

# Newsletter of YunTech

National Yunlin University of Science & Technology

Taiwan R.O.C.

Volume 17, Number 2

2018

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## Outstanding Performance

### The Pride of YunTech: Student Liu Yi-zen is Granted the 2018 President Educational Award!

The award list of 2018 President Educational Award was announced by the Ministry of Education (MOE). Student Liu Yi-zen of the Graduate School of Technological and Vocational Education stood out among the nearly 300 candidates after the first and second selection stages and was eventually chosen as the winner in the college students group. The purpose of the President Educational Award is to honor flagship students who live in difficulties but still strive in breaking through their limitations. It is believed that the awarding students can be models for all students in Taiwan. It is a great honor for Liu to win the award. Both teachers and students of YunTech are so proud of her.



Graduate student Liu Yi-Zen (3rd from left) and her advisor Wu Ting-ting (1st from right) awarded the Best Journal of the 13th Taiwan E-Learning Forum.

Liu is studying at the Graduate School of Technological and Vocational Education at YunTech. When she was a child, her parents separated. Her mother takes care of her younger brother and her individually. Being rich is not what they want but they only want to live more comfortably. Despite growing up without her father, Liu still appreciates the effect her father had on her and her younger brother.

“My mother is a down-to-earth and simple person, but she has always tried her best to love and educate me and my younger brother. Living in difficulties and having a simple diet is not hard for us. The hard part is to see my mother working so hard yet I cannot help her with anything. I feel really painful about this. However, I have not wasted this feeling of pain. Through it, I have learned to be in other people’s shoes and have come to understand the greatness of feedback to society. Pain is the feeling that makes me understand that if I help and contribute to others, I will have more in return,” Liu stated.

Liu is the Director of the Senior Education Center in Douliu, even as she studies at the Graduate School of Technological and Vocational Education. Her other notable achievement has been integrating local resources to bring about love and care for the disadvantaged elder. Moreover, she has utilized her learning in class to provide e-learning teaching materials for her program. Without a doubt, she holds great potential as a leader in her field. Liu is called everybody’s little granddaughter by the students of the program. During her student life, her advisor Wu Ting-ting did not just assist her with her studies but also taught her important daily life lessons. Liu stated “Dr. Ting-ting helps me a lot with both my studies and life.”



Graduate student Liu Yi-zen shares the outcome of her senior year of learning with different colleges.

“I spent my childhood in countryside and had left my hometown for a while. Now I am back as an adult. It’s so lucky to have the chance to stay in my hometown, Yunlin, and to serve and contribute what I can do to this beautiful land,” Liu stated. She hoped she could inspire the local students to contribute to their hometown as well with the award for this time. If all the local students can contribute themselves to their hometown, then the land and the students themselves will create mutual benefits in the future.

## YunTech Devotes Time and Effort in Cultivating Global Talents for Renewable Energy by Cooperating with Renewables Consulting Group, England.

YunTech actively planned the Global Research and Industry Alliance in Renewable Energy. The main mission of the alliance is to focus on R&D related to advanced technology and promotion in customized products. Members of the alliance aim to provide services in technology innovation, industrial application, talents cultivation, and policy consultation.

To cooperatively cultivate global talents in the field of renewable energy, President Yang Neng-shu of YunTech and Chairman Alan Chivers of Renewables Consulting Group (RCG) signed a Memorandum of Understanding (MOU) on August 15th, 2018 on behalf of each other’s institutes. Representatives of Yunlin County Government, Sinogreenery Company and Infra-wet Company were invited to witness the signing ceremony. RCG is a firm providing services in market intelligence, management consulting, and technical advisory. Its branch companies are located in Glasgow, London, New York, Southampton, Taipei, and in other cities of the world. With YunTech’s ample experiences in industry-academia collaboration and research ability and with RCG’s practical courses, it is anticipated that global talents for renewable energy industry can be fostered.



President Yang Neng-shu of YunTech and Chairman Alan Chivers of RCG sign an MOU on talent cultivation for offshore wind power plants.

Taiwan’s government is pushing forward a green energy policy and will devote a lot of resources in the field of renewable energy to achieve its mission by 2025. The coastal area of Yunlin has been specially

selected as an ideal location for wind power, and Sinogreenery Company will establish offshore wind power plants along coastal areas such as Taixi. After passing the Environment Impact Assessment (EIA) in April 2018 and being allowed to produce a certain amount of emission by the Ministry of Economic Affairs, Sinogreenery Company has started a discussion with YunTech on preparing talents in the renewable energy field with the assistance of both the university and RCG. The cooperation between these parties will create different opportunities, including student internships in the maintenance of wind power plants in both land and coastal areas, training courses on wind power plants, assistance for students in obtaining professional certificates, establishment of a wind power education center to offer virtual reality experiences, and environmental education workshops.



