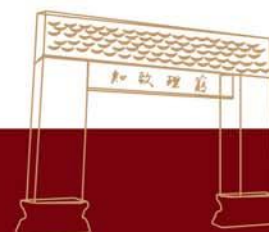




**NCKU**  
National Cheng Kung University



國立成功大學工學院

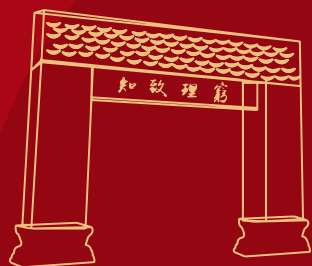
College of Engineering, National Cheng Kung University

70101台南市大學路1號

No.1, Ta-Hsueh Road, Tainan 701, Taiwan.

+886-6-2757575 ext. 62000    em62000@email.ncku.edu.tw    <http://www.eng.ncku.edu.tw/>





## ■ The Oldest College in NCKU

College of Engineering (COE), NCKU  
was established in

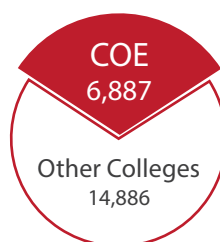
1931

as the first college school in Taiwan.

College of Engineering, NCKU

# About COE of NCKU

## ■ The Highest Percentage of NCKU Faculties & Students



One third NCKU students



One fourth NCKU Faculties

## ■ Excellence in International Linkage



More than **618** international students  
from over **58** countries

**50** partner universities/  
institutes in **12** countries on  
**5** continents



ONE OF  
THE TOP  
ENGINEERING  
COLLEGE  
IN THE WORLD

## ■ Outstanding Academic Achievement



**2<sup>nd</sup>**  
in Asia



**38<sup>th</sup>**  
in the world

College of Engineering, NCKU

# Academic Units

## Departments

- ✓ Department of Mechanical Engineering
- ✓ Department of Chemical Engineering
- ✓ Department of Resources Engineering
- ✓ Department of Materials Science and Engineering
- ✓ Department of Civil Engineering
- ✓ Department of Hydraulic & Ocean Engineering
- ✓ Department of Engineering Science
- ✓ Department of Biomedical Engineering
- ✓ Department of Systems & Naval Mechatronic Engineering
- ✓ Department of Aeronautics & Astronautics
- ✓ Department of Environmental Engineering
- ✓ Department of Geomatics

## Institutes

- ✓ Institute of Ocean Technology & Marine Affairs
- ✓ Master of the International Institute of Medical Device Innovation (MDI)

## Programs

- ✓ International Master Program on Intelligent Manufacturing
- ✓ International Bachelor Degree Program on Energy Engineering (IBDP-E)
- ✓ International Master Degree Program on Energy Engineering (IMDP-E)
- ✓ International Doctoral Degree Program on Energy Engineering (IDDP-E)
- ✓ The international Curriculum for Advanced Materials Program (iCAMP)
- ✓ International Master Program on Natural Hazards Mitigation and Management (iNHMM)

English courses



Websites of  
Departments and Programs







NCKU  
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College of Engineering, NCKU

## Our Alumni

Many NCKU alumni have brilliant performance in education, academia, politics, business, arts, and media.

Companies founded by  
COE of NCKU alumni

\*arranged in alphabetical order



BERLIN CO., LTD.



Chong Hong  
CONSTRUCTION CO., LTD.



LELON ELECTRONICS CORP.



LUXNET  
CORPORATION



MINGTAI CHEMICAL CO., LTD.



MOLDING INNOVATION



Rechi Precision Co., Ltd.



PT SULAWESI MINING INVESTMENT



TOA Resin  
Corporation Limited



Universal Microelectronics



WAH LEE  
INDUSTRIAL CORP.



大聯大控股  
WPG Holdings



The above is a partial list of companies founded by COE of NCKU alumni.

