMG! Oh My Genie! (An AI-Enabled Automated Last Mile Fulfillment System for Brands and Suppliers)

Description
Oh My Genie! is a last-mile fulfillment system that enables an easier fulfillment method for retail brands by consolidating orders coming from their various sales channels and routing these orders to the store nearest the customer, allowing for faster delivery and decreasing inventory distortions for the retail brands and suppliers.

Startup Company
Chimera Technologies Corporation

Priority Area
Supply Chain and Logistics

Project Leader
Mr. Karl Frederick N. Kesner IV

Contact Information
karl.kesner@ohmygenie.ph

Project Title
Market Segment Validation and Targeting for CodeChum, An Online Programming Class Platform

Description
CodeChum is an online, web-based platform for programming education for teachers and students.

Startup Company
Platform Technologies Inc. CodeChum

Priority Area
Learning and Education

Project Leader
Mr. Jemar Jude A. Maranga

Contact Information
jude@codechum.com

Project Title
Enhancement and Market Validation of Infinit LMS a Learning Management System with Outcomes-Based Education Analytics

Description
Infinit LMS is a learning management system to conduct online learning and for sharing of materials and resources

Startup Company
Infinit LMS

Priority Area
Learning and Education

Project Leader
Mr. Wedmark A. Parajes

Contact Information
somerset@infinitwebsolutions.com
infinitwebsolutions@gmail.com

Project Title
Enhancement of Prototype and Market Validation of TinkerClubs.com (A STEAM-Learning Platform for K-to-6 Learners)

Description
TinkerClubs is an online learning community platform that supports STEAM (Science, Technology, Engineering, Arts and Math) workshops, projects and learning kits for young students.

Startup Company
Tinkerhouse

Priority Area
Learning and Education

Project Leader
Mr. Christopher G. Sabando

Contact Information
christophersabando@gmail.com

Project Title
Enhancement and Market Validation of Nutricoach (A work-from-home productivity tool for nutrition professionals)

Description
Nutricoach is an online platform that aids nutrition professionals to manage their business, simplify the nutrition care process (NCP), and work with clients remotely.

Startup Company
NutriCoach, Inc.

Priority Area
Work-from-Home Productivity Tools

Project Leader
Sharafiyah Amina Batua

Contact Information
fia.batua@nutricoach.pro

Project Title
Virtual Reality and Networking Feature for our Virtual Events Platform

Description
VIRNEW is a virtual events platform that helps companies and organizations conduct events by providing a virtual venue, event management software/solutions, and Virtual Reality (VR) feature.

Startup Company
Olern, Inc.

Priority Area
Creative industries

Project Leader
Win Dizon

Contact Information
win@olern.ph

Project Title
Enhancement of Material Property of Lesstics Roofing Tile (Bio-based Insulation Polymer/Waste Single-Used Plastic Composite)

Description
Lesstics is a cost-effective and sustainable material derived from waste Single Used Plastics.

Startup Company
Lesstics

Priority Area
Sustainable Industries

Project Leader
Mr. Kenno Michael Uy

Contact Information
lesstics@gmail.com

Project Title
Enhancement and Market Validation of ROBIN (A reverse vendo machine for collecting PET bottles and aluminum cans)

Description
ROBIN (Recycle On-demand BIN) is a reverse vendo machine that collect plastic bottles and aluminum cans for exchange of reward points.

Startup Company
ROBIN

Priority Area
Sustainable Industries

Project Leader
Emmanuel Bobis

Contact Information
emmanuel.bobis@gmail.com

Project Title
Enhancement and Validation of the Advanced Robust Cooperative System (ARCS), an integrated Software-as-a-Service (SAAS) solution for cooperative management and regulatory compliance

Description
The Advanced Robust Cooperative System (ARCS) is a Software-as-a-Service (SAAS) platform that will help cooperatives in the Philippines manage and grow their operations and comply with regulatory requirements by integrating various basic and advanced data collection and reporting modules unique to cooperatives in an easy-to-use online platform.

Startup Company
IOL

Priority Area
Sustainable Industries

Project Leader
Mr. Renzo N. Ducusin

Contact Information
kevin@iolph.com

Project Title
Improvement of the MAGWAI Reef-Safe Sunscreen Formulation to Accelerate its Market Adoption

Description
Magwayen Organics, Inc. is the maker of the MAGWAI Reef-safe Sunscreen which was launched back in 2018. It contains non-chemical UV filters and is rated SPF 50, has a non-greasy feel, and is hypoallergenic.

Startup Company
Magwayen Organics, Inc.

Priority Area
Sustainable Industries

Project Leader
Mr. Lindberg R. Gilera

Contact Information
lindberg@magwai.com.ph

Project Title
Enhancement of Local Disaster Reporting and Response System

Description
OBX's Local Disaster Reporting and Response System is a system that aims to easily identify and track the location of the reported incidents and facilitate the dispatching of appropriate response to emergency needs.

Startup Company
OBX

Priority Area
Tools for Public Service

Project Leader
Mr. Arnel Arreglado

Contact Information
arnelarreglado@gmail.com

Project Title
Enhancement of XPERTO Events Management and Credentialing Platform Using Cloud Technologies and Artificial Intelligence

Description
XPERTO provides total digital solutions for professional events management including registration, payment collection, virtual event platform setup, and issuance of digital certificates.

Startup Company
Wayvent Innovations, Inc. (XPERTO)

Priority Area
Tools for Public Service

Project Leader
Emmanuel Caguimbal

Contact Information
emman@xperto.ph

IP Management Program for Academic Institutions Commercializing Technologies (IMPACT)

Project Title
IMPACT: Establishment of the Technology Transfer and Commercialization Management System at Cagayan State University

Implementing Agency
Cagayan State University

Project Leader
Jose D. Guzman

Designation, Affiliation, Address
Director of Climate Change Program, CSU-OVPRDE / TBI Manager, BizNEST TBI

Contact Information
joguz1129@gmail.com
tbicsu@gmail.com

Project Title
IMPACT: Reinforcing the Capability of the Technology Transfer Program of the DOST-Forest Products Research and Development Institute

Implementing Agency
DOST Forest Products Research and Development Institute (FPRDI)

Project Leader
Ms. Maria C. Reyes

Designation, Affiliation, Address
Senior SRS, FPRDI

Contact Information
maria.reyes@fprdi.dost.gov.ph

Project Title
IMPACT: Establishment of the Knowledge, Innovation and Technology Transfer Processes of the Holy Angel University

Implementing Agency
Holy Angel University

Project Leader
Engr. Gina S. Tumang

Designation, Affiliation, Address
ITSO Manager

Contact Information
gtumang@hau.edu.ph
ginagie_tumang@yahoo.com

Project Title
Establishment Iloilo Science and Technology University Technology Transfer Processes

Implementing Agency
Iloilo Science and Technology University

Project Leader
Engr. Naci John Trance

Designation, Affiliation, Address
Director, Intellectual Property Management Office

Contact Information
nacijohn@gmail.com

Project Title
IMPACT Operationalizing Technology Transfer in T.I.P.: A Reference for T.I.P. Initiatives to Strengthen the Innovation Ecosystem

