



PCCA TOWARDS A CULTURE AND ARTS FOR THE PEOPLE

LA Piluden



Members of the PCCA visit Museo Kordilyera

Members of the President's Committee on Culture and the Arts (PCCA) gathered in the Newtown Plaza Hotel in Baguio City last January 29-31, bringing together the various OICA directors and CCA chairs from all the constituent units of the University of the Philippines to discuss strategic plans and culture and arts initiatives pursued by each CU and the UP system as a whole.

This strategic planning workshop comes in light of the ten flagship programs prioritized in the strategic matrix under UP Pres. Jimenez's administration. Among the salient discussions in the strategic planning workshop were the benchmarking of various culture and arts initiatives, calling for a clearer articulation of the arts in the present strategic framework, outcomes set for the culture and arts by 2029, the institutionalization of the PCCA, and the elevation of the remaining CCAs to become full-fledged OICAs.

UP Baguio Chancellor Corazon Abansi welcomed the PCCA members to Baguio City. Present in the meeting were Prof. Laurence Castillo of UP Los Baños, Prof. Monica Santos of UP Diliman, Prof. Martin Genodepa of UP Visayas, Prof. Diego Maranan of UP Open University, Prof. Jay Jore of UP Cebu, Prof. Dennis John Sumaylo of UP Mindanao, Ms. LA Piluden of UP Baguio, Prof. LaVerne Dela Peña of the UP Center for Ethnomusicology, Prof. Toym Imao of the UP College of Fine Arts, Atty. Gaby Concepcion, and VP for Public Affairs Roland Tolentino. The meeting was chaired by the outgoing PCCA Chair Prof. Raymundo Rovillos.

The three-day workshop is a testament to UP's commitment to nurturing cultural and artistic spaces within campuses and communities, and overall, as the PCCA impact statement affirms, "a flourishing culture and arts for the people."

The workshop aptly concluded with a meet with National Artist Ben Cabrera in his museum in Asin, a tour in Museo Kordilyera, and a gathering in Ili-likha, a well-known watering hole for Baguio artists, where National Artist Kidlat Tahimik

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presented through film, performance, and anti-architecture his pursuit of the “indio-genius,” the project of engaging with indigenous/local knowledge in our artistic expressions.



PCCA Members pose in the Ili-Likha Cinematheque after a rousing performance by National Artist Kidlat Tahimik. (Photo credits: Jay Jore)

RESEARCH TRAINING IN THE “BEAUTIFUL ISLAND” (PART 1)

JENNIFER B. ANTONIO

Taiwan, a country found in Southeast Asia with a geographic latitude of 25° 02'N and geographic longitude of 121° 38'W is just above the Luzon Strait in the Philippines. This country was once known as Formosa, a Portuguese term which means beautiful island in English. Last October 17 -28, 2023 I was lucky to have been accepted in the International Joint Research and Training Workshop on Environmentally Green Technology for Sustainable Development Goals and Net Zero Emission which was held at National Tsing Hua University (NTHU). The training was sponsored by Taiwan's National Science and Technology Center (NSTC), National Tsing Hua University (NTHU), and the WISE Center.



Prof. Antonio with other Filipino participants during the welcome dinner

The second day was the introduction of researches or relevant office (for school administrators) in the 3-5 minutes flash talk. I presented my research on natural plant fiber extraction and coffee biochar in my Benguet attire and for once felt proud of myself, a novice in the research world for getting that far. But what fascinated me was the wishing plant placed at the entrance and believed to bring success to the 12-day training.

The third day was the start of the series of lectures for the whole training. The first lecture was on the use of Sustainable Development Goals (SDGs) to Leverage Net-Zero Emission. It focused on the use of research catalyzing progress on Sustainable Development Goals (SDGs) and close the gap between science, policy, and society. One of the examples discussed was the problem in wastewater from pig farms discharged to rivers; to close the loop, treated wastewater can be processed for biogas or methane (CH₄) to become another source of energy in the farm. Wastewater can also be converted into compost to be used as fertilizers for corn supplied as food for pigs on the same farm. The closing of the loop entails more researches not only in agriculture but also in other facets of daily living such as food industry, health, and sanitation.