" NCKU has been taking the top spot at the *Global Views Monthly Taiwan* Graduate Employability Rankings for 7 consecutive years. "





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College of Engineering, NCKU

# Academia-Industry collaboration

Collaboration & cooperation with leading  
industries and investors worldwide



CHIMEI



China Petrochemical  
Development Corporation



China Steel Corporation



CSBC Corporation, Taiwan



E. SUN BANK



Qisda



Quanta Computer



TECO



台灣積體電路製造股份有限公司  
Taiwan Semiconductor Manufacturing Company, Ltd.



WAH LEE  
INDUSTRIAL CORP.

YAGEO  
Group



The above is a partial list of industries that are currently in collaboration with NCKU.



For the Industry income category, NCKU has scored over 99 out of 100 for the past 10 consecutive years.



College of Engineering, NCKU

# Internationalization & Collaboration

3+1+1

dual degree program  
with Purdue



For strengthening the international mobility, a 3+1+1 dual degree program was established between the NCKU and Purdue. The students enrolled in this program will spend the first 3 years in the NCKU ME, and the 4-5th years in Purdue. During their years at NCKU, the students will take at least 1 course lectured by Purdue professors each year. At the completion of this program, the student will receive Bachelor's degree from NCKU and Master's degree from Purdue. This program is the first project-based international dual-degree program at NCKU.



## A Solid and Trusting Partnership

Opening of TU Darmstadt's Liaison Office at NCKU,  
the First German University Center in Taiwan



The National Cheng Kung University (NCKU) since 1987 has established a partnership with the Technische Universität Darmstadt (TU Darmstadt) that now opens a new chapter. TU Darmstadt launched its first Asian liaison office in Taiwan at NCKU on May 21st, 2019. Following another MOU on academic collaboration and an exchange agreement in 2011, and TCUS & TU9 alliance programs from 2015 onwards, over 50 total students from both universities have taken part in this international exchange program.

Now we are looking at the past and the future of this partnership, which has created an increasing momentum. This solid partnership between NCKU and TU Darmstadt has been in place for over 30 years, and will continue to grow.



**NCKU**  
National Cheng Kung University

Internationalization & Collaboration



## NCKU-Towing Tank Model Verification Service



NCKU Towing Tank is authorized by the Japanese Class NK Maritime Association to issue ISO-9001 towing tanks and EEDI test certification unit (State of fact, referred to as SOF), and is the only unit in Southeast Asia with EEDI certification, and the second in the global academia.

With "NCKU-Towing Tank Model Verification Service" as the main axis, it leads Taiwan's shipbuilding industry, National Shipbuilding, Submarine National Manufacturing, and yacht companies to join forces to resist international competition and assist in the promotion of national policies.



## International Summer Camp for Civil Engineering - An Insight of Sustainability and Disaster Mitigation

To enable international students in Department of Civil Engineering to know the research expertise of professors in depth, experience the development of technology in Taiwan, and the culture of Tainan, so the Department held 'International Summer Camp for Civil Engineering - An Insight of Sustainability and Disaster Mitigation' on July 8-10 in 2020.

We arranged specialized lectures and field trips in Tainan for students from Indonesia, Vietnam, India, Malaysia, and Belize. Field trips include National Center for Research on Earthquake Engineering, Taiwan CAR Lab, NCKU Museum, Tainan Art Museum, and Stage 3 Construction Project of Tainan Urban Zone Northern Outer Ring Road.



## Taiwan – Germany Joint Project on Batteries



The Department of Chemical Engineering presides over the Taiwan-German battery international cooperation project of the Ministry of Science and Technology, integrating the R&D energy of nearly 10 academic and research units, jointly developing the next-generation lithium batteries, and significantly enhance NCKU's international visibility and research standards.

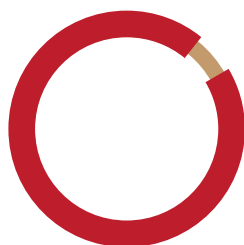


College of Engineering, NCKU

# Scholarships

91%

international graduate students  
on scholarships

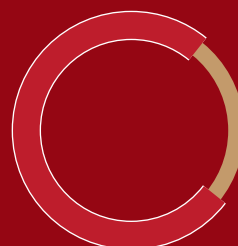


- graduate students not on scholarships
- amount of graduate students on scholarships (overseas & Mainland Chinese students are excluded)

- Scholarships, bursaries and grants are all there to help different students in varying situations.