President Yang Neng-shu of YunTech and Chairman Alan Chivers of RCG have finished the signing.

President Yang stated, "To meet the developmental needs of Taiwan and Yunlin, YunTech will positively cooperate with renewable energy companies to cultivate global talents in renewable energy, and these talents will also become the future human resources for local companies to rely on, thereby creating more value for them."



## Awards and Commendation

### YunTech Has an Outstanding Performance at the 32nd World Genius Convention & Education Expo 2018

The 32nd World Genius Convention & Education Expo 2018 took place June 4-5 at Tokyo International Forum (TIF). 5 products of YunTech won 2 gold, 3 silver awards and the Best School Award.

The 2 gold-awarded inventions are listed below:

The first gold-awarded invention Energy Harvesting Applied to the Internet of Things was invented by students Lin Yu-ren and Shi Bo-yun under the instruction of Associate Professor Hung Chung-wen of the Department of Electrical Engineering. The energy harvesting circuit of this invention adopted a supercapacitor to replace the traditional/lithium battery. It was found that a day's accumulation of electricity consumption by the sensor of this invention was 1.190328mAh (the concentration of PM 2.5 was measured every 2 hours). Supercapacitors have the advantage of being able to be quickly charged up. Also, supercapacitors do not exhaust easily compared with traditional/lithium batteries. When applied with a high efficiency solar power harvesting circuit and energy harvester to control the IC, the whole structure can work stably for a long time. No extra human effort is needed to maintain the system anymore. If a supercapacitor is fully charged, the system can work for a whole day without any light. The invention can be further applied to appliances such that the appliances can control themselves in the future.

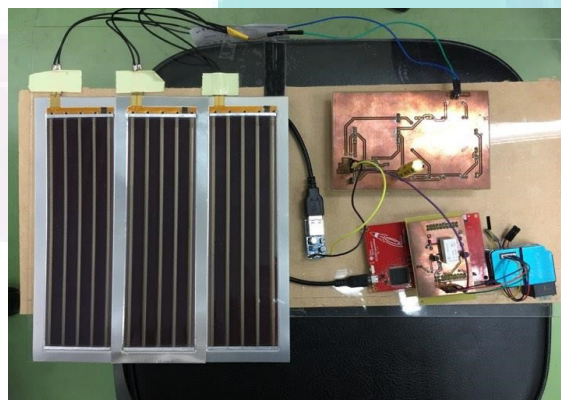


Photo of the invention, Energy Harvesting Applied to the Internet of Things.

The second gold-awarded and special-awarded invention Method and Apparatus for Measuring Etching Depth was produced by students Shu Li-home, Chang Zong-ping, Shi Hong-da and Li Tze-shien under the instruction of Professor Wang Yung-cheng of the Department of Mechanical Engineering. Etching process is an important stage for semiconductor industry. The current measuring method in etching depth involves applying a system parameter with time which cannot be measured directly. The invention provides a method and apparatus which can measure etching depth directly



and accurately through one easy and simple structure: the adoption of a common path interferometer. After soaking one matrix in etching liquid, light will radiate on the surface of the matrix and will reflect onto the common path interferometer. Signal processing will occur and the distribution of interference fringe will then be observed; the wavelengths can be calculated from the distribution. The invention provides a method and apparatus which prevents circumstantial interference, it performs in high resolution, and it allows for direct measurement.

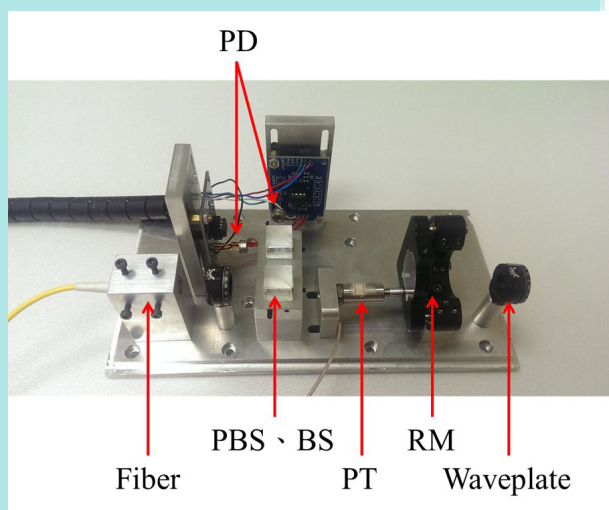


Photo of the invention, Method and Apparatus for Measuring Etching Depth.