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Flash Talk on the 2nd Day of the Research Training

The first day of the training was arrival time of the 34 scholars from Southeast Asia - Nepal, Vietnam, Philippines, India, Indonesia, Malaysia, Laos, Thailand, and Cambodia. The Taiwanese generosity and hospitality started with a welcome dinner at Rododo Hotpot in Hsinchu, a city in the northern part of Taiwan where participants were accommodated. It felt good to be seated with fellow Filipino participants from Mapua University, University of the Philippines - Diliman, University of Sto. Tomas, and Technological University of the Philippines as well as with Filipino graduate students who shared stories on braving the tides of university life as PhD students away from home.

HOW THE ANTIOXIDANTS FROM PLANTS BENEFIT HUMANS

Elsie C. Jimenez, PhD

The human body is continually exposed to oxidants, such as free radicals produced during biological processes. Free radicals act as signaling molecules in the cells, as they perform essential roles in gene expression and apoptosis (programmed cell death). In human cells, free radicals are produced in the mitochondria, endoplasmic reticulum, peroxisomes, and plasma membrane. The mitochondria normally generate most of the cellular energy via oxidative phosphorylation, with some electrons combining with oxygen to produce reactive oxygen species, such as hydrogen peroxide (H_2O_2), O_2^{\bullet} and HO_2^{\bullet} . The endoplasmic reticulum takes charge of much of the cell's protein synthesis and folding, and it generates reactive oxygen species as a byproduct.

The peroxisomes perform a vital role in the production and scavenging of reactive oxygen species. They manage the reactions that deactivate radicals, which damage the cells leading to cell death. In the peroxisomes, electrons removed from different metabolites are utilized to convert O_2 to H_2O_2 , then to H_2O .

The respiratory pathway in peroxisomes is not coupled to oxidative phosphorylation; hence, it does not generate energy in the form of adenosine triphosphate (ATP). Instead, free energy in the form of heat is released.

The human body normally maintains a balance between free radical production and oxidative stress by utilizing effective antioxidant defenses. The mitochondria, endoplasmic reticulum and peroxisomes maintain different metabolic and signaling pathways. Dysfunction in any of these organelles results in overproduction of free radicals, causing toxic effects on DNA, proteins, and lipids, which leads to certain medical conditions.

In plants, the generation of free radicals increases during biotic and abiotic stresses. The biotic stressors include bacteria, fungi, insects, nematodes, etc., while the abiotic stressors include sunlight, soil, temperature, drought, humidity, salinity, pollution, among others.

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The Solid Oxide Electrolysis Cell (SOEC), a small packet producing clean, reliable, and affordable hydrogen energy.

The ultimate goal in today's world is to limit global warming to less than $2^{\circ}C$ and as close to $1.5^{\circ}C$ above pre-industrial levels; thus, there is a need to adjust human activities to attain the objectives of the United Nations' 17 SDGs. The afternoon discussion focused on Low Carbon Energy or Bloom Energy. The inventors in the

Bloom Company discussed the benefits of Hydrogen (H_2) gas such as its abundance and presence in most common substances such as water (H_2O), its high energy by weight which means that energy produced is 3X more than that of gasoline, and its production from abundant natural fuels.

The main theme on the 4th day was waste water treatment. In the morning, there was a talk on municipal and industrial wastewater treatment. What I can recall about the talk was the turning off of the aeration system used to mix and maintain dissolved oxygen since aeration system employed in traditional activated sludge system uses extensive amount of energy. The new method is the use of dark fermentation for the production of methane (CH_4) and hydrogen (H_2) gas. With the use of chemotrophic microorganisms from the species of clostridia, thermophilia, enterobacter, and others, extensive use of energy will not be employed. In the afternoon, the principles used in sustainable water purification technology was extensively discussed — the use of Advanced Oxidation Process (AOP) by generation hydroxyl (OH^{\bullet}), H_2O_2 2-Fe (II) or fenton reagent for electrodeless oxidation reaction, and the use of electrodes for redox reaction.