71%

international undergraduate  
students on scholarships



- undergraduate students not on scholarships
- amount of undergraduate students on scholarships (overseas & Mainland Chinese students are excluded)







NCKU  
National Cheng Kung University

College of Engineering, NCKU

# Our Campuses



We offer a borderless learning environment, which are characterized by classical western & modern eastern scenery.



*National Cheng Kung University*  
- An Engaged Academy



# Research & Development

Research Center | Research Outcomes

## Research Center

### Aerospace Science and Technology Research Center (ASTRC)

The Aerospace Science and Technology Research Center (ASTRC), an outgrowth of the Institute of Aeronautics and astronautics in National Cheng Kung University (IAA/NCKU), is the center of comprehensive research and development in modern aerospace science and technology in Taiwan. The principal goals of ASTRC are to execute basic and applied research under the sponsorship of government agencies and in collaboration with industries in aeronautics, aviation and space.

The center operates a number of modern aerodynamic facilities: a transonic wind tunnel, a low speed wind tunnel, a shock tunnel, and flow measurement laboratory. The propulsion and combustion laboratory has four combustor test cells and a space propulsion facility. The TT&C ground station of FORMO-SAT is operated since 1997.

ASTRC has successfully accomplished a number of research works and projects in connection with the technology development in aerospace and non-aerospace areas. Through these activities, ASTRC has developed a close link with the defense research agencies and civil industry in the country. ASTRC has also gained a good deal of experiences with regard to international collaboration in the past years, including conducting joint research projects and hosting foreign visiting scholars. ASTRC looks forward to playing an even more active role to promote the utilization of aerospace technology for various applications.



### Electric Motor Technology Research Center (EMTRC)

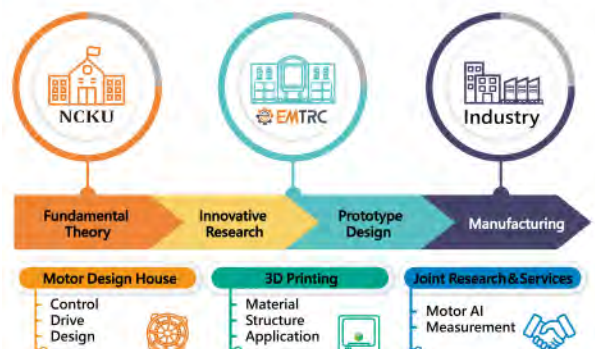
The Electric Motor Technology Research Center (EMTRC) was established in 1999 to develop motor-related technologies and support the automation industry in Taiwan.

The EMTRC aims to provide efficient mechanism for the smooth transfer of motor related technologies from academia to industry, assist local or global companies in building their own expertise, develop technical collaborations with industry and other research institutes in Taiwan, and strengthen relationships with other international organizations. EMTRC actively commits to providing education in cultivation through its industry sponsored Master-Degree Program in Motor Design and Drive; and also provides fundamentals of electric motor technologies with visual-aids and hands-on demonstrations for academia and industry.

Furthermore, the center provides motor related services such as motor design consultation, prototyping on magnetic metal additive manufacture, motor and magnetic characteristics measurement, and intelligent motor fault pre-diagnosis to facilitate interactions with industries.



