



Centre For Interdisciplinary  
Research On Food  
By-Products Utilization

Newsletter Issue 01 | 19/08/2021

## Announcement

### **Establishment of the Centre for Interdisciplinary Research on Food By-products Utilization (CIFU)**

We are delighted to announce the establishment of the 3<sup>rd</sup> research centre at THEi: Centre for Interdisciplinary Research on Food By-products Utilization, or CIFU, on January 1, 2021. THEi has been developing its applied research capacity around the strategic research theme of “Sustainability”. Deliverables of the two research centres: the Research Centre for Waste and Resource Management and the Centre for Sustainable Design and Environment have established a solid foundation for THEi to further expand its research arms to sustainable innovation of natural resources. The CIFU will promote synergies across both the “hardware” and “software” of THEi through interdisciplinary research programmes in food by-products utilization. Two research laboratories, namely the Food Product Development Lab (FPDL) and the Food Recovery Lab (FRL) have been established across THEi campuses. Focused research initiatives, include but are not limited to, the sustainable innovation of food by-products in both edible and non-edible applications using “green” and environmentally friendly approaches. Members of the CIFU includes: Prof. Christina HONG, Dr. Paul TSANG, Mr. Sonny CHOY, Dr. FONG Lai-ying, Dr. Alex TSANG, Dr. Vicky LEUNG, and Dr. Angus LAW. Colleagues who are interested in exploring your research activities in interdisciplinary perspectives are welcomed to contact the CIFU.

## Research Activities

### **Amazing work to re-vitalize the food by-product into nutritious food with technology!**

Nowadays, local food industries generate large amounts of waste and by-products annually. About one-third of food waste is produced during food processing. Transforming them into useful raw materials or food sources is the vital role of this project. Two food by-products, soy okara and spent grain, are used as the major ingredients for making this plant-based burger.

Soy okara is soy pulp. It remains after filtering of pureed soybeans in the production of soy milk and tofu. Spent grain is the leftover malt and adjuncts. They are produced from the mashing process when extracting the sweet wort for alcoholic drinks fermentation in breweries. These two food by-products actually consist of high values of insoluble protein and dietary fibres.

To produce this plant-based burger, these by-products are hygienically collected from food factories, then dehydrated by freeze-drying as well as milling and sifting for homogenization of its particle size. All powdered soy okara and spent grain are then mixed well with texturized vegetable protein, starchy thickeners, natural beetroot juice and seasoning ingredients to form a patty. A healthy and tasty plant-based burger is created after being pan-fried and sandwiched with tomatoes and green leafy vegetables. The result is a delicious Plant-based Burger made from spent grain and soy okara!



Spent Grain



Soy Okara (After Freeze-drying and Milling)



Mixing with other ingredients and seasoning to form the Plant-based Burger



Plant-based Burger Patties



Enjoy the Plant-based Burger!

## Networking Activities

### **Building Bridges with Tung Wah Group of Hospitals**

Dr. Paul TSANG and Dr. Angus LAW have fostered a network-relationship with Ms Florence CHAN, the Assistant Superintendent of Jockey Club Rehabilitation Complex of Tung Wah Group of Hospitals. Her team visited THEi on May 14, 2021 to explore further research collaboration opportunities with the CIFU.

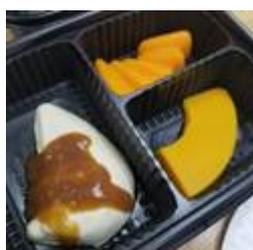


Dr. Paul TSANG shared the concepts of “Sustainable Living”, the research capacity of THEi and the CIFU to Ms Florence CHAN and her team.

A visit to the “Central Kitchen” of social enterprise “CookEasy” was held on June 17, 2021 to explore potential research collaboration with the CIFU in both edible and non-edible perspectives. The CIFU team members had an opportunity to taste the soft meals.



“Central Kitchen” of CookEasy at Kwai Chung.



Soft meals for individuals with swallowing difficulty.



Group photo

## Machines and Labs

### **Installation of Accelerated Solvent Extractor (ASE) System**

A new system for automated solvent extraction was purchased under the approved funding of the IDS(R). Compared with the traditional method, chemical extraction performed by the system uses 50-90% less solvent, allowing solvent extraction to be performed in a more environmentally friendly and economical way. Automatic extraction can be performed on up to 24 samples with sample size up to 100g.

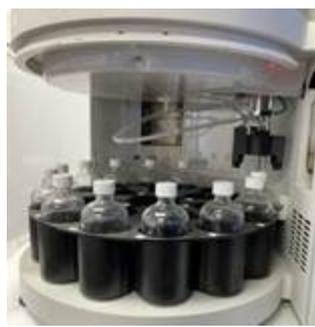
The system is installed at (Rm 1003 THEi TY). Colleagues who are interested in using the system for research can enrol in training workshops (details provided below).