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According to the speaker, the use of electrodes by electrochemical degradation is the most promising and sustainable technology being studied at present.



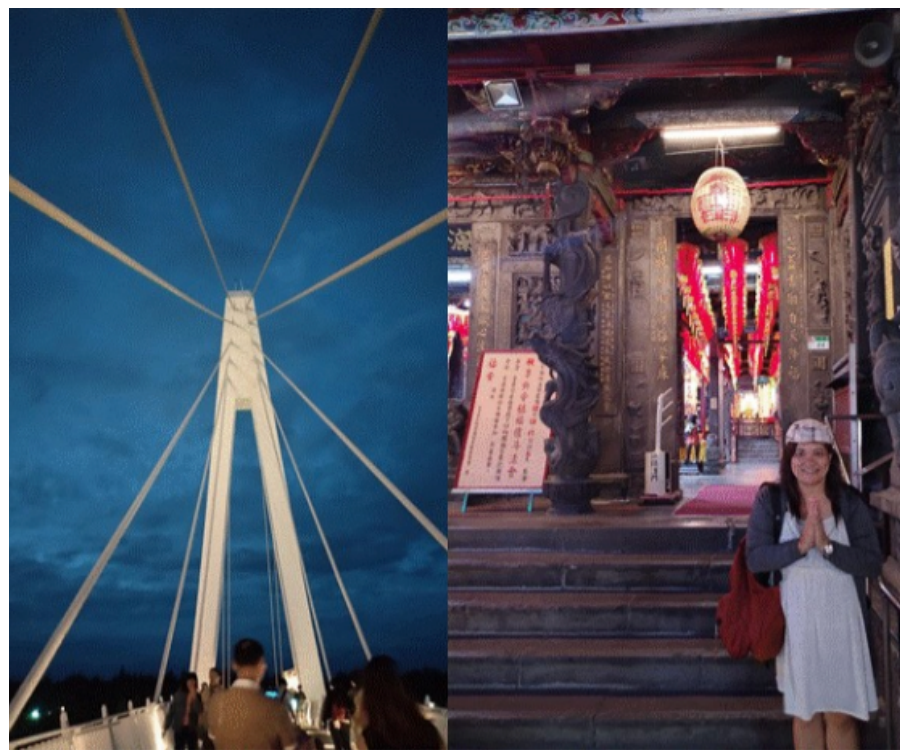
An aged rice wine

The 5th day of the training was a Saturday, so it was spent travelling to Puli which is a town in Nantou County in the center of Taiwan where Puli Shaohshing Brewery is located. This is where they sell local wines which are mass produced but they also sell rice wine that is buried and fermented underground for longer years. One kind of rice wine I saw cost NTD 49,000.00 or roughly Php 88,000.00 for 3L of a 52% (v/v) concentration or around 100 proof strength. In the afternoon, the group visited National Chi Nan University (NCNU) which is one of the widest universities with a land area of 150 hectares but with a student population of only 6000. What captured my interest the most aside from their butterfly research is their strong partnership with water bamboo farmers. Some of their researches is on the application of blue light to increase yield and the utilization of bamboo agricultural waste such as husks and leaves as a biochar, thus eliminating CO₂ production when waste is burned.



Shots of Taipei 101 and Chiang Kai Shek Temple

The 6th day was a Sunday. This was the only free time given to the participants. Most of the participants opted to visit Taipei which can be reached by bus for around 2-3 hours and by high-speed train for 45 minutes. I went along with my roommate from Mapua University to see some of her Biochemistry colleagues from UP Manila who were research trainees in Academia Sinica.



