

# Innovations

**Innovation is what drives the units under the Science and Technology cluster, and from March to December, 2020, 24 of the 30 projects listed under the #TatagUP banner were from colleges in this cluster.**

**T**he College of Engineering (COE) currently has 12 projects, collectively known as “Engineering Solutions to Fight the Threat of COVID-19.” Kickstarted with the help of either alumni donations, industry partners, or government partners, these projects are currently in various stages of completion.

Two teams led by a professor and an alumnus, respectively, of the Department of Mechanical Engineering (DME) are working separately on two prototypes for adult ventilators.

Another team has created and are currently testing ConTra+, a contact tracing app for phones and Tracing for Allocation of Medical Supplies, a movement tracker for persons under investigation and medical supplies.

The COE’s UP Bike Share project lent out their fleet of 92 bicycles to several hospitals in Metro Manila.

The Department of Industrial Engineering and Operations Research (DIEOR) helped the Philippine General Hospital (PGH) operate more efficiently by creating and introducing the Integrated Emergency Healthcare System or ieHEALS, an integrated management system that automatically takes care of tracking donations, hospital inventory as well as online appointments.

The team behind ChlorGen: On-site hypochlorite disinfectant generation via brine water electrolysis aims to create a system that can make sodium hypochlorite—also known as the common disinfectant liquid bleach—from brine water which can be installed in places like hospitals, eliminating the need to buy it.

A team of experts from the DME are developing a locally manufactured powered air-purifying respirator (PAPR). PAPRs are PPEs that function much like a water purifier, using a battery-powered blower that pulls outside air through replaceable filtration materials/cartridges. The COE prototypes are expected to be more efficient and effective than N95 masks.

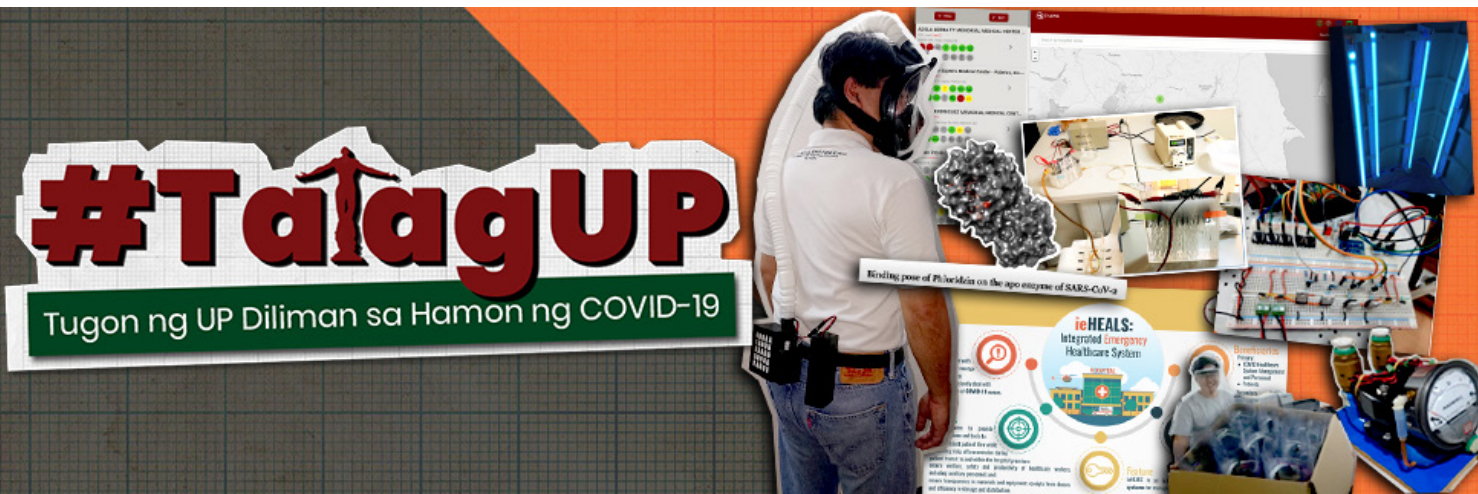
Another team from the Department of Chemical Engineering is applying computational methods, big data processing, and machine learning to identify ten possible drug candidates against SARS-COV-2, the virus that causes COVID-19.

A group at the Department of Computer Science is proposing the creation of a website that will act as a tool kit using data from local government units to estimate the demand for testing in their areas.

Nine non-functioning ventilators were brought to the DME for possible repair. The project team concluded that repairs may be too difficult and provided recommendations on the appropriate repair service providers and parts suppliers to the PGH.

A team from the Department of Mining, Metallurgical and Materials Engineering (DMMME) are currently refurbishing a large plasma chamber and fabricating various essential components to create a mobile apparatus that can disinfect surfaces such as hospital walls and office equipment.