Implementing Agency
Technological Institute of the Philippines

Project Leader
Engr. Jennifer Enriquez

Designation, Affiliation, Address
ITSO Manager

Contact Information
jennifer.enriquez@tip.edu.ph

Project Title
IMPACT: Establishment of the SU-KTTO at Silliman University, Dumaguete City, Negros Oriental

Implementing Agency
Silliman University

Project Leader
Engr. Klint Ian Austero

Designation, Affiliation, Address
ITSO Officer

Contact Information
klintvaustero@su.edu.ph

Project Title
TRUE IMPACT: Technology and Research of USeP Enhanced through IMPACT

Implementing Agency
University of Southeastern Philippines

Project Leader
Engr. Filmann T. Simpao

Designation, Affiliation, Address
Director, Knowledge and Technology Transfer Division

Contact Information
filmann.simpao@usep.edu.ph

Project Title
IMPACT: Establishment of Technology Management System at Samar State University

Implementing Agency
Samar State University

Project Leader
Dr. Vivian L. Moya

Designation, Affiliation, Address
IPTBDO Director

Contact Information
vivian.moya@ssu.edu.ph

Project Title
IMPACT: Establishment of Knowledge, Technology Transfer and Business Development Processes and Services in West Visayas State University

Implementing Agency
West Visayas State University

Project Leader
Dr. Arnel N. Secondes

Designation, Affiliation, Address
College Secretary, College of ICT

Contact Information
arnel.secondes@wvsu.edu.ph

2021

COMPLETED PROJECTS

Project Title	Project Leader	Implementing Agency	Project Manager	Funding Source
TBI 4.0 Program				
TBI 4.0: Elevating the Capacity & Services of TBIs Towards 4th Generation Incubator's Facilities	DOMINGA MALLONGA	QBO	Leizl Sueno Catherine Miranda Jejomar Carlos	PCIEERD-GIA
TBI 4.0: Evolution of UPScale from Local to Global Incubation	Stephen Fajardo	University of the Philippines-Diliman	Edward Apigo Jejomar Carlos	PCIEERD-GIA
TBI 4.0: DOST-S.I.B.O.L. Labs: Startup Innovation and Business Opportunity Linkage Labs (A collaboration between UC Berkeley Sutardja Center for Entrepreneurship and Technology and UP Los Banos Technology Transfer and Business Development Office)		University of the Philippines-Los Baños	Ryan Torrico	DOST-GIA
TBI 4.0: Technology Business Incubator 4.0 for Region 4	Dennis Dela Cruz	Batangas State University	Leizl Sueno Daniel Malapitan Edward Apigo Ryan Torrico	PCIEERD-GIA
TBI 4.0: Co-incubation Program between CDO b.i.t.e.s. and and Spring Valley	Alvin Chua		Leizl Sueno Marivic Oquialda	DOST-GIA
TBI 4.0: Upgrading and Capability-Enhancement Animo Labs TBI		De La Salle University (DLSU)	Leizl Sueno Francis July Rivera	PCIEERD-GIA
HEIRIT Program				
HEIRIT: DOST-Business incubation zone for Novel and Sustainable Enterrprises (BizNEST) in Cagayan State University	Vivian Moya		Ryan Torrico	PCIEERD-GIA
HEIRIT: Establishment of TBI Center for the University the Cordilleras	Efrhain Louis Pajota		Leon Mendigorin	PCIEERD-GIA
HEIRIT: Support for the Establishment of TBI in Holy Angel University (HAU)	Edgar Garcia	Holy Angel University	Marivic Oquialda	PCIEERD-GIA
HEIRIT Establishment of the DOST-Bicol University Technology Business Incubation (BU-TBI) Center for Bicol Region		Bicol University	Leizl Sueno Kristelle Anne Icuspit	PCIEERD-GIA
HEIRIT: Technology Business Incubator Establishment at Saint Louis University (SLU) Technohub			Edward Apigo Daniel Malapitan Norman Nicole Jimenez	PCIEERD-GIA
HEIRIT: AgiLab: Establishment of USeP Technology Business Incubation Facility and Services for Internet of Things (IoT) Industrial Technology and Systems Application Development		University of Southeastern Philippines (USP)	Jejomar Carlos	PCIEERD-GIA
HEIRIT: Establishment of the DOST-CITU TBI Wildcat Innovation Labs		Cebu Institute of Technology	Marivic Oquialda	PCIEERD-GIA
HEIRIT: Establishment of a Technology Business Incubator at Silliman University		Silliman University	Edward Apigo Daniel Malapitan Daniel Bryan De Asis	PCIEERD-GIA
HEIRIT: ESTABLISHMENT OF THE SABATAN: THE NUEVA VIZCAYA STATE UNIVERSITY TECHNOPRENEURS HUB		Nueva Vizcaya State University	Marivic Oquialda	PCIEERD-GIA
HEIRIT Establishment of the DOST technology Business Incubation in UP Mindanao		University of the Philippines Mindanao	Leizl Sueno Jhon Louis Salom	PCIEERD-GIA
HEIRIT: Establishment of DOST-BulSU BARAS TBI (Business Assistance for Research Acceleration and Sustainability Technology Business Incubator)		Bulacan State University	Leon Mendigorin	PCIEERD-GIA
HEIRIT: Establishment of the DOST-TUPV HIVE (Hub for Innovation and Value Engineering)			Christian Mari Zamora	PCIEERD-GIA
HEIRIT: ESTABLISHMENT OF DOST-SAMAR STATE UNIVERSITY TECHNOLOGY BUSINESS INCUBATOR		Samar State University	Francis July Rivera	PCIEERD-GIA
HEIRIT: UMasenso: Establishment of University of Mindanao Technology Business Incubation Facility and Services for Environmental Solutions		University of Mindanao Philippines	Christian Mari Zamora	PCIEERD-GIA
IMPACT Program				
IMPACT: Enhancement of Intellectual Property and Technology Transfer Processes in MSU-IIT			Christian Mari Zamora	PCIEERD-GIA
FASTRAC Program				
FASTRAC: MAPX: Manage Assets and Properties and Map for Visualization		Caraga State University (CSU)	Leizl Sueno Jejomar Carlos	PCIEERD-GIA
FASTRAC: X-LIPAD: Light Intelligent Platform for Autonomous Drones		De La Salle University (DLSU)	Jejomar Carlos	PCIEERD-GIA
Other Projects				
MICAB CAB HAILING BIG DATA ANALYTICS ENGINE	Jose Guzman		Jejomar Carlos	PCIEERD-GIA
Technology Innovation for Commercialization (TECHNICOM) Management Support Program - (Continuing Program)			Russell Pili Christian Mari Zamora	DOST-GIA
Innovation, Science and Technology for Accelerating Regional Technology-Based Development (iSTART)			Russell Pili Daniel Malapitan Edward Apigo Norman Nicole Jimenez	PCIEERD-GIA
Support to the Commercialization of 500 DOST Generated Technologies and Strengthening the Country's Intellectual Properly and Technology Portfolios (Phase 3)		Technology Application and Promotion Institute (TAPI)	Leizl Sueno Jejomar Carlos	PCIEERD-GIA
PILOT-TESTING AND DEPLOYMENT OF A POST COMMUNITY QUARANTINE (CQ) HEALTH MONITORING AND CONTACT-TRACING ONLINE SYSTEM FOR THE IT-BPM SECTOR		Department of Science and Technology - Region 6 (DOST 6)	Russell Pili Ryan Torrico Paulo Jay De Jesus	PCIEERD-GIA
2017-2019 DOST Technology Transfer Day (TTD)			Kristelle Anne Icuspit Marivic Oquialda	DOST-GIA
OPTIMIZATION OF VIRTUAL REALITY KIT (VR KIT) FOR NEW MEDIA TECHNOLOGY AND COMMERCIAL COMPETITIVENESS		Mataverse Incorporated	Marivic Oquialda Leizl Sueno	PCIEERD-GIA
CRADLE: Enhancement and Market Validation of Plasma Enhanced Chemical Vapor Deposition industrial Prototype for Nitride-Based Coatings		University of the Philippines-Diliman	Francis July Rivera	DOST-GIA
Enhancing Operational Capability of Palawan International Technology Business Incubator (PITBI)		Palawan State University	Leizl Sueno Francis July Rivera	PCIEERD-GIA