The 3 silver-awarded inventions are listed below:

The first silver-awarded invention Efficiency Improvement of Dye-Sensitized Solar Cells Integrated with TiO<sub>2</sub> Nano Structures was invented by students Lin Yi-an, Wu Yi-de and Shu Chi-long under the instruction of Associate Professor Lin Jian-yang of the Department of Electronic Engineering. The invention uses a TiCl<sub>4</sub> chip processed by means of anodic oxidation as the anode. The processing is easier and TiO<sub>2</sub> Nano arrayed can be produced, which increases adsorption of the photosensitizing dye and efficiency of electron transport in order to increase battery efficiency. The platinized film on a transparent electric-conducted plastic matrix was used as the cathode and the anodic-oxidated TiCl<sub>4</sub> chip was used as the anode. Due to the features of materials used by this invention, the invention will be flexible, light, handy and euphotic for the cost. It is believed that the invention can be applied in the renewable solar

power industry. The invention can effectively increase the power generation efficiency of the dye-sensitized solar cell from 10 to 15%.

The second silver-awarded invention Copolymers Based on 2,5-di(thiophen-2-yl)thieno[3,2-b]thiophene and 2-(2-thienyl)furan as Promising Anodic Electrochromic Materials in High Optical Contrast Smart Window was produced by students Kuo Chong-wen, Chou Yen-ting, Huang Shen-wei, Wang Yau-ting and Huang Wen-chien under the instruction of Associate Professor Wu Tzi-yi of the Department of Chemical Engineering. With increasing awareness of the climate change crisis in recent years, green buildings have become the trend for the global village and this has increased the need for electrochromic materials. Electrochromic inventions feature a skill that can be compared to face-changing performed in the Sichuanese Operas. With micro electricity, multiple colors will magically be displayed in turn and leap in front of the viewers' eyes. The concept of the invention can be applied to the windows of homes as well. Using the power switches, the windows of your house will be either dark or bright and will display different window films to prevent light and heat from coming into your house. It is believed the invention will be a big helper to energy saving by reducing the use of air-conditioner in homes.

The third silver-awarded invention Easy-Press was invented by students Yang Chia-wei, Wu Chia-ying and Yeh Tzi-hou under the instruction of Associate Professor Chang Tsen-yao of the Department of Creative Design. The invention is a caster. When using the caster, you will press the top to affect the elastic part and the elastic part will be squeezed to affect the slide part to move and then will let you spray spice as you need. The caster can be used by one hand only, and each press is a half a teaspoon, which reduces your time in spraying spices and creates more convenience. Furthermore, the elastic part of each caster has different shapes to help you easily recognize spices.



Photo of the judges and YunTech students.

## YunTech Has an Outstanding Performance at the MACAO International Innovation & Invention Expo

A research team made up of faculty and students of YunTech had an outstanding performance at the 2018 MACAO International Innovation & Invention Expo held from July 13- 15 at the Macau Fishman's Wharf & Exhibition Centre. YunTech won 2 gold, 1 silver, and 2 copper awards this year.

The 2 gold-awarded inventions are listed below.

The first gold-awarded invention An Automated Optical Inspection System for a Tube Inner Circumference State was invented by students Chiang Chen-gu, Li Wei-ting and Shi Bo-yun under the instruction of Associate Professor Hung Chung-wen of the Department of Electrical Engineering. Although industrial automation has become a trend for the industrial field, some companies in the traditional industry still do not have a complete automatic production line to increase their productive capacity and lower their cost to earn the greatest profit possible due to the high cost of machinery. Take the chopsticks industry for example; the most expensive part in the manufacturing process is the cost required to inspect defects. The inspection mostly relies on workers' judgement regarding the finished products. In fact, most unqualified chopsticks have defects due to their original materials instead of the manufacturing process. Using the naked eye to inspect defects is difficult and wastes too much time. The invention tries to solve the problem through an automated optical inspection method with the machine learning technique. This method will not break the surface of tubes and the matching vision technique of this method will select chopsticks with defects before

the manufacturing process kicks in.