#### Connection between academia and industry

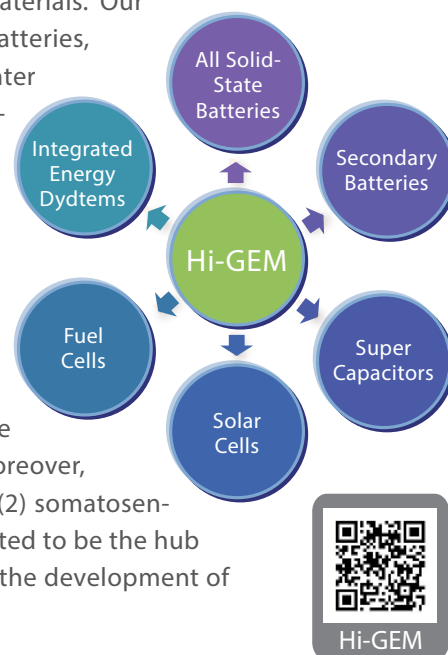




## Hierarchical Green-Energy Materials (Hi-GEM) Research Center

Hierarchical Green-Energy Materials(Hi-GEM) Research Center is one of the National Cheng Kung University (NCKU)'s school-level research centers, established since 2018 by the grants from the Ministry of Education and the Ministry of Science and Technology to fulfill the increasing demand of green materials. Our research focuses on energy storage (solid-state batteries, secondary batteries, super-capacitors) and energy conversion (solar cells, fuel cells). Hi-GEM Center aims not only to develop novel green materials but also to cultivate high-level R&D talents, strengthen international cooperation, and create industry-academic links.

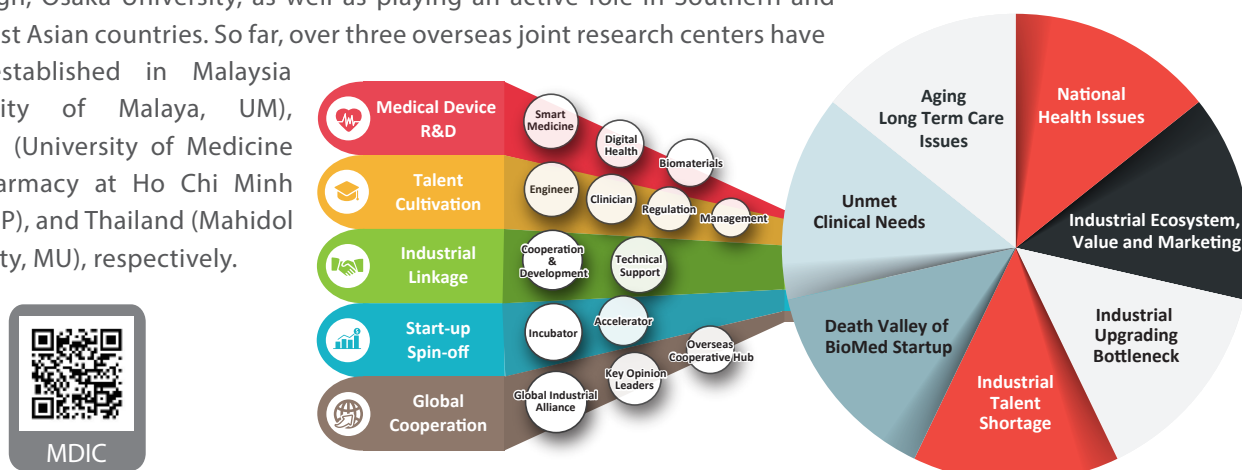
Hi-GEM's breakthrough technologies include the developments of (1) high performance gel-types solid electrolytes compatible with the liquid electrolyte production line, (2) high performance silicon-carbon anode materials, (3) low-resistance nanocomposite cathode materials and high-ionic conductivity composite electrolytes for low-temperature solid oxide fuel cells, and (4) the world's highest conversion efficiency printable dye-sensitized solar cells and Calcium Titanite perovskite solar cells. Moreover, three main targets are set up for daily life applications: (1) smart luggage, (2) somatosensory VR device, and (3) iBeacon indoor. With all the efforts, Hi-GEM is expected to be the hub of researchers, students, industries, and international scholars to promote the development of green-energy materials in Taiwan.



## Medical Device Innovation Center (MDIC)

Established in 2011, MDIC is a research organization that devotes to help booming the industry environment through its research strengths, interdisciplinary talent cultivation, medical device innovation, industry specialized service, overseas collaboration, as well as incubating those startup companies in the Medical Devices Industry. We work closely with domestic and international scientists, clinicians, engineers, and business enterprise leaders to solve unmet clinical needs and develop value-oriented medical devices, mainly focusing on Cutting-edge Medicine, Smart Health, and Elderly Care. In recent years, we even develop and integrate latest technologies such as ICT, 3D printing, AR/VR and AI into our research outcomes.