Information Dissemination

Communicating science is a crucial part of R&D. When research results are not passed on, it'll render the research project insignificant.

As DOST-PCIEERD supports more than a hundred projects yearly, it makes sure that Filipinos remain informed of the Philippines' latest advancements in S&T.

It undertakes sustained programs for information dissemination to facilitate access to and proper utilization of information and research results by the industry, the business sector, and other potential technology users.

The Council keeps up with the emerging science communication trends and is active in multimedia channels to reach as many Filipinos as it can and enlighten them with the wonders of science.

Travelling exhibit helps train close to 100k teachers and students

Project Title: Philippine Science Centrum Traveling Exhibits: A platform for Promoting Science Interest Among Students in Geographically Isolated Disadvantaged Areas (GIDA)

Project Leader:
May M. Pagsinohin

Implementing Agencies:
Philippine Foundation for Science and Technology

Despite the pandemic roadblocks, the Philippine Foundation for Science and Technology (PFST) successfully trained close to 100,000 students and teachers through the Philippine Science Centrum's travelling exhibits.

Aimed for geographically isolated disadvantaged areas (GIDA), it is dubbed as the GIDA Project with the goal to arouse interest among students in selected geographically isolated disadvantaged areas in the Philippines, funded under the Grants-in-Aid (GIA) program of the Department of Science and Technology (DOST) and monitored by the DOST Philippine Council for Industry, Energy, and Emerging Technology Research and Development (DOST-PCIEERD).

PFST Executive Director May Pagsinohin said the implementation of the project was quite challenging amid the existing lockdowns imposed since March 2020. But she said that the foundation found its way to carry out the project as education, primarily in remote communities, remains at the premium of their mandate.

"With the anticipation of the community quarantine being relaxed in the early 2021 and with the low transmissions in the isolated areas of the country, the project team opted to narrow down the 12 GIDA venues to only (6) six venues specifically in the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM). The said region was open with the project to be conducted in their area, thus initial meetings and coordination have been done already," she said.

However, with the continued challenges brough about by the pandemic, the foundation opted to conduct the exhibits fully video based, as well as the training for teachers.

Pagsinohin said that with the transition to the digital platform, the foundation is optimistic to provide a valuable learning opportunity for 90,000 students and 900 teachers for the nine GIDA areas which are Romblon, Marinduque, Occidental Mindoro, Masbate, Catanduanes, Northern Samar, Eastern Samar, Zamboanga del Norte, and Zamboanga del Sur on the Year 2 implementation of the GIDA project in 2022.

Events and Activations

11 years of building PH's R&D capability

Championing the theme "From labs to lives: Building R&D capacities and opportunities for sustainable recovery," the Department off Science and Technology - Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) celebrated its 11th founding anniversary with innovativeness, integrity, excellence, and unhampered public service to the Filipino people.

DOST officials including Secretary Fortunato T. de la Peña and Undersecretary for R&D Dr. Rowena Cristina L. Guevara, together with the Japan Science and Technology Agency Director for International Affairs Mr. Osamu Kobayashi and notable Balik Scientists attended the event to commemorate the milestones in human resource and institution development, along with its innovations for the COVID-19 pandemic.

"Kudos to everyone in PCIEERD for their hard work and dedication. The DOST family takes great pride in all of PCIEERD's achievements, successes, and great contributions to the growth of the Philippines," said de la Peña.

Guevara added, *"with PCIEERD, we are doing so well in innovation. We need to drum up development of more strategies and programs to build stronger R&D institutions backed by a critical mass of researchers, scientists, and engineers."*

Testament to this is the impact of its Human Resource Development Program (HRDP) as it has assisted **434** Filipinos from 2015 to 2021. Since 2017, **29** student teams have also turned their bright ideas into reality under the Young Innovators' Program (YIP). In addition to this, **32** balik scientists under the sectoral coverage of PCIEERD have helped universities and research institutions achieve their R&D targets.

With a total investment of **P179 million**, DOST-PCIEERD's Institution Development Program has helped establish and upgrade **34** laboratories across the nation. It was also highlighted that the Council allocated **P52 million** for the Smarter Philippines through Data Analytics Research and Development, Training and Adoption or Project SPARTA to upskill **30,000** Filipinos to efficiently manage and interpret big data.

To continue upskilling Filipinos, DOST-PCIEERD launched these six new grants and capability building programs for RSEs:

Providing Resources, Opportunities and Support for Project-based Personnel and Researchers (PROSPPER)

PROSPPER provide assistance to project personnel and researchers of PCIEERD-supported and monitored R&D projects for the conduct and completion of their graduate degrees while gaining research experience in the said projects.

Researchers on Industry, Energy Emerging Technologies - Opening Opportunities for Learning (RIEETOOL)

RIEETOOL gives support to researchers, scientists, engineers, faculty, students, and personnel from academic and research institutions, as well as government and private institutions, to enhance their skills and knowledge that will complement the human resources and skills requirements of the industry, energy and emerging technology (IEET). Also, the grant provides support to attendance to highly specialized trainings and conduct of group trainings to acquire specialized skills and new knowledge in the IEET sectors.

Balik Saliksik

The grant provides support to Filipino researchers who have obtained their PhD degrees from local and foreign universities and would like to conduct research in their respective institutions upon their return. Also, the grant aims to attract Filipino graduates to return and work as adjunct/permanent researchers in higher education institutes (HEIs) and/or DOST-attached research and development institutions (RDIs).

Expert Intervention for Scientific Engagement (ExpertISE) for PCIEERD Regional Consortia

The ExperTISE Program aims to uplift regional consortia for industry, energy, and emerging technologies by providing regional experts to industry and identify potential niche, industry gaps, challenges and R&D needs, and conceptualize Science & Technology innovations that will address the gaps in the industry.

Regional Research Institution (RRI)

RRI covers support for R&D to new researchers, scientists, and engineers (RSEs) and new institution in the region under the PCIEERD Consortium to assist them in the development of their research capabilities and eventually increase the available RSEs in regions.

S&T Fellows Program

Experts in science and technology (S&T) are encouraged to apply for the S&T Fellows Program to help DOST enrich the country's S&T human resources.

