NATIONAL CHUNG CHENG UNIVERSITY

2022
CCU SUMMER INTERNSHIP PROGRAM

COLLEGE OF ENGINEERING (CoE)
&
ADVANCED INSTITUTE OF MANUFACTURING WITH HIGH-TECH INNOVATIONS (AIM-HI)

國立中正大學
National Chung Cheng University

2022
CCU SUMMER INTERNSHIP PROGRAM
In Engineering Field

Continuing the yearly internship program in the engineering field, the College of Engineering (CoE) and Advanced Institute of Manufacturing with High-tech Innovation (AIM-HI) jointly offer summer internships for international students in 2022.

The internships are designed for international junior students in undergraduate programs and graduate students who are currently enrolled in Taiwanese educational institutions.

PROGRAM BENIFITS	To have an enjoyable and enriching experience in academic study and exchange their ideas of research with CCU students.
INTERN PERIOD	**4 July – 3 September 2022** At least 7 weeks. Individual mentors may have different definition of intern period. Please refer to each research topics for precise definition.
FEES	**FEE-FREE**. The program fee and registration fee will be provided by CoE & AIM-HI.
SUBSIDIES	AIM-HI provides free on-campus housing, reimbursement for domestic transportation, and subsidies for living expenses of NTD1,500 (before tax) per week. *Note: Utilities and fees other than the basic room charge are **NOT** covered.

PROGRAM ELIGIBILITY

- Current graduate school students (master students) in Taiwanese educational institutions.
- Current junior students in Taiwanese educational institutions.
- Passport holders of People's Republic of China, Hong Kong, or Macau are ***NOT*** eligible to apply.
- Students who will graduate before July are ***NOT*** eligible to apply.

APPLICATION MATERIALS

1. Online Application Form
2. Curriculum Vitae in PDF format
3. Official Transcripts
4. Proof of enrollment
5. Research Plan in PDF format
6. The permission letter (DOWNLOAD) from the applicant's advisor in Taiwanese educational institutions.
7. Copy of Passport (Bio-page and the page with the latest entry and exit date)
8. Head-shot Photo in JPG format
9. Other Supplementary Documents(Optional)

APPLICATION

- Applicants should read the requirements of each research topic carefully, finish the online application form, prepare **application materials**, and send them in a ZIP-compressed file to coleng_dia@ccu.edu.tw.
- The title of the e-mail please be marked with "**Application for 2022 CCU/COE&AIMHI Summer Internship"**. All the intern research topics and their requirements are listed as follows.
- **Application deadline: 13 April 2022**
- More detailed information about application can be found on the website https://sites.google.com/view/ccu-sumintern-coe-aimhi-taiwan/home

CONTACT

+886-5-2720411 ext 23003, 23005

coleng_dia@ccu.edu.tw

No.168, Sec. 1, University Rd., Minhsiung, Chiayi 621301, Taiwan (R.O.C.)

INTERN RESEARCH TOPICS

Number	P1
Project title	A Study of Grid Forming Inverter-based Resources for Low-Inertia Power System
Description of the research	Massive integration of inverter-based renewable energy systems (IBRs) has been displacing conventional synchronous generators and causing a reduction in system inertia. IBRs are integrated into power systems through power-electronics inverters. These are generally categorized as (i) grid-following (GFL) and (ii) grid-forming (GFM) inverters. The GFM inverter is a promising emerging technology that generates its own voltage signal and has the capability to regulate the frequency and voltage at the point of interconnection. The simulation-based research project will focus on investigating the potential applications to enhance low-inertia power system resilience and stability when the system is subjected to severe disturbances.
Mentor in CCU	**Prof. Gary Chang, PhD, PE, FIEEE** Dept. of Electrical Engineering, National Chung Cheng University, Taiwan, ROC. (e-mail: ieegwc@ccu.edu.tw)
Expected student level	☐ Post-graduate student ☐ Third-year undergraduate junior student ■ Both (higher priority will go to undergraduate students if more than two applicants)
Intern period	☐ Start on Jul. 4 & end on Aug. 20 (7 weeks) ☐ Start on Jul. 11 & end on Aug. 27 (7 weeks) ☐ Start on Jul. 18 & end on Sept. 3 (7 weeks) ■ Start on Jul. 4 & end on Aug. 27 (8 weeks) ☐ Start on Jul. 11 & end on Sept. 3 (8 weeks)