ASE System



Control Panel



Solvent Samples

**Gel Permeation Chromatography Machine available at THEi (Rm 1003 THEi TY).**

Polymers are a part of our everyday life and they can be found almost anywhere, especially from food by-products. Various useful polymer materials such as starch, cellulose, lignin, chitin, chitosan can be extracted from food by-products or food wastes and they can be converted to useful materials from table ware to energy storage materials. CIFU centre is happy to inform you that a new Gel Permeation Chromatography (GPC) equipment has been procured and installed at EEM lab (Rm 1003 THEi TY) to specifically serve the purpose of polymer identification. The equipment can determine the molecular weight of the extracted polymers and therefore find their suitable applications. Colleagues, students, technicians and research assistants who are interested in using the machine for research can enrol in the coming training sessions.



GPC Machine connected to PC



Chemical Reservoir

**Ball-milling machine available at THEi (Rm 1003 THEi TY) now!**

CIFU centre is glad to offer the availability of ball-milling machine to assist staff's research for various purposes, such as blending powder, inducing solid state reactions in a variety of technologies, size-reduction, activation of silicates, solvent free inorganic synthesis, and mechanical alloying. The machine was located at (Rm 1003 THEi TY). Colleagues, students, technicians and research assistants who are interested in using the machine for research can enrol in the coming training sessions. At FST, research staff are already actively using it to prepare solid-state materials for energy storage applications.



Ball milling machine located at (Rm 1003 THEi TY).



Sample before ball mill



Sample after ball mill

### **Installation of Fermentation System (Rm N1035 THEi CW)**

A new Fermentation System was purchased under the approved funding of the CIFU. The Fermentation System is equipped with a working volume of 10L autoclavable glass vessel linked with a single controller. Major uses of the Fermentation System include pilot scale microbial and cell culture applications, scale-up processes, and production of biomolecules. A training session will be arranged on August 25, 2021 (see below for details of registration), and colleagues, technicians, and research staff who are interested are encouraged to enrol.



Fermentation system located at Rm N1035, THEi CW.

### **3D Printing Machine, 3D Printing Filament Maker, Plastic Pellet Dryer, Shredder and Universal Testing Machine at (Rm S311b THEi CW)**

The Food Recovery Lab in Chai Wan Campus resides in room S311b as well as room N1035. Several machines have been delivered and installed in these spaces. For room S311b, a 3D printer (fused deposition modelling) will print bio-plastic prepared with the help of the shredder, 3D Printing Filament Maker and the Plastic Pellet Dryer. These machines work together to allow preparation of bio-plastic 3D printed parts. After these are created, the parts may be tested for their tensile and bending strength using the installed Universal Testing Machine. The Universal Testing Machine measures the maximum forces a sample of plastic or other material can withstand. It gives precise data on tensile, compression and bending stresses. A training session will be arranged for the 3D Printing machine on August 25, 2021 (see below for details of registration), and colleagues, technicians, and research staff who are interested are encouraged to enrol.



3D Printing Machine



3D Filament Making Machine



Dryer



Shredder



Universal Testing Machine

## Training Workshops

### **Ball-milling Machine**

A training workshop for the Ball-milling machine will be held on August 27, 2021 at 10:00am -10:30pm at Rm 1003, Tsing Yi campus. Colleagues who are interested in the training workshop may register on the Google form below by August 23, 2021. For questions please send an email to Mr. Alex TSANG ([ctsang@thei.edu.hk](mailto:ctsang@thei.edu.hk)).

### **Gel Permeation Chromatography Machine (GPC)**

A training workshop for the Gel Permeation Chromatography Machine (GPC) will be held on August 26 (9:30am -5:00pm) and 27 (9:30am – 12:00pm), 2021 at Rm 1003, Tsing Yi campus. Colleagues who are interested in the training workshop may register on the Google form below by August 23, 2021. For questions please send an email to Mr. Alex TSANG ([ctsang@thei.edu.hk](mailto:ctsang@thei.edu.hk)).

### **Accelerated Solvent Extractor (ASE) System**

A training workshop for the Accelerated Solvent Extractor (ASE) System will be held on August 27, 2021 at 2:00pm – 5:00pm at Rm 1003, Tsing Yi campus. Colleagues who are interested in the training workshop may register on the Google form below by August 23, 2021. For questions please send an email to Mr. Angus LAW ([anguslaw@thei.edu.hk](mailto:anguslaw@thei.edu.hk)).

### **3D Printing Machine**

A training workshop for the 3D Printing Machine will be held on August 25, 2021 at 1:30pm – 3:00pm at S311b, Chai Wan Campus. Colleagues who are interested in the training workshop may register on the Google form below by August 23, 2021. For questions please send an email to Mr. Sonny CHOY ([schoy@thei.edu.hk](mailto:schoy@thei.edu.hk)).