It is a long-term engagement that has the goal of upgrading the R&D know-how of the department's attached agencies. S&T fellows will direct, undertake, and promote R&D in the country that are envisioned to spur socio-economic growth, as well as speed-up inclusive development in the countryside through state-of-the-art innovations.

Science Communication Fellowship Program

In partnership with the University of the Philippines Los Baños College of Development (UPLB-CDC), DOST-PCIEERD is rolling out the Science Communication Fellowship Program to empower 40 scientists, researchers, and communications specialists to better promote their innovations and research results to the public. The program is composed of a series of mentoring activities that will introduce the concepts of science communication, popularization techniques, and skills in developing communications materials.

"As the preferred partner in boosting productivity and growth in the Philippines' S&T fields, we are confident that these new programs will help many Filipinos evolve into S&T experts and fast track overall development," said DOST-PCIEERD Executive Director Dr. Enrico C. Paringit.

The virtual event had 224 attendees from the academe, government, industry, and private sector.

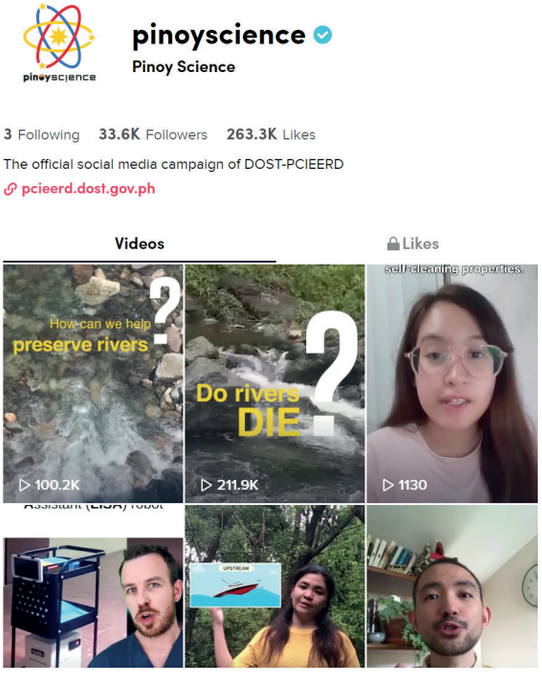
Popularizing science on TikTok

Popularizing science has been a struggle for scientists and researchers in the Philippines. This challenged the Department of Science and Technology – Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) to always find innovative ways to communicate science to the public, especially amid the COVID-19 pandemic.

It is in this light that TikTok, a known video-sharing app, partnered with the Council to produce high-quality videos that inform Filipinos about the country's latest advancements in science and technology through one to three-minute videos on TikTok from January to June 2021.

This partnership is an opportunity for DOST-PCIEERD to show to the world that Filipino scientists and researchers are not only world class innovators, but effective science communicators as well.

"Communicating science is a vital part in research as it bridges effective translation of the knowledge generated in the research to a more accessible and easily understandable information that do not only enrich the knowledge of those who learn it but also empower individuals to make science-based decisions," said DOST-PCIEERD Executive Director Dr. Enrico C. Paringit.

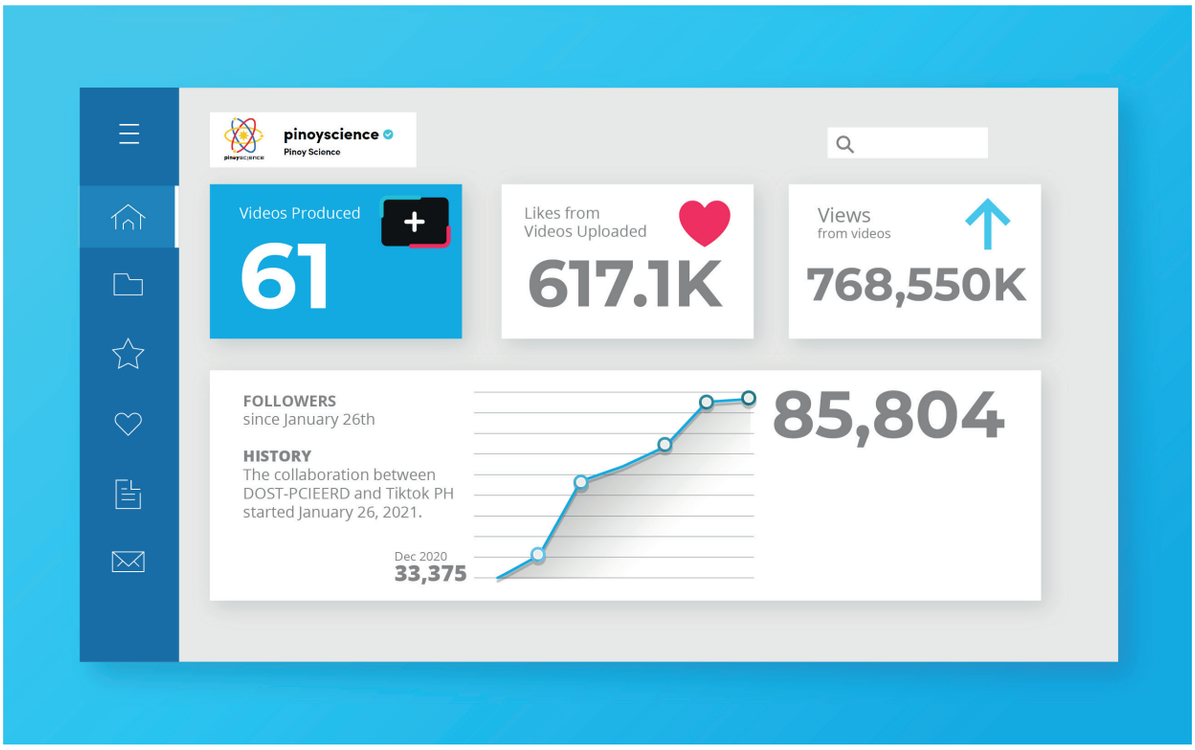


Activities and Accomplishments

Videos on Pinoy Innovations

Videos on DOST and PCIEERD projects and initiatives were produced in partnership with researchers, project leaders, DOST employees to share knowledge and research results, and showcase Filipino innovations.