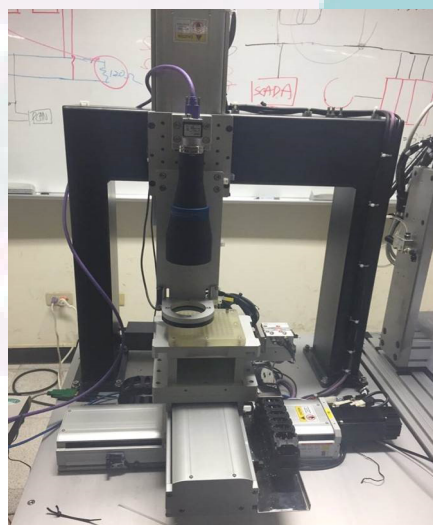


Photo of An Automated Optical Inspection System for a Tube Inner Circumference State.

The second gold-awarded invention A Superposition Asymmetrical Lighting Headlamp was invented by students Chou Chia-hou and Yeh Yun-chen under the instruction of Associate Professor Chen Ksi-choa of the Department of Electronic Engineering. The LED car headlamp presents light in an asymmetrically oblique angle, providing clear driving sights for drivers thus enabling them to pay attention to the safety of pedestrians, bikes, and motorbikes without affecting others.



Photo of the right side of A Superposition Asymmetrical Lighting Headlamp.

The silver-awarded invention Copolymer Based on Indole-6-carboxylic Acid and 2,3'-bithiophene as Potential Anodic Material in High Optical Contrast and Multicolor Energy-saving Electrochromic Device was invented by the research team grouped by Associate Professor Kuo Chung-wen of the Department of Chemical and Materials from National Kaohsiung University of Science and Technology and students Tzo Yen-ting, Fan Shu-chien, Wang Yao-ting and Huang



Shen-wei led by Associate Professor Wu Tzi-yi of the Department of Chemical Engineering. The concept of the invention comes from the face-changing skill performed in Sichuanese Operas. When performers cover their faces with clothes and 'waves', in the very next moment they will have their faces changed instantly. The performance is always highly prized by the audience. Likewise, the multicolor energy-saving electrochromic device of the invention can present more than 3 colors in 3 seconds with little electricity.

The 2 copper-awarded inventions are listed below.

The first copper-awarded invention Efficiency Improvement of Silicon-based Solar Cells with Silicon-Germanium Film was invented by students Lin Yi-an, Wu Yi-de and Shu Li-lung under the instruction of Associate Professor Lin Jian-yuang of the Department of Electronic Engineering. This invention adopts an aluminum-induced crystallized method to produce a polycrystalline silicon-germanium thin film as the base to make single crystalline silicon/polycrystalline silicon-germanium solar cells. The solar cells have 3 advantages. First, they increase the energy conversion efficiency of the solar cells. Second, they do not need air, which is expensive and highly risky. Third, the manufacturing process is easy. If the crystalline silicon solar cells on the market adopts this technique, they can increase their power generation efficiency and product value.

The second copper-awarded invention Easy-Grind was invented by students Yang Chia-wei, Wu Chia-ying and Yeh Zi-hao under the instruction of Associate Professor Chang Tsen-yao of the Department of Creative Design. The purpose of this invention is to provide a set of mortar which can be folded to reduce the volume and weight of the appliance, thus making the appliance easy for carrying and storage. The convenience and manners of use will only increase.

The R&D inventions from YunTech's research teams have focused on the needs of industry and convenience of usage in life, making the inventions highly potential to be marketed. YunTech showed its innovation power and achievement at this competition again. Faculty members and students taking part in this competition will devote themselves to the needs of industry through

industry-academia cooperation in the future.

## Academic Exchanges

### R&D Exhibition of the Department of Electronic Engineering of YunTech

The Department of Electronic Engineering of YunTech held an R&D Exhibition on August 22nd, 2018. 8 R&D inventions were displayed at the exhibition. The first product was Interactive Mimic Visual Design created by the research teams instructed by Assistant Professor Huang Chien-sheng and Associate Professor Lin Ching-huang. The invention is a plastic laryngoscope which follows the structure of the limbs of anthropoids as models. The disposable laryngoscope belongs to Class II medical appliances. The main purpose of the product is to maintain the respiratory tracts of patients who are subconscious or unable to comfortably sustain spontaneous ventilation. According to ISO 7376-2009, the interchangeability of laryngoscopes shall be under 10 mm when the medical appliances are forced under 65 Newtons in a due to being in certain positions. The maximum interchangeability of #4 plastic laryngoscopes for domestic or international areas is currently more than 10 mm (roughly 17 mm), resulting in the problem of a light leak. The inventors revised the product's optical design and processing (Bi-injection molding) to meet the standards of the ISO Medical Care Act, thus producing a high strength structural plastic laryngoscope without the problem of a light leak.