Number	P2
Project title	Silicon photonics and optical biosesnors
Description of the research	The topic is to develope (a) new types of silicon-based, CMOS compatible photodetectors, which have many advantages over conventional III-V based counterparts for mid-infrared applications, (b) new disposable optical biosensors for cost-effective and rapid biomedical detection for precise medicine. This internship program is open for talents who are interested in advanced optoelectronic-sensing technologies. Focus will be placed on designing, simulating, and analyzing new Si-based group-IV photodetectors and optical biosensors. For related information, please refer to the website of our lab at https://ccuphotonics307.wixsite.com/ccuphotonics307
Mentor in CCU	**Prof. Guo-En Chang** Dept. of Mechanical Engineering National Chung Cheng University, Taiwan, ROC. (e-mail: imegec@ccu.edu.tw)
Expected student level	☐ Post-graduate student ☐ Third-year undergraduate junior student ■ Both
Intern period	■ Start on Jul. 4 & end on Aug. 20 (7 weeks) ■ Start on Jul. 11 & end on Aug. 27 (7 weeks) ■ Start on Jul. 18 & end on Sept. 3 (7 weeks) ■ Start on Jul. 4 & end on Aug. 27 (8 weeks) ■ Start on Jul. 11 & end on Sept. 3 (8 weeks)

Number	P3
Project title	Trustworthy AI for Sustainable Smart City Applications
Description of the research	The internship will cover data collection, data processing, checking data trustworthiness, AI model building, checking model trustworthiness, and testing model. The applications will be related to sustainable smart city such as pollution data, traffic data, or travel data. Sustainability KPI on U4SSC will be our metrics. Fairness (bias detection), explainability, and vulnerability detection will be our AI trustworthiness attributes.
Mentor in CCU	**Prof. Pao-Ann Hsiung** Dept. of Computer Science and Information Engineering National Chung Cheng University, Taiwan, ROC. (e-mail: pahsiung@csie.io)
Websites	Personal Home Page： https://www.cs.ccu.edu.tw/~pahsiung/ Embedded Systems Lab Web Page： https://embedded.cs.ccu.edu.tw/ Research Center Web Page： https://embedded.cs.ccu.edu.tw/TWIN/
Expected student level	■ Post-graduate student ☐ Third-year undergraduate junior student ☐ Both
Intern period	☐ Start on Jul. 4 & end on Aug. 20 (7 weeks) ☐ Start on Jul. 11 & end on Aug. 27 (7 weeks) ☐ Start on Jul. 18 & end on Sept. 3 (7 weeks) ■ Start on Jul. 4 & end on Aug. 27 (8 weeks) ☐ Start on Jul. 11 & end on Sept. 3 (8 weeks)

Number	P4
Project title	Formation of nanomaterials for lithium ion battery, lithium sulfur battery, metal-air battery and supercapacitor
Description of the research	The research will focus on the synthesis of nanomaterials such as carbon nanotubes, oxide nanomaterials and single atom catalysts for novel applications in the field of the energy storage including metal ion battery, metal air battery, and supercapacitors.
Mentor in CCU	**Prof. Yuan-Yao Li** Dept. of Chemical Engineering, National Chung Cheng University, Taiwan, ROC. (e-mail: chmyyl@ccu.edu.tw)
Expected student level	☐ Post-graduate student ☐ Third-year undergraduate junior student ■ Both
Intern period	■ Start on Jul. 4 & end on Aug. 20 (7 weeks) ■ Start on Jul. 11 & end on Aug. 27 (7 weeks) ■ Start on Jul. 18 & end on Sept. 3 (7 weeks) ■ Start on Jul. 4 & end on Aug. 27 (8 weeks) ■ Start on Jul. 11 & end on Sept. 3 (8 weeks)