The Lover's bridge and the temple inside Shilin Market.

We visited scenic attractions in Taipei such as Chiang Kai Shek Temple with lively activities all over the place, Taipei 101 with its expensive shops such as Gucci, Tamsui Fisherman's Wharf with its cabled bridge known as the lover's bridge, and the Shilin Night Market where they sell candied fruits and white bitter melon shake.

RESEARCH TRAINING IN THE "BEAUTIFUL ISLAND" (PART 2)

JENNIFER B. ANTONIO

The 7th day started with a talk on solar energy and Taiwan's initiative towards solar photovoltaic (PV) cell as a future alternative to natural gas, oil, and coal as an energy source to households and industries. Solar PV generates energy with very low carbon emission as compared to natural gas, oil, and coal energy sources. The next talk was on chemical engineering separations which focused on some techniques without the use of heat thus lowering global energy use, emissions, and pollution. The talk focused on carbon capture with the use of N₂/CO₂ membranes and enzymatic membranes to replace the use of amine solvents. The use of adsorption membranes in air purification technologies aim to remove CO₂ from the air, and recover H₂ and generate N₂.

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A small space for students to play and eat near the supervisor's office

On the next day (8th day) of my stay in Taiwan, Dr. Alvin Culaba, a professor at De la Salle University, Philippines and the president of the National Academy of Science and Technology (NAST) presented his model or simulation on microalgae bioreactor facades in glass buildings for CO₂ mitigation and O₂ production. His talk was appreciated everyone. The afternoon was a trip to National Chung Hsing University in Taichung (94 km away from Hsinchu City) found in central Taiwan.

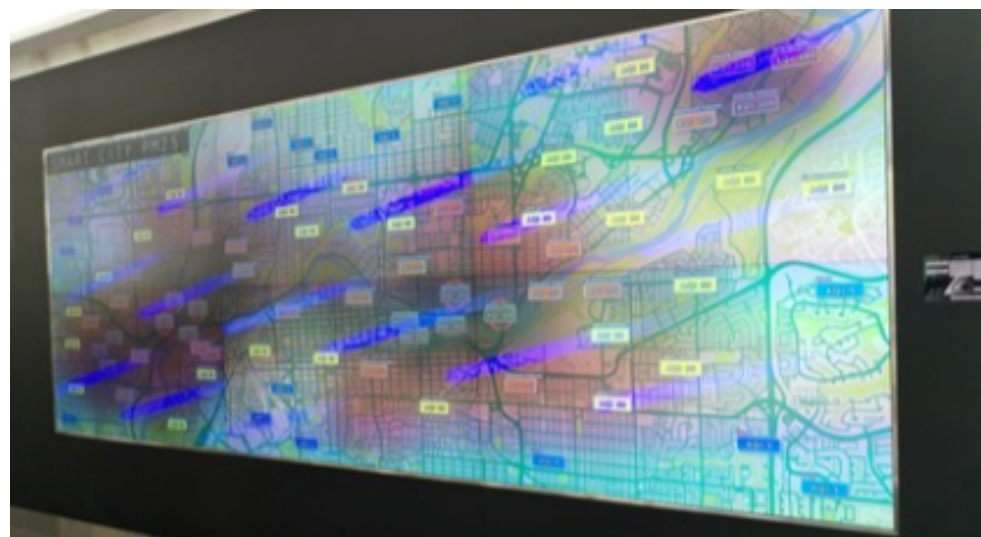


A common sight in the laboratories of the university

The destination was at the Department of Environmental Engineering where the group was divided into two, biotechnology and material science groups. I was in the material science group so I was not able to witness the cloned goat presented to the biotechnology group. Professor Doong, the coordinator of the training, introduced us to faculty members in the material science track and showed us their laboratories and researches. Some of the researches were on Piezoelectric materials like SnS₂ for organic waste water treatment, complex oxides for green technology like ZnO as green pesticide, and CoO as catalyst for soot oxidation.