Assistant Professor presenting Interactive Mimic Visual Design.

Under the support of the Project of the Internet of Things and Talents Cultivation by the Ministry of Education (MOE), the research team of Associate Professor Hsueh Ya-hsin produced the Smart Visible Lighting Communication Cart in the Hypermarket. The product applies Visible Light Communication (VLC) to carts and the light is not only pure light but is also equipped with functions in positioning and delivering information. The smart cart is equipped with a VLC positioning system and one app for mobile phones was developed to assist with shopping, helping shoppers to look for the position of the items that they would like to purchase through navigation of the app. Moreover, management departments of hypermarkets can obtain useful information on product popularity, crowd intensity, and so forth using the human flow data. Through the positioning data, hypermarkets can display the products' details, advertise products, and relate discount information automatically to shoppers. The technology turns the LED into an intelligent system. If a public place is equipped with intelligent functioning from the beginning, no wifi device is needed to set the indoor positioning function.

For many years, the other research team led by Associate Professor Hsueh Ya-hsin has focused on medical appliances, soft- and hard-wares needed for long-term care institutions, cognitive training for patients who suffer from dementia, and research and applications related to middle-aged and older adults. The product Intelligent Wheelchair Cushion is equipped with alerting functions for falling and sliding. Users can also engage with interactive rehabilitation games while in the wheelchair. The product Interactive Cycling System for Rehabilitation is an intercollegiate research outcome resulting from a cooperation between the Department of Electronic Engineering of YunTech, the Department of Physical Therapy of Chung Shan Medical University, and the Department of Product Design of Ming Chuan University. The product was created for the training of the lower limbs of patients suffering from strokes. Through the training designed by doctors and physical therapists, patients suffering from strokes can increase their ability to maintain their physical balance.



Associate Professor Hsueh Ya-hsin (2nd from left) is presenting Intelligent Wheelchair Cushion.

Besides the abovementioned 4 products, there were 4 pioneering research products.

The 4 inventions are listed below:

Fabrication of Deformed TiO<sub>2</sub> Aggregate as Photoanode Applied in Dye Sensitized Solar Cell invented by the research team instructed by Professor Chou Hsueh-tao.  
A LSPR Bio-Sensor Using Au Nanoparticles for Detecting Glucose invented by the research team instructed by Professor Chou Hsueh-tao.

A Superposition Asymmetrical Lighting Headlamp invented by the research team led by Associate Professor Chen His-chao.

Fabrication of Dye-Sensitized Solar Cell with Phosphorene Modified Titanium Dioxide Photoelectrode invented by the research team under Associate Professor Chen His-chao.

It is evident that the Department of Electronic Engineering's performance on both R&D and practical application is exceptional. Besides its contribution to the electronic industry in Taiwan, the department has also won awards at many international invention competitions. With its rich R&D results, the department has proven that it has a good track record on learning and teaching and that it employs an academic staff devoted to the training and research of both the theoretical and practical aspects of the field. The Department of Electronic Engineering of YunTech has positively pushed forward with industry-academia cooperation, doing its level best to decrease the gap between learning and application. Due to the efforts of the department and its faculty, students of the department are trained well in their ability to work for industry after graduation and can easily become elites



in both the electronic and optoelectronic industries needed by the country.



**Publisher:** Neng-Shu Yang

**Publication Office:** National Yunlin University of Science and Technology

**Chief of Newsletter of NYUST Editing Committee:** Chang- Franw Lee

**Chief Editor:** Po-Kai Wu

**Executive Editor:** Shu-Ling Tsai

**Translator:** Huei-Ching Kang

**Cover Design:** Sheng-Hsiung Hsu

**Tel:** +886-5-534-2601

**Fax:** +886-5-532-1719

**Address:** 123 University Road, Section 3, Douliou, Yunlin, Taiwan 64002, R.O.C.

**Web:** <http://www.yuntech.edu.tw>

**E-mail:** [aax@yuntech.edu.tw](mailto:aax@yuntech.edu.tw)