Engagement



#PinoyInnovator Hashtag Challenge

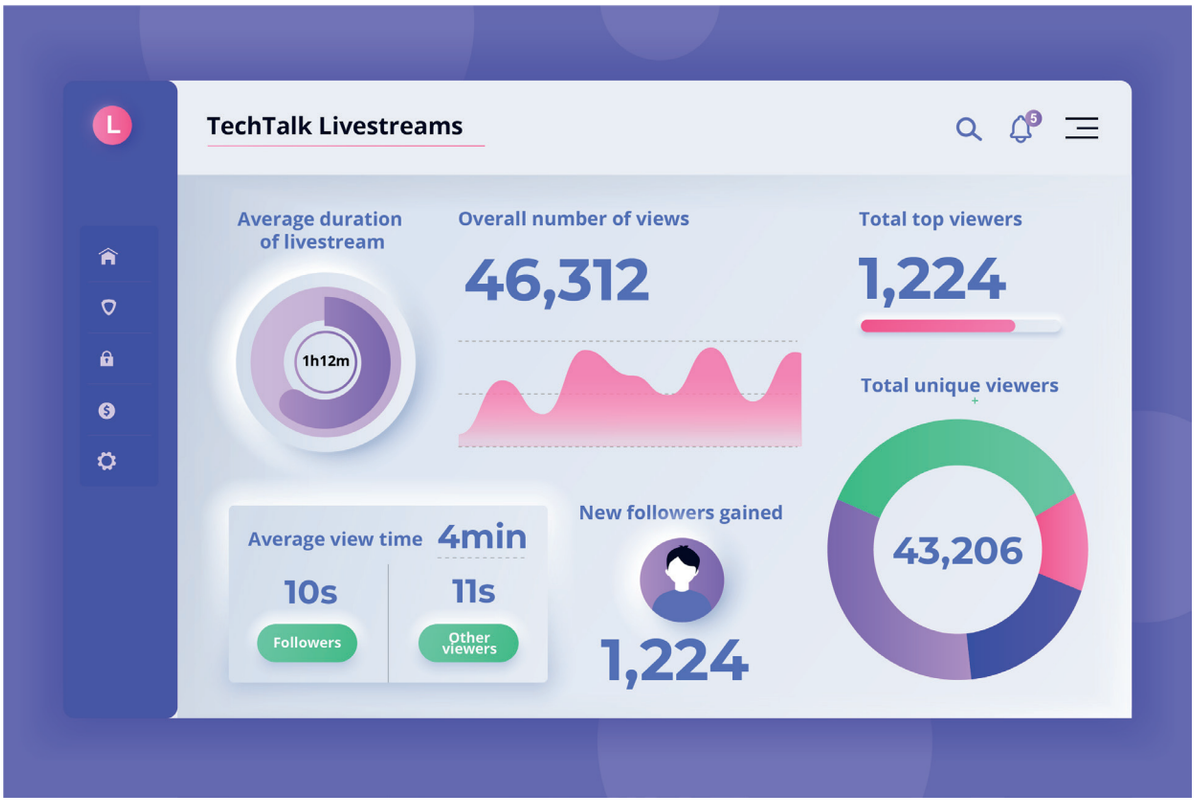
This hashtag challenge invited TikTok users to proudly show how creative and resourceful they are by developing a nifty innovation or invention out of common household items.

The 2021 #PinoyInnovator is Engr. Jeremy C. de Leon. He won by creating an affordable, handy microscope. To date, he used the prize money to refine the microscope. He recently reached out to DOST-PCIEERD to collaborate in organizing a TikTok giveaway contest for students who will find the microscope useful for their studies and research.

TechTalk Livestreams

TechTalk is a series of livestreams in talk show format hosted by a known TikTok creator. Each episode featured project leaders and representatives from PCIEERD-supported projects to share their innovations and accomplishments in a fun and engaging way.

Topic	Date
1. Learning in the COVID-19 pandemic	April 15, 2021
2. Upgrading Face Masks in the COVID-19 Pandemic	April 29, 2021
3. Importance of Data Science in the Philippines	May 27, 2021
4. Fighting COVID-19 with bioinformatics	June 24, 2021



Science Communication on TikTok Workshops

In May, DOST-PCIEERD and TikTok organized two workshops for researchers, communication officers, and interested public audiences who aim to use the TikTok app as a platform to promote and communicate science and technology-related information.

1. Communicating Science for the People through TikTok, 11 May 2021 (Internal Workshop)
2. Science Communication on TikTok, 20 May 2021 (Public Workshop)

Overall number of attendees:

- Internal: 191
- Public: 706

#AskPinoyScience

The #AskPinoyScience information campaign encouraged TikTok users to ask questions on science topics. Pinoy experts and scientists were invited to answer the questions. DOST-PCIEERD noticed that the campaign also encouraged discourse on science; many TikTok users shared their curiosities and opinions while others tried to answer some questions commented and debunk some misinformation on some scientific facts.

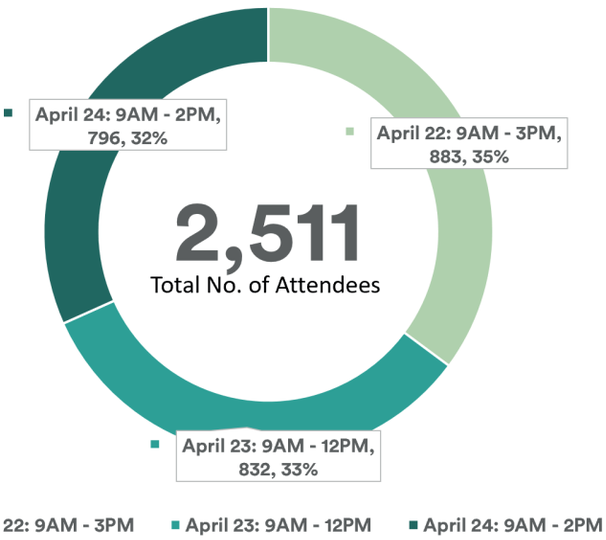
PCIEERD holds 1st graduation for completed R&D projects

To showcase and recognize the accomplishments of Filipino scientists, the Department of Science and Technology – Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) conducted a conference that served as the culminating activity for its completed R&D projects in 2020.

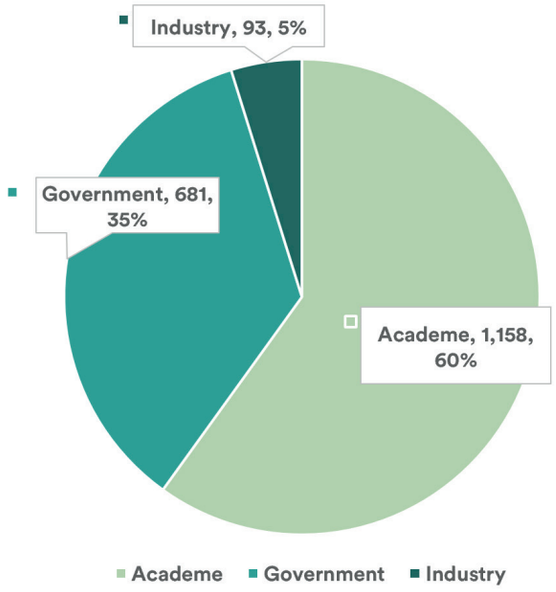
Held on April 22 to 24, the Philippine Research, Development, and Innovation Conference (PRDIC) was a 3-day virtual event that showcased and celebrated 66 projects. From that number, 24 were under emerging technologies, two from the energy sector, 17 for special concerns, and 24 projects from the industry sector.

The first and second day of the event featured all the R&D projects, with QBO TBI Awards to cap off the second day. Meanwhile, a pitching competition on sustainability was conducted in partnership with the Benito Catalina Yap Foundation (BCYF) on the third day together with the BYCF Innovation Awards.