The 9th day was lecture-filled where morning sessions were on the construction of carbon – organosilica based hybrid membrane and electrolytic reduction of CO₂. The afternoon sessions were on the valorization of bio-derivatives and microalgal cultivation for enhanced

methane (CH₄) transfer. Let me just summarize some of the learnings I can remember from the lectures. The construction of carbon–organosilica membrane is aimed at removing CO₂ by acting as a molecular sieve due to its high permeability and selectivity. The polymers used to remove CO₂ by direct air capture from a factory were bis (triethoxysilyl) ethane (BTESE) but the novelty of the project was on co-polymerizing this organosilica with glycidyl – POSS to create a matrix with increased performance in CO₂ capture. The production of vanillin used in flavorings, food, and pharmaceuticals from lignin was also presented. Like cellulose, lignin is also a component of fibers from agro-waste and can be oxidized to vanillyl alcohol then further oxidized aerobically to produce guaiacol, vanillic acid, and vanillin. In addition, cellulose can also be processed to produce gamma-valerolactone which is valuable in biofuel production.



Particle Matter (PM) Screen showing how polluted the air is in the different cities in Taiwan

On the 10th day, a model on carbon farming was presented using a concept on food recycling. The aim of this is to reduce carbon emission from agriculture. An example presented was recycling of food waste from the city by pre-processing or sorting out waste from food then fermenting the waste materials in a feeder to produce organic fertilizer rich in probiotics. The fertilizers produced goes back to the farm for food production. In the next talk on biochar and circular economy, one slide presented was on the history of gasification technique. This technique does not produce CO₂ but produces H₂ and CH₄ which are in turn used to produce energy or electricity. It was mentioned that aside from USA and Germany, the Philippines in 1981 already had the concept of gasification already with 20 kilograms of charcoal gasified to produce clean fuel such as H₂ and CH₄. The fuel can be consumed for 5-6 months. But unlike USA and Germany who are at present developing H₂ powered cars, most of our jeepneys and transportation system still depends on non-renewable fuel sources.

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Plants obtain their energy from sunlight through photosynthesis, which produces reactive oxygen species. The sun's ultraviolet light and the reactive oxygen species can cause permanent damage, so plants normally produce antioxidants for themselves as a protection against damage from free radicals. Marketing strategy that promotes certain plants with antioxidants can be misleading since all plants are expected to produce antioxidants for their own need, coincidentally benefiting humans. The levels of antioxidant production in plants may be affected by the extent of biotic and abiotic stresses.

It must be noted that free radicals are not always injurious; their toxicity depends on the type of reactive oxygen species, the localization and concentration, and the kinetics of production and removal. Genetic and environmental factors cause cells to overproduce free radicals in their life stages. The human body possesses efficient enzymatic antioxidant defense, but its non-enzymatic antioxidant defense has undergone less evolution than that of plants. The plant cell peroxisomes have a functional non-

enzymatic antioxidant, ascorbate-glutathione cycle, but in human peroxisomes not much is known regarding the occurrence of non-enzymatic antioxidant. So, it has been presumed that humans should regularly take dietary antioxidants to maintain low levels of free radicals.

Plants are usual sources of food and medications, either as pure produce or as traditional products. The antioxidants from plants include carotenoids such as carotenes and xanthophylls; polyphenols such as anthocyanins, flavonoids, lignans, phenolic acids, and stilbenes; as well as vitamins C and E. The antioxidants can be utilized to protect the human body from the free radicals typically produced through metabolic processes and environmental stresses.

Antioxidants are vital for health and their deficiencies can cause diseases. It has been documented that antioxidants have various health effects, such as anticancer, antibacterial, antiviral, anti-inflammatory, and anti-aging effects.