Another team from DMMME successfully created two prototypes of ultraviolet (UV) chambers/closets that can each disinfect four to six PPEs and eight face masks in 40 minutes. The prototypes are now being used in the



PGH and East Avenue Medical Center and the PGH was requested for another chamber to treat coveralls.

Several DIEOR faculty are also members of the UPD Supply Chain Covid-19 Response Task Force, a committee constituted through Administrative Order No. FRN-20-030 to address the supply chain issues of food and essential goods.

Over at the College of Architecture (CA), the CA Tropical Design Studio Laboratory with the UP Resilience Institute proposed to begin research and design explorations on how post-COVID-19 scenarios will affect campus planning, and management, design and utilization of buildings for education through Plan MANILA 2030.

Another team led by lecturer Martin Rinen designed a portable swabbing or COVID-19 testing station with biosafety features that can fit in a barangay basketball court. Some booths have already been constructed in the PGH, the Philippine Lung Center and select areas in Cavite province.

Professor Cristopher Espina led a team that designed a mobile specimen collection unit that can collect

swab samples from barangays and forward them to the nearest laboratory for testing. The unit consists of a single modified van or similarly-sized vehicle manned by a driver and two medical staff.

CA lecturer John Ryan Santos designed a central referral complex with networks of hospitals and isolation facilities where patients can be admitted and cared for.

UP School of Statistics Prof. Peter Julian Cayton, PhD and instructor Jan Gil Sarmiento designed a recommendation rubric for the appropriate quarantine policy for a specific provincial or local government unit.

They are also producing a daily book of statistics with national, regional, provincial, and city/municipal levels of aggregation. This is a compendium is available at the Department of Health website.

The pair developed the methodology for solving the national, provincial and city or municipal level time-varying reproduction number or Rt and the epidemic curves, data used to assess the efficiency of a particular policy in reducing transmission within a community.

Credits: Language Warriors PH, Mitch Dulce, The Cupboard Chef and UP COE

**ieHEALS: Integrated Emergency Healthcare System**

**Problem**  
Hospitals are faced with the need to better manage their operations to effectively and efficiently deal with admission and care of COVID-19 cases.

**Objectives**  
The system aims to provide protocols, guidelines and tools to:

- enable efficient patient flow while minimizing risks of transmission during patient transit to and within the hospital premises;
- ensure welfare, safety and productivity of healthcare workers, including auxiliary personnel; and
- ensure transparency in materials and equipment receipts from donors and efficiency in storage and distribution.

**Beneficiaries**  
Primary:  
• COVID Healthcare System Management and Personnel  
• Patients  
Secondary:  
• Donors  
• Hospitals referring COVID Healthcare Centers

**Multi-System**  
1. Patient Referral System  
2. Workplace Design  
3. Donation System  
4. Inventory System  
5. Appointment System

**Feature**  
ieHEALS is an integrated personnel, material, and information systems for managing critical hospital operations in an emergency setting.

**Current Beneficiaries:**

1. Philippine General Hospital
2. Cagayan Valley Medical Center

**LANGUAGE WARRIORS PH**  
HELPING FIGHT COVID-19 ONE LANGUAGE AT A TIME



They also co-designed the Time Varying R Dashboard — which contains monitoring statistics and indicators in COVID-19 — as part of the Leading Evidence-based Actions through Data Science for Health Security and Resilience [LEADS 4 HSR] Consortium.

Not to be outdone, two teams from the College of Science (CS) are working on modeling how the disease is transmitted.

Prof. Lillian Rodriguez, PhD of the Institute of Mathematics and a team led by Prof. Johnrob Bantang of the National Institute of Physics are working on models of COVID-19 transmission.

Experts from the National Institute of Molecular Biology and Biotechnology collaborated with the Philippine Genome Center and the National Institutes of Health in UP Manila to design TRAINS, a 2-part online lecture series meant to teach laboratories how to conduct RT-PCR based testing for COVID-19 and basic biosafety and biosecurity practices.

The CSSP's Department of Linguistics launched Language Warriors PH, where information dissemination materials, mostly related to physical

health, were translated to 65 Philippine languages, dialects and sociolects that can be used in information materials.

The CSSP Department of Psychology collaborated with UPD Psychosocial Services (PscServ) to offer psychotherapy and mental health care services to frontliners through the Internet.

The Department of Sociology launched the Spotify podcast “Socio Speaks” meant to “sociologically analyze various coping strategies with the COVID-19 pandemic.”

College of Arts and Letters' (CAL) Prof. Eilene Antonette Narvaez created “Terminolohiya Kaugnay ng COVID-19,” a compendium of COVID-19-related terms translated into Filipino.

National College of Public Administration and Governance professor and civil engineer Noriel Tiglaog developed a Quarantine Checkpoint Map.

Photo compilation of #TatagUP Innovations