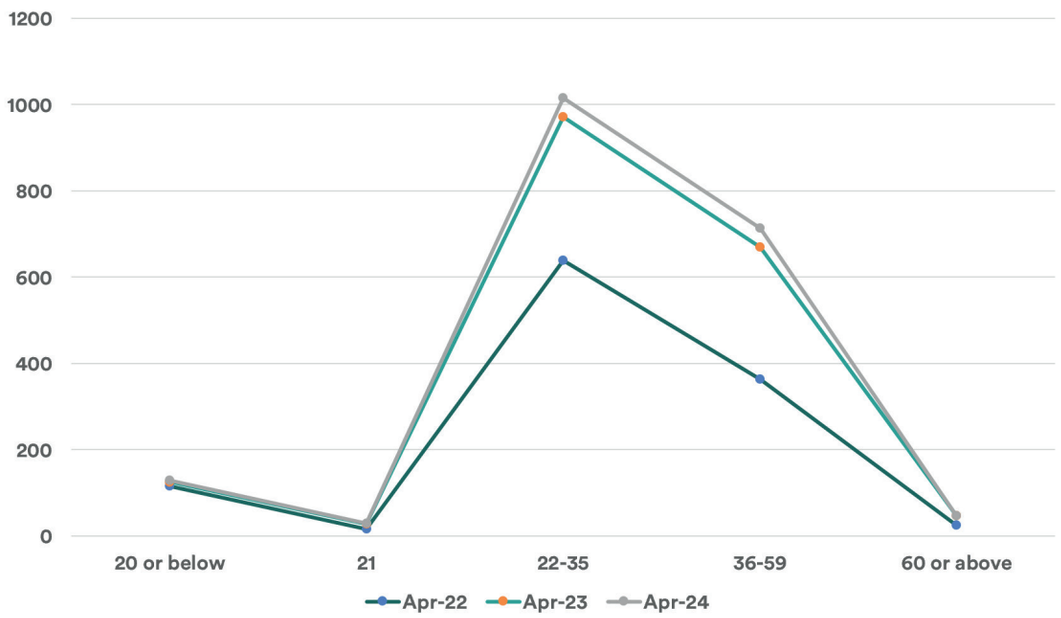
Attendees

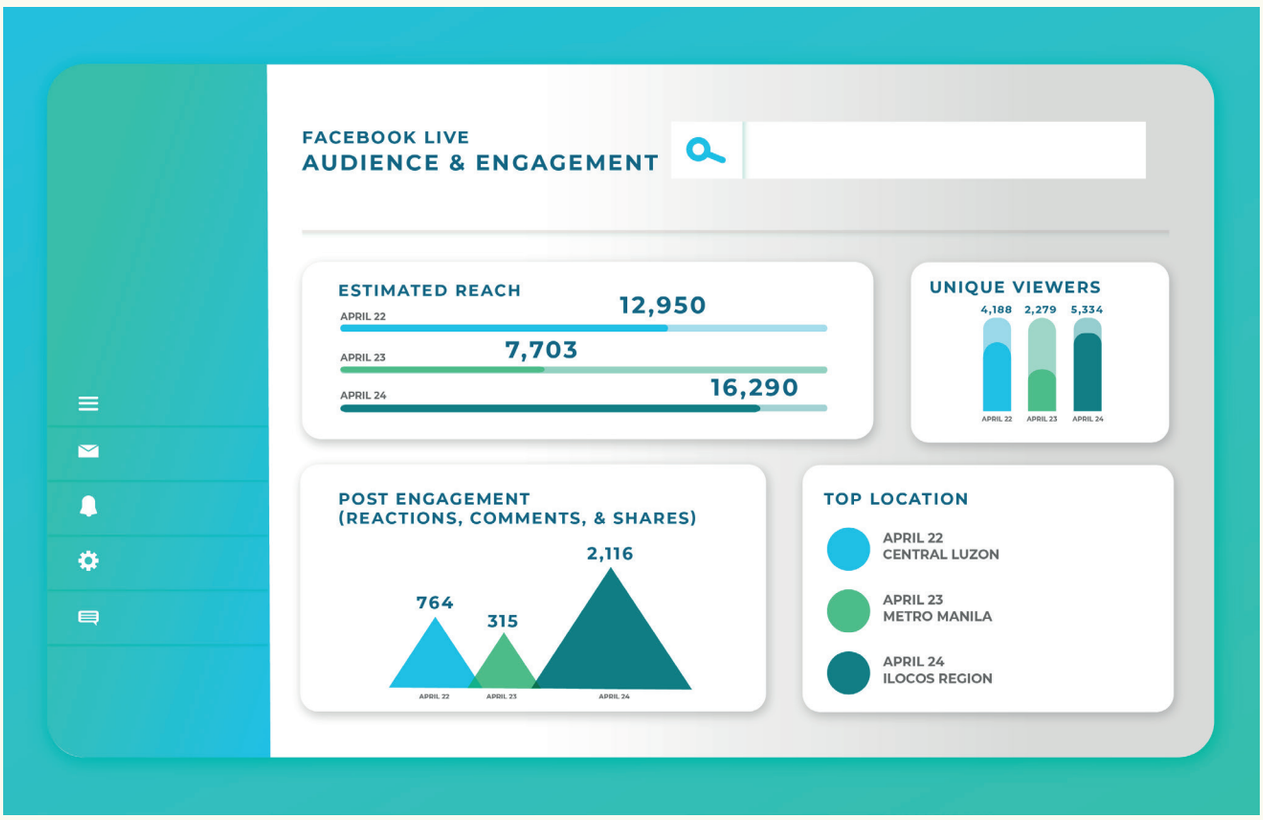


Affiliation



Age Group





With the success of PRDIC, DOST-PCIEERD will now annually hold a graduation for completed R&D projects to put these in the spotlight and let the public learn about new Filipino-made innovations that are ready for transfer and commercialization. (30)

SIBOL 2021:

Science and Innovation Budding Opportunities for Leverage

Showing off what's next in Philippine R&D

As a leader in spurring innovations through research and development (R&D), the Department of Science and Technology – Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) launched the Science and Innovation Budding Opportunities for Leverage or SIBOL webinar series to show off its newly supported R&D projects.

A new science communication initiative, SIBOL is now DOST-PCIEERD's annual showcase of upcoming innovations for the industry, energy, and emerging technology sectors.

For its first run, SIBOL 2021 had 11 webinars that unveiled 149 R&D projects for these application sectors:

All in all, **2,686** attended the SIBOL 2021 Webinar Series through the Zoom platform and reached over **79,065** Facebook users through Facebook Live.

PARTICIPANT'S FEEDBACK

- *The projects presented are very promising and the proponents are really esteemed. The webinar was very well facilitated. Kudos po!*

- *It was very interesting and educating to learn more about efforts of the government and other agencies in Disaster Preparedness.*

- *This webinar is very timely and relevant. Speakers and presenters have showed quality and effective platforms and goals to sustain and meet the problems of our nation in terms of food development.*

- *I like the short but very informative presentations.*

- *It was superb. I have attended 3 SIBOL webinars and I am still wanting more to learn about the researches that was funded by DOST*

- *Came here for Lungsod but coming out with more newly found ongoing tech projects. Here's to science and progress!*

- *Great learning experience, I begin to love science and technology more than ever.*

- *I hope that there would be more webinar like this that will enlighten us about the state of our environment and reports about the projects regarding protection of our surroundings through engineering, science and technology.*

- *The webinar was overwhelming with ideas and really met my expectations.*

- *Very interesting topic, keep it up it's a very good source of learnings*

Awards and Nominations

DOST-PCIEERD vies for international science engagement breakthrough award

The Department of Science and Technology Philippines Philippine Council for Industry, Energy and Emerging Technology Research and Development enters the Finals of the prestigious international science engagement competition Falling Walls Engage 2021 for its science communication social media campaign Pinoy Science in partnership with TikTok.