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A group picture with the other participants

In Taiwan, NCHU is already developing a model of a net zero carbon emission community. They are adopting the model from Finland, the first gasifier in the world and for Taiwan they are starting with smaller communities. Bio-waste from farms is placed in the community gasifier then CH₄ and H₂ are converted into energy and are stored in battery charging zones that are connected to micro-grid

systems, generating electricity utilized in residential areas. The afternoon was spent at Delta Electronics in Taipei. Delta Electronics is a company that supports net zero emission by developing products that are very much energy efficient. An asteroid is actually named after Bruce C.H. Cheng, the founder of the company. This is in due recognition of his efforts to take good care of the earth through energy conservation and reducing carbon emissions.

The day ended with a farewell banquet and according to Professor Doong,

“Goodbye is not the end but the beginning of something new,”

which I do also believe in. Like a flower, life has to wilt to give its seed a chance to produce a new plant.

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On the 11th day, we had the chance to visit the Industrial Technology and Research Institute (ITRI) in Hsinchu. The institute employs many Asians including Filipinos. Most of their work are on water and waste water purification system and providing water purification machines to poorer countries during disaster (flood, typhoon, and earthquake) when clean water is scarce. We walked back to NTHU for laboratory tours in the Department of Chemical Engineering Building and in the Department of Biomedical Engineering and Environmental Science Building. Their laboratories are all well- equipped with needed instruments. Each professor has his own space where all instruments needed in his/her field of research is housed so there is no need to transfer from one building to another or from one university to another when samples need characterization.



A safety net situated at the center of the building

In the chemical engineering building, one thing that caught my attention was a safety net that was situated at the center of the building. I just thought that this might be for suicide prevention. If it were just a sunshade for plants then it must not be thick and sturdy as seen in the picture.



Awarding of Certificate of Participation by Prof. Ruey Ann Doong



Last snack served at the training

Professor Doong gave his best to please everyone in the last meal they served. There were times when he was so sorry with the quality of food prepared but for me and the other Filipinos, it was still excellent. The Bento box sold for Php 300 in the Philippines is still not that good when compared to Taiwanese Bento boxes. I noticed that food in Taiwan is really prepared carefully with variety of local ingredients mixed for a superb taste. The food quality, food packaging, and food presentation are commendable. This can also be observed in their market restaurants (turo-turo for us). Certificates were received in a not so way; there was a picture taking with Professor Doong in front of NTHU's iconic SDG wall.



A wishing plant placed for good luck at the entrance

My non-scientific mind told me that the wishing plant must have been a factor in the success of the training program for on the 12th day my roommate and I were conveyed from Hsinchu to the airport in Taipei. It took us around 2 hours to reach the airport by car on a traffic-free road. The 12-day research training program was indeed one of the best learning experiences I had.

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It is believed that free radicals cause permanent damage to the body, which is shown as aging. By avoiding the production of oxidants and avoiding free radical damage through antioxidants, aging can slow down.

There is evidence that a diet rich in fruits and vegetables may reduce the risk of dementia. It appears that antioxidants can help a person live healthier. The experimental therapeutic effects of plants are mainly associated with their potent antioxidant activity. It has been considered that the maintenance of a healthy lifestyle and the treatment of diseases could explain the scientific basis of traditional herbal medications.

Even with some concerns regarding plant antioxidants, the antioxidant supplement is considered as a promising product that can improve the pathophysiology of human diseases, that is, the changes occurring during the disease process associated with free radicals. Plant antioxidants have been shown to regulate the generation of reactive oxygen species by scavenging free radicals leading to the enhancement of the body's endogenous antioxidant defenses. Nonetheless, the utilization of plant antioxidant supplements (labeled "No therapeutic claims") as medications remains a concern that needs to be judiciously taken into consideration, possibly through in-depth laboratory investigations including in vitro and in vivo preclinical trials, and consequent clinical trials.

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ISSN 0119-6634

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Published by the University of the Philippines Baguio through the Office of Public Affairs



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