### **Fermentation System**

A training workshop for the Fermentation System will be held on August 25, 2021 at 3:00pm – 4:30pm at N1035, Chai Wan Campus. Colleagues who are interested in the training workshop may register on the Google form below by August 23, 2021. For questions please send an email to Dr. Paul TSANG ([paulwktsang@thei.edu.hk](mailto:paulwktsang@thei.edu.hk)).

Please register at this link – [GOOGLE FORM REGISTRATION](#) before end of play August 23, 2021.

## Competitions

### The CIFU logo Competition



CENTRE FOR  
INTERDISCIPLINARY  
RESEARCH ON FOOD  
BY-PRODUCTS UTILIZATION  
(CIFU)

HK\$3,000 Prize

LOGO  DESIGN  
COMPETITION

Objective:  
CIFU was established on 1 Jan 2021 as a collaboration between Faculty of Management and Hospitality, School of General Education and Languages, Faculty of Science and Technology and Faculty of Design and Environment, which is a focused Centre for Interdisciplinary Research on Food By-products Utilization. CIFU is now seeking a design for its logo and invites you to participate in this logo design competition.  
The most outstanding design will be honored as the logo for CIFU.

The CIFU research team initiated a Logo Design Competition to allow all THEi students to demonstrate their creativity. The Competition was open to all THEi students between April and June 2021. All entries were collected and the competition met its deadline on 30 June 2021. The entries received were of the highest quality, with students echoing themes of sustainability, innovation and creativity. The entries were judged by the entire research team including THEi's President, THEi's Research Manager and members from all faculties. A numerical score from 1-10 was allocated on Aesthetic, Relevance, Creativity and Originality. The logo with the highest score was chosen as the winner! One winner and three finalists were chosen. The Winner receives HK\$3,000 while each finalist receives HK\$1,000 for their work. The Winners will be presented with their certificates and

prize money in the upcoming CIFU Opening Ceremony which is targeted for February 2022. Congratulations to the following winners:

Winner - Mak Chun Ning – 180546545 – HK\$3,000  
DS145108 Bachelor of Science (Honours) in Multimedia Technology and Innovation

Finalist 1st - Tsui On Kay Michelle – 170540579 – HK\$1,000  
ST125201 Bachelor of Science (Honours) in Health Care

Finalist 2nd - Liu Xingyu Caroline – 208200261 – HK\$1,000  
DS125101 Bachelor of Arts (Honours) in Advertising

Finalist 3rd- Ng Sze Wai – 180521759 – HK\$1,000  
DS145107 Bachelor of Science (Honours) in Surveying



Winner



Finalist 1<sup>st</sup>



Finalist 2<sup>nd</sup>



Finalist 3<sup>rd</sup>

## Contact Persons

### Team Leader

**Dr TSANG Wai-kei, Paul.** ([paulwksang@thei.edu.hk](mailto:paulwksang@thei.edu.hk)), Tel: 3890 8143.

Dr TSANG will be supervising the whole project. He will be the Manager of the CIFU and will administer both the Food Production Development Lab and the Food Recovery Lab. He will be involved in the experimental work related to the construction of bacteria and / or yeasts as “green” strategies for energy production.

### Members

**Mr CHOY Yip-hong, Sonny.** ([schoy@thei.edu.hk](mailto:schoy@thei.edu.hk)), Tel: 3890 8305.

Mr CHOY will be co-supervising the Food Recovery Lab and be responsible for all research work related to industrial design and non-edible applications of food by-products. It will include application of plant-based bio-composite materials in nonedible contexts.

**Dr FONG Lai-ying.** ([lyfong@thei.edu.hk](mailto:lyfong@thei.edu.hk)), Tel: 2176 1818.

Dr FONG will be co-supervising the Food Product Development Lab and be responsible for research work related to food product development and production using various advanced technology and new product formulations with emphasis on balanced nutrients and improved packaging for high food quality and safety.

**Dr TSANG Chi-wing, Alex.** ([ctsang@thei.edu.hk](mailto:ctsang@thei.edu.hk)), Tel: 2176 1843.

Dr TSANG will be co-supervising the Food Product Development Lab and be responsible for designing and managing all experimental work for research development. He will be in charge of all technical aspects of lignin extraction from various food by-products, supervising research staff and undergraduate students for product and process optimization.

**Dr LEUNG Tsui-yan, Vicky.** ([vicky\\_ty\\_leung@thei.edu.hk](mailto:vicky_ty_leung@thei.edu.hk)), Tel: 3890 8172.

Dr LEUNG will be focusing on research work on menu development, consumer behaviours, and perception-related research. Dr LEUNG will investigate the potential applications of food by-products in both edible and non-edible contexts from different stakeholders' views.

**Dr LAW Ho-yin Angus.** ([anguslaw@thei.edu.hk](mailto:anguslaw@thei.edu.hk)), Tel: 3890 8165.

Dr LAW will be co-supervising both the Food Product Development Lab and the Food Recovery Lab. In this proposal, Dr LAW will construct genetically engineered plants, cell lines for production of desirable proteins or lipids, with the use of food by-products as raw materials.