Out of the 189 competitors from around the world, DOST PCIEERD is among the Top 50 Finalists in the international tilt and will be vying to be included in the Top 20 winners which will be selected by the Fallings Walls Advisory Board composed of renowned scientists, communicators, and consultants with a variety of backgrounds and a shared expertise in the evaluation of science engagement projects. This will be announced on August 18 to 23, 2021. From the Top 20 winners, a Breakthrough of the Year will be selected during the Falling Walls Conference in November 2021.

The partnership between DOST-PCIEERD and TikTok was forged in 2021 to promote science and technology specifically through the Pinoy Science TikTok account.

Through the collaboration, Filipinos were trained to use the social media platform for science communication, Filipino-made technologies were promoted, and hashtag contests such as the #PinoyInnovator challenge was conducted.

"We thank Falling Walls for this recognition and we share this award with the game-changing innovations that our researchers come up with and share in this innovative platform. We thank TikTok for this partnership and giving us a channel to share to the world Filipino ingenuity," DOST-PCIEERD Executive Director Enrico C. Paringit said.

The Top 20 winners of the Falling Walls Engage Competition will get a chance to present their project on stage of the Falling Walls Conference in front of an international audience of global leaders in science, politics, business, and the media, which will also be the first in-person gathering since the pandemic erupted. This will take place in Berlin, Germany from November 7 to 9, 2021 on the anniversary of the historic fall of the Berlin Wall.

Falling Walls Engage is the global platform for science engagement, hosted by the Falling Walls Foundation in cooperation with the Robert Bosch Stiftung, which aims to provide a better understanding and public involvement in science that can help tackle global societal challenges through fact-based decision-making and contribute to the overall wellbeing of the society.

DOST-PCIEERD earns ISO 9001: 2015 certification amid the pandemic

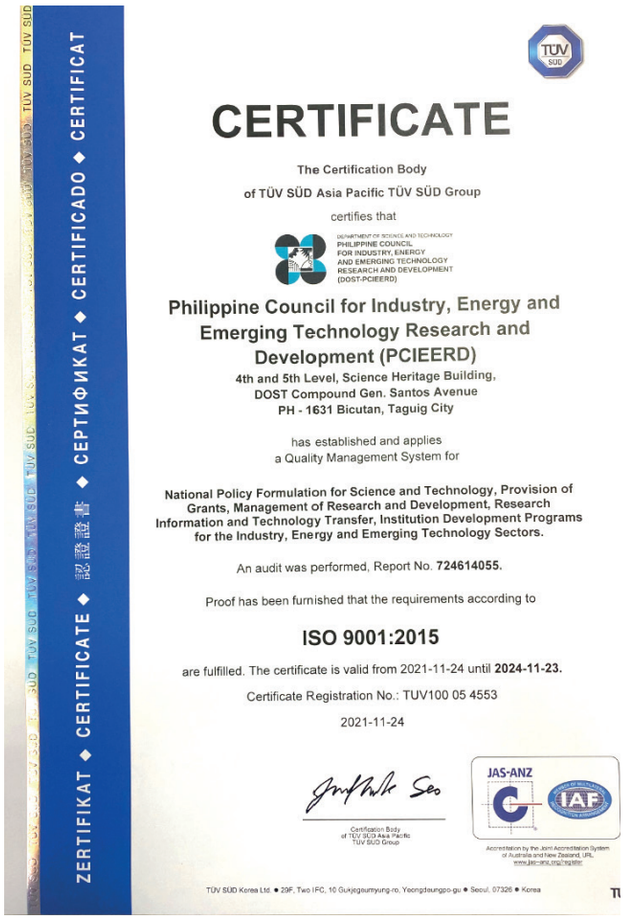
Testament to its excellent public service, the Department of Science and Technology – Philippine Council for Industry, Energy and Emerging Technology (DOST-PCIEERD) earned its ISO 9001:2015 certification amid the COVID-19 pandemic.

This feat is proof that DOST-PCIEERD remains consistent in exuding the total quality management (TQM) philosophy as it continuously acquires certification, since 2010, to internationally accepted performance excellence certification for quality management system.

During the first stage audit, the audit team evaluated how DOST-PCIEERD established, implemented, and improved its management system at the different areas of the organization.

The audit covered all relevant processes and areas to obtain an overall picture of the degree of management system implementation including the national policy formulation for science and technology, provision of grants, management of research and development, research information and technology transfer, institution development programs for the industry, energy and emerging technology sectors.

The audit team confirmed the effectiveness of DOST-PCIEERD's management system through the Council's accomplishments related to its quality objectives.



ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD

CERTIFICATE

The Certification Body
of TÜV SÜD Asia Pacific TÜV SÜD Group
certifies that

DEPARTMENT OF SCIENCE AND TECHNOLOGY
PHILIPPINE COUNCIL
FOR INDUSTRY, ENERGY
AND EMERGING TECHNOLOGY
RESEARCH AND DEVELOPMENT
(DOST-PCIEERD)

Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD)
4th and 5th Level, Science Heritage Building,
DOST Compound Gen. Santos Avenue
PH - 1631 Bicutan, Taguig City

has established and applies
a Quality Management System for

National Policy Formulation for Science and Technology, Provision of Grants, Management of Research and Development, Research Information and Technology Transfer, Institution Development Programs for the Industry, Energy and Emerging Technology Sectors.

An audit was performed, Report No. **724614055.**

Proof has been furnished that the requirements according to

ISO 9001:2015

are fulfilled. The certificate is valid from 2021-11-24 until **2024-11-23.**

Certificate Registration No.: TUV100 05 4553

2021-11-24

Certification Body
of TÜV SÜD Asia Pacific
TÜV SÜD Group

JAS-ANZ

IAF

Accreditation by the Joint Accreditation System of Australia and New Zealand. URL: www.jas-anz.org/register

TÜV SÜD Korea Ltd. ● 20F, Two IFC, 10 Gukjegeumyung-ro, Yeongdeungpo-gu ● Seoul, 07326 ● Korea

"At trying times like this, we must remain committed to rendering high-quality, world-class public service as Filipinos need the power of science and technology now more than ever. We at DOST-PCIEERD will regularly review and improve our processes and system to ensure that we aid the Philippines in powering through the pandemic," said DOST-PCIEERD Deputy Executive Director Engr. Ninaliza H. Escorial.

ISO 9001 is an international standard that specifies requirements for a quality management system (QMS). Organizations use the standard to demonstrate the ability to consistently provide products and services that meet customer and regulatory requirements *(source: https://asq.org/quality-resources/iso-9001).*

DOST-PCIEERD wins KWF's seal of excellence for public service

As a nod to initiatives in the scientific field communicated in the Filipino language, the Komisyon sa Wikang Filipino (KWF) awarded the *Selyo ng Kahusayan sa Serbisyo Publiko* to the Department of Science and Technology – Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD).

"Nagpapasalamat kami sa KWF para sa kanilang pagkilala sa ating mga inisyatiba para suportahan ang paglilinang ng wikang Filipino sa ating mga proyekto at programa. Ibinabahagi namin ang parangal na ito sa mga mananaliksik at kawani ng DOST PCIEERD na siyang nagsasanib pwersa para maitaguyod ang mga adhikain ng pagsusulong ng wikang Filipino," said DOST PCIEERD Executive Director Dr. Enrico C. Paringit.

DOST-PCIEERD received the prestigious award during KWF's virtual event on August 31, in celebration of the *Buwan ng Wikang Pambansa 2021.*

KWF established the *Selyo ng Kahusayan sa Serbisyo Publiko* in 2016 to recognize government agencies and local government units (LGUs) that have shown excellence in the use of the Filipino language in serving Filipinos.

This year, KWF focused on the use of Filipino in the social media posts and campaigns of agencies and LGUs.

DOST PCIEERD supports the advancement of the Filipino language through research and development projects like:

Project Marayum - a collaboratively built online dictionary platform for Philippine languages. Its goal is to empower native language speakers to create and curate an online dictionary of their language without needing to have technical expertise in website design, implementation, and maintenance.

Senti AI – a DOST-PCIEERD supported startup that provide social media monitoring services that is focused on understanding Filipino. To process social media posts better, they have developed a machine learning -based language classifier that automatically detects the language of any document. The product will allow the clients to view the market behavior on social media as well as the real time conversations about their brands.

The Innovation Council also uses the Filipino language in its social media pages for announcements and sharing information about breakthroughs in its research projects and initiatives.

"Nakikiisa kami sa KWF sa adhikain nitong linangin at palaganapin ang paggamit ng wikang Filipino sa bansa. Lalo pa naming paiigtingin ang paggamit ng wikang Filipino sa aming mga opisyal na gawain at sa aming mga pakikipagtalastasan," added Paringit.

Partnerships and Linkages

International Linkages

the e-ASIA Joint Research Program

Japan Society for the Promotion of Science · Founded 1932

Newton Agham

UKRI Natural Environment Research Council

SOUTHEAST ASIA-EUROPE JOINT FUNDING SCHEME FOR RESEARCH AND INNOVATION

DOST

Manila Economic and Cultural Office
菲律賓駐台代表處

TAIWAN Taiwan Economic and Cultural Office

MOST 科技部 Ministry of Science and Technology

Local Partners

Academe

Industry/Startups

XPERTO

Pirfs Multimedia Distribution Services

W.V.J.A Foods Product Manufacturing

NGOs

ANGELES UNIVERSITY FOUNDATION

Philippine Foundation for Science and Technology
*Recipient of the DOST-SEI's **L**eadership and Innovations for **D**evelopment **R**elevant (LIDER) to Science Education Award*

NGAs

2021

PCIEERD Financial Resource Management

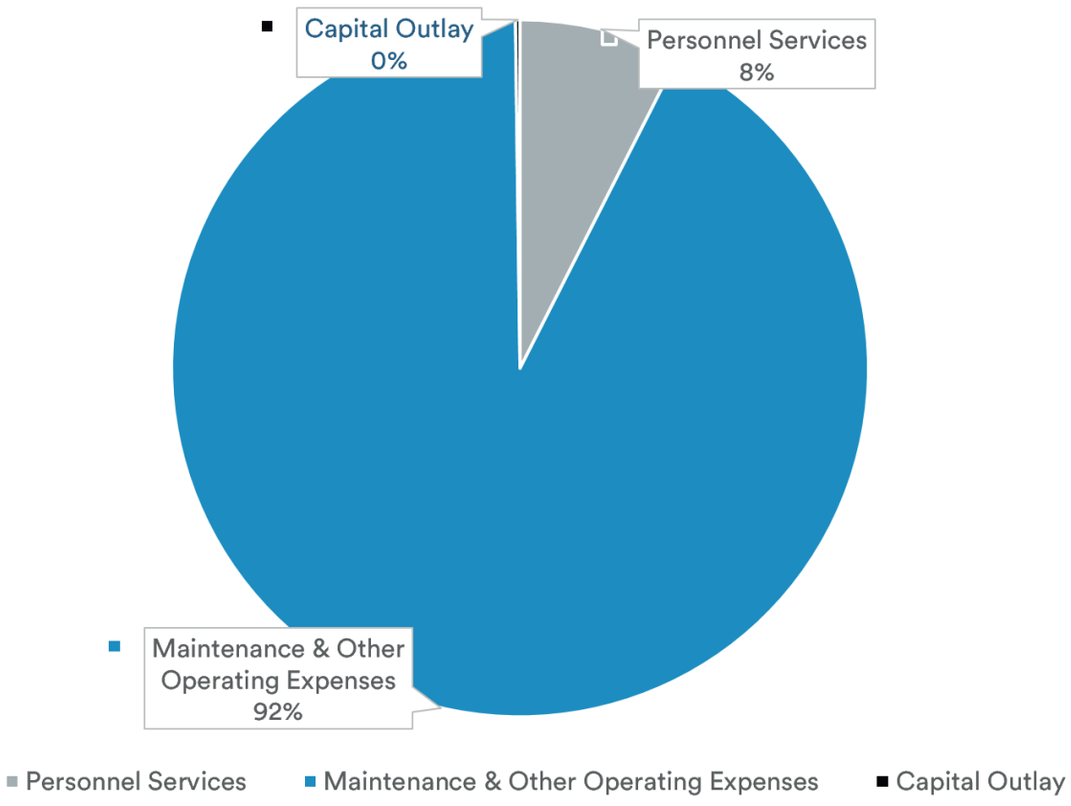
DOST-PCIEERD

Under the 2021 General Appropriations Act, PCIEERD's approved budget is Eight Hundred Sixty-Four Million Nine Hundred Seventy-Five Thousand Pesos **(P864,975,000.00)**, broken down as follows:

1) Personnel Services – P64.578M;
2) MOOE – P798.58M; and
3) Capital Outlay – 1.82M.

From the approved MOOE budget, **96.7%** was allocated to fund S&T programs and activities.

2021 PCIEERD Budget



Major programs funded in 2021 are as follows:

Appropriate Technologies for Industry Competitiveness that includes Technology Transfer and Human Resource Development Programs, Sustainable Energy, Sustainable Mass Transport, and Environment, Climate Change Adaptation and Disaster Risk Reduction.

The Council was able to utilize **99.82%** of its budget, being able to fund a total of **201** projects against the **110** projected target.

PCIEERD also received external funds for the monitoring of various projects, in collaboration and partnership with the DOST, partner institutions and other government agencies. From the **P146.58M** external funding, the Council was able to utilize more than **P81M** or approximately **55%** of the total funds. PCIEERD monitored a total of **264** projects against the **180** targeted projects.

DOST-PCIEERD

Philippine Council for Industry, Energy, and Emerging
Technology Research and Development (DOST-PCIEERD)
4th and 5th Level Science Heritage Bldg., Science Community Complex, Gen. Santos
Avenue, Bicutan, Taguig City 1631, Philippines
Telephone: 8837-2071 to 82 loc. 2100, 2120 & 2121
Fax: 8837-6154

CONNECT WITH US!

@dostpcieerd

@pinoyscience

DOSTPCIEERDInnovationCouncil

pcieerd@pcieerd.dost.gov.ph

pcieerd.dost.gov.ph