MDIC is also regarded as the first institute to promote STB Biodesign Course by containing Biodesign into its educational objectives and training programs. Moreover, MDIC endeavors to empower successful models by global network. This includes collaborating with worldwide top Universities and Institutes like Mayo Clinic, University of Pittsburgh, Osaka University, as well as playing an active role in Southern and Southeast Asian countries. So far, over three overseas joint research centers have been established in Malaysia (University of Malaya, UM), Vietnam (University of Medicine and Pharmacy at Ho Chi Minh City, UMP), and Thailand (Mahidol University, MU), respectively.



## Research Center for Energy Technology and Strategy (RCETS)

- Establish collaborations to integrate energy research groups in Taiwan
- Promote basic and applied research on energy



In February 2008, the Research Center for Energy Technology and Strategy (RCETS) was established by the National Cheng Kung University (NCKU), with the goal of organizing the university's researchers and resources in energy related fields. RCETS has created thirty-two research groups that focus on a wide variety of energy technology, including most importantly solar cells, energy strategies, bio energy, wind power, LED lighting, carbon capture and storage, and hydrogen systems. These groups represent eight colleges and thirty departments at NCKU, along with thirty off-campus research institutes and companies. Approximately 200 NCKU professors and researchers are involved. Since 2011, RCETS has become one of the four most prominent research centers at NCKU.

- Strengthen international cooperation in energy research and education
- Support project applications and executions
- Bridge the gap between academia and industry

- Promote energy education
- Develop energy-related knowledge, skills and potential

In 2017, in consideration of international research trends and the main national energy policy development, RCETS readjusted six key technologies, including smart grid (smart



grid and energy storage), offshore wind power (offshore wind farm observation, operation and maintenance), microalgae biomass energy (microalgae carbon fixation and water purification), flexi-fuel energy saving and emission reduction (flexi-fuel energy saving and emission reduction and circular economy), composite buildings (multifunctional building design), and energy strategies (energy strategies and policies).

## Research Outcomes

### Microalgae biorefinery and Circular Economy



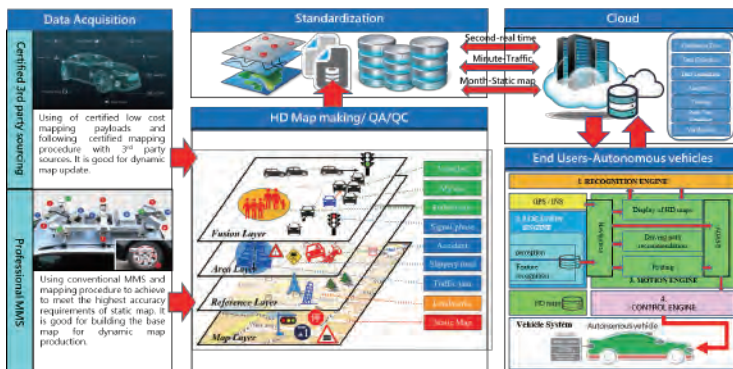
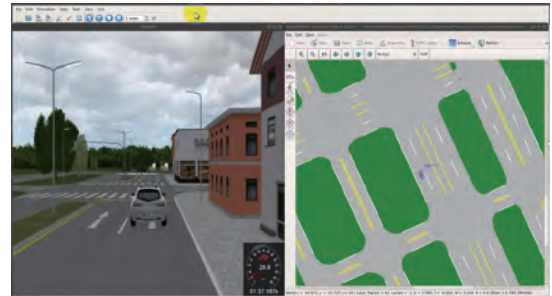
Prof. Jo-Shu Chang of Department of Chemical Engineering has a wide collection of microalgae and is the world-leading expert in microalgae research, currently ranking #1 in the world for publications in the area of both "microalgae" and "microalgal biofuels" (according to Web of Science). He and Dr. Chun-Yen Chen are founders of National Cheng Kung University (NCKU)'s "Center for Microalgae Biotechnology and Engineering." The NCKU's microalgae team owns state-of-the-art technologies for production of microalgae-based biofuels and chemicals, as well as flue gas CO<sub>2</sub> reduction and utilization.