Number	P5
Project title	Computer vision applications based on deep learning techniques
Description of the research	This research is to do researches on computer vision based on the modern deep learning (machine learning) techniques. In this research, you will learn deep learning techniques such as CNN, RNN, LSTM, AE, VAE, etc. The possible applications and topics include: (1) 3D human skeleton extraction, skeleton-based action recognition, action prediction for elderly monitoring, (2) depth estimation from mono- binocular images, (3) 3D object (vehicle, pedestrian, cyclist) detection and positioning from fusion of RGB/LiDAR sensor data, (4) maples robot navigation based on deep reinforce learning (DRL), (5) object (head/vehicle/human/object) pose estimation from single RGB image, (5) deep learning-based by-product prediction for clinic medicine use. The intern student is expected to have some preliminary knowledge on NN (neural network) or deep learning and skilled in Python programming. He/She will learn how to apply state-of-the-art deep learning techniques to solve the indicated problems.
Mentor in CCU	**Prof. Wen-Nung Lie** Dept. of Electrical Engineering, National Chung Cheng University, Taiwan. (e-mail: ieewnl@ccu.edu.tw) Youtube: https://youtu.be/tIwenpyFRhw
Expected student level	☐ Post-graduate student ☐ Third-year undergraduate junior student ■ Both
Intern period	☐ Start on Jul. 4 & end on Aug. 20 (7 weeks) ☐ Start on Jul. 11 & end on Aug. 27 (7 weeks) ☐ Start on Jul. 18 & end on Sept. 3 (7 weeks) ■ Start on Jul. 4 & end on Aug. 27 (8 weeks) ■ Start on Jul. 11 & end on Sept. 3 (8 weeks)

Number	P6
Project title	(a) Experimental study of O_3 density in an atmospheric-pressure helium dielectric barrier discharge reactor. (b) Numerical modelling of O_3 density in an atmospheric-pressure helium dielectric barrier discharge reactor.
Description of the research	Atmospheric-pressure helium dielectric barrier discharges (APHeDBDs) have been developed extensively in the last two decades for various biomedical applications such as wound healing, cancer treatment, and sterilization due to the efficient generation of reactive species. Ozone species plays an essential role in discharge chemistry and applications due to its high reactivity. The ozone molecules generated by an APHeDBD reactor will be measured by using ultraviolet absorption spectroscopy (UVAS) with theoretical model developed for interpretation. A chemical model including the generation of ozone species will be built in conjunction with the development of plasma fluid model for simulating the evolution of ozone species in the DBD reactor. The simulated results will be compared with the experimental measurements to valid the model developed. Further analysis will be conducted to investigate essential mechanisms in an APHeDBD reactor for ozone generation.
Mentor in CCU	**Assoc. Prof. Kun-Mo Lin** Dept. of Mechanical Engineering National Chung Cheng University, Taiwan, ROC. (e-mail: kmlin.tw@gmail.com)
Expected student level	☐ Post-graduate student ☐ Third-year undergraduate junior student ■ Both
Intern period	■ Start on Jul. 4 & end on Aug. 20 (7 weeks) ■ Start on Jul. 11 & end on Aug. 27 (7 weeks) ■ Start on Jul. 18 & end on Sept. 3 (7 weeks) ■ Start on Jul. 4 & end on Aug. 27 (8 weeks) ■ Start on Jul. 11 & end on Sept. 3 (8 weeks)

Number	P7
Project title	Implementing evaluation scenarios in B5G/6G communication of IMT-2030
Description of the research	This project is to build topologies and derive environmental channel conditions in several generally accepted scenarios which contain focused B5G/6G challenges in the IMT-2030, such as a hybrid network consisting of disparate networks including fixed, mobile cellular, high-altitude platforms, satellites and others yet to be defined. The B5G/6G will also bring previously fictional technology capabilities within the reach of users: three-dimensional holographs providing fully-immersive virtual and augmented reality and an extraordinary user communications experience. The outcome of this project can be used in realization, visualization, demonstration, evaluation, and calibration of future B5G/6G communication systems in IMT-2030. For related information, please refer to the website of our lab at https://sites.google.com/view/ccuantlab/english
Mentor in CCU	**Assoc. Prof. Jen-Yi Pan** Dept. of Communications Engineering, National Chung Cheng University, Taiwan, ROC. (e-mail: jypan@ccu.edu.tw)
Expected student level	☐ Post-graduate student ☐ Third-year undergraduate junior student ■ Both
Intern period	■ Start on Jul. 4 & end on Aug. 20 (7 weeks) ■ Start on Jul. 11 & end on Aug. 27 (7 weeks) ■ Start on Jul. 18 & end on Sept. 3 (7 weeks) ■ Start on Jul. 4 & end on Aug. 27 (8 weeks) ■ Start on Jul. 11 & end on Sept. 3 (8 weeks)

Number	P8
Project title	Renewable Energy Studies for Power Systems
Description of the research	This project covers the issues of renewable energy integration on power systems. It covers wind power control, power system simulation, renewable power forecasting and other associated issues.
Mentor in CCU	**Prof. Yuan-Kang Wu** Dept. of Electrical Engineering National Chung Cheng University, Taiwan, ROC. (e-mail: allenwu@ccu.edu.tw)
Expected student level	☐ Post-graduate student ☐ Third-year undergraduate junior student ■ Both
Intern period	☐ Start on Jul. 4 & end on Aug. 20 (7 weeks) ☐ Start on Jul. 11 & end on Aug. 27 (7 weeks) ☐ Start on Jul. 18 & end on Sept. 3 (7 weeks) ■ Start on Jul. 4 & end on Aug. 27 (8 weeks) ☐ Start from Jul. 11 & end on Sept. 3 (8 weeks)

Number	P9
Project title	Object localization and recognition of autonomous vehicles via camera, Lidar, and radar
Description of the research	Based on the sensed signals from cameras, Lidars and radars from the open datasets, please design deep neural networks to figure out object localization and recognition of autonomous vehicles.
Mentor in CCU	**Prof. Oscal Tzyh-Chiang Chen** Dept. of Electrical Engineering National Chung Cheng University, Taiwan, ROC. (e-mail: oscal@ee.ccu.edu.tw)
Expected student level	☐ Post-graduate student ☐ Third-year undergraduate junior student ■ Both
Intern period	■ Start on Jul. 4 & end on Aug. 20 (7 weeks) ■ Start on Jul. 11 & end on Aug. 27 (7 weeks) ■ Start on Jul. 18 & end on Sept. 3 (7 weeks) ■ Start on Jul. 4 & end on Aug. 27 (8 weeks) ■ Start on Jul. 11 & end on Sept. 3 (8 weeks)

指導教授/導師同意書
Advisor's Consent Form

茲同意本校學生_____

Hereby agree the student (full name on the passport)

現就讀於_____ 大學_____系

(Currently enrolled at the Department of the University)

於_____年_____月_____日至_____年_____月_____日

from (year) (month) (day) until (year) (month) (day)

至國立中正大學進行實習。

to have an internship at National Chung Cheng University.

姓名：_____ /_____

Name of consent (中文姓名) (英文姓名)

關係：□指導教授 □導師 □其它：_____

Relationship: Advisor Mentor Other

職稱：_____ 服務單位名稱：_____

Profession Title Name of department/institution

電子信箱：_____

E-mail address

簽名：_____

Signature

日期：_____(年 / 月 / 日)

Date (year/month/day)

Attention comments:

1. National Chung Cheng University reserves the right to change or cancel the internship program.
2. The internship applicant shall submit this form with other application materials when applying.