The team has developed innovative and effective photobioreactor technologies to convert CO<sub>2</sub> into feed, health food and fuels via integration of microalgae isolation, cultivation system design, biomass harvesting, and product recovery/purification technologies. Furthermore, they also established core technologies for microalgae-based wastewater treatment and follow-up circular economy strategies with the application of specific microalgae as fertilizers for plants and feed supplements for grouper and shrimp.



## Mapping the World for Autonomous Vehicles

In the next decades, we will face the development about autonomous driving technology. For society and people to accept autonomous vehicles, the autonomous drivers must be safer than human drivers. By combining HD maps and dynamic information like traffic light, autonomous vehicles will be able to make instant decisions which is faster than human. HD maps can make autonomous vehicle safe.



Hence, the issue of mapping production includes data sources, technologies, standards, and processes will be discussed. Next stage will be dynamic HD maps ecosystem. The main topic of communicating with self-driving cars and mapping fleets, automated HD maps production, classification, modeling, end user automated format conversion, cloud platform, and V2X will be interesting.

## The world's first wearable ultrasonic monitoring device to monitor the collapse of the tongue base in Obstructive sleep apnea (OSA) patients during the whole night's sleep

The team of Professor Chih-Chung Huang have developed the world's first wearable ultrasonic monitoring device to monitor the collapse of the tongue base in Obstructive sleep apnea (OSA) patients during the whole night's sleep, and completed clinical trials of about 40 people in the Sleep Center of Geng-xin Hospital. Experimental results shown that this device can monitor the structural changes of the tongue during sleep and integrate ultrasonic information into the commercial PSG system, which provides beneficial diagnostic information for judging the collapse position and the thickness of the tongue base.

The core technology is the development of a wearable ultrasonic array transducer and video monitoring device software and hardware, which providing specialists with new information on the diagnosis of sleep-disordered patients, and will also develop new medical equipment for whole night sleep. Diagnosing the degree of collapse of the respiratory tract and changes in tongue elasticity of patients with sleep apnea is expected not only to become a tool for the diagnosis of sleep apnea, but also to contribute to the medical equipment industry in Taiwan.



Future Tech Awards 2020

# Tainan City

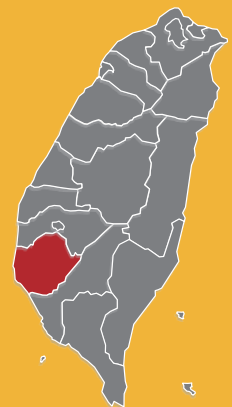
Photo by SU Bo-An on Flickr (<https://reurl.cc/Gml30v>)

Our campuses are located in Tainan City, the oldest city which enjoys the title of its former status as capital city for more than 200 years. Therefore, the city is commonly known as the "Capital City", 府城. There are abundant well-preserved ancient monuments, historical temples and affordable delicious local cuisines all around the city center.



Photo by 黃郁清 on 臺南旅遊網圖庫管理系統 (<https://gallery.twtainan.net>)

## Location



## History

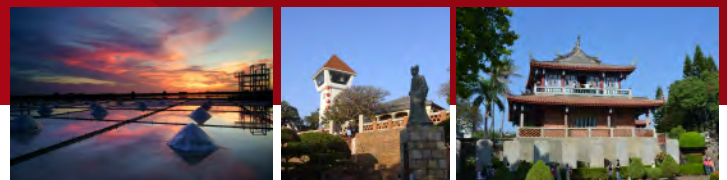
Tainan was established in **1620**. It was the first walled city in Taiwan and was also the place of origin of the name "Taiwan."

## Population

**1.8 million** ↑  
\*2021

## Climate

Tainan has a warm humid subtropical climate, with mild, dry winters and hot, humid summers. Beyond south of the city, the climate transitions from subtropical to tropical.



## Transportation

There are 3 major international airports in Taiwan (Taipei/TSA, Taoyuan/TPE and Kaohsiung/KHH). After your arrival, you may choose to take (1) High-Speed Rail, (2) Taiwan Rail, or (3) coach bus from the airport to Tainan.

### Travel to Tainan

#### from TSA



#### from TPE



#### from KHH



Promotional Video of